

CUTLER HYDROELECTRIC PROJECT

FERC NO. 2420

Proposed Technical Study Plans

Volume III

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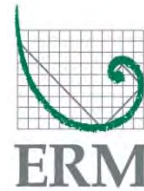


PROPOSED TECHNICAL STUDY PLANS

CUTLER HYDROELECTRIC PROJECT FERC NO. 2420

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**CUTLER HYDROELECTRIC PROJECT
FERC No. 2420****PROPOSED TECHNICAL STUDY PLANS****TABLE OF CONTENTS**

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PROPOSED TECHNICAL STUDY PLANS**CUTLER HYDROELECTRIC PROJECT
FERC PROJECT NO. 2420****PACIFICORP
SALT LAKE CITY, UTAH****1 OVERVIEW**

1.1 INTRODUCTION

PacifiCorp is the licensee, owner and operator of the Cutler Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 2420. The Project is located on the Bear River in Cache and Box Elder counties in Utah, approximately 3-miles west of the city of Logan at the closest point, on approximately 9,500 acres of lands owned and managed by PacifiCorp. PacifiCorp operates the Project under a 30-year license issued by the FERC on April 29, 1994. Because the current license is due to expire on March 31, 2024, PacifiCorp initiated the formal relicensing process utilizing the Integrated Licensing Process (ILP) by filing the Notice of Intent (NOI) and Pre-Application Document (PAD) with the FERC on March 29, 2019.

PacifiCorp initiated early contact with stakeholders, as described in the PAD (Section 2.0 and 3.5). The process started with a public event on February 13, 2019, the purpose of which was to inform the public about the Project and upcoming opportunities to participate in the relicensing process.¹ On June 25, 2019, PacifiCorp hosted an additional workshop (in parallel to the relicensing process) to create opportunities for stakeholders to identify questions and potential issues that would be appropriate for the relicensing process and provide comments on the proposed Technical Study Plan (Study Plan) annotated outlines.² On June 26 and 27, 2019, the FERC hosted two Scoping Meetings (a morning and afternoon session)^{3,4} and a site visit. These workshops helped develop a common understanding of the issues to be addressed during the relicensing. Stakeholders provided input on draft proposed Study Plan annotated outlines that

¹ [Cutler Relicensing Public Workshop – Meeting Summary \(February 13, 2019\)](#)

² [Cutler Relicensing Stakeholder Workshop – Meeting Summary \(June 25, 2019\)](#)

³ [Transcript of the morning Scoping Meeting \(June 27, 2019\)](#)

⁴ [Transcript of the afternoon Scoping Meeting \(June 27, 2019\)](#)

were developed in response to the previous workshops and other stakeholder input. Stakeholders were invited to provide comments on the PAD, Scoping Document 1 (SD1), and to propose any additional studies by July 29, 2019; these comments are summarized in the Response to Comments Table for Proposed Study Plans (Appendix A).

PacifiCorp invited federal and state agencies, non-governmental organizations (NGO) and Native American Tribes and tribal organizations to participate in the public meeting, workshops, scoping meeting and site visit.

During these meetings and through eLibrary submission, stakeholders and PacifiCorp identified the need to conduct the studies contained in this proposed Study Plan. This proposed Study Plan details the study objectives, study area, methods and schedule for each study. Appendix A provides a table summarizing stakeholders' comments on the proposed Study Plan annotated outlines, the PAD, and SD1, and how PacifiCorp addressed those comments. If PacifiCorp did not incorporate a comment or accommodate a request, PacifiCorp provided rationale based on Project-specific information with references to the FERC ILP Study Plan criteria (when applicable), which is outlined in Appendix A and Section 5.

Section 7 of the PAD (Volume I)⁵ summarized identified issues and provided an overview of the Technical Study Program that PacifiCorp believes will address questions regarding Project impacts. The Response to Comments Table for Proposed Study Plans (Appendix A) summarizes how PacifiCorp addressed comments raised by stakeholders during the public meetings, workshops and scoping meetings.

It is PacifiCorp's belief that the proposed Study Plans, as revised and detailed from the previous outlines, captures the appropriate range of issues that the FERC and stakeholders identified during its scoping process under 18 Code of Federal Regulation (CFR) § 5.8 (Notice of Commencement of Proceeding and Scoping Document) and § 5.9 (Comments and Information or Study Requests). The Revised Technical Study Plan will contain a history of all comments received during the process.

⁵ The PAD was submitted as two volumes. Volume I contained the Notice of Intent to File Application for New License, and the PAD. Volume II contained all Appendices.

1.2 PROJECT DESCRIPTION

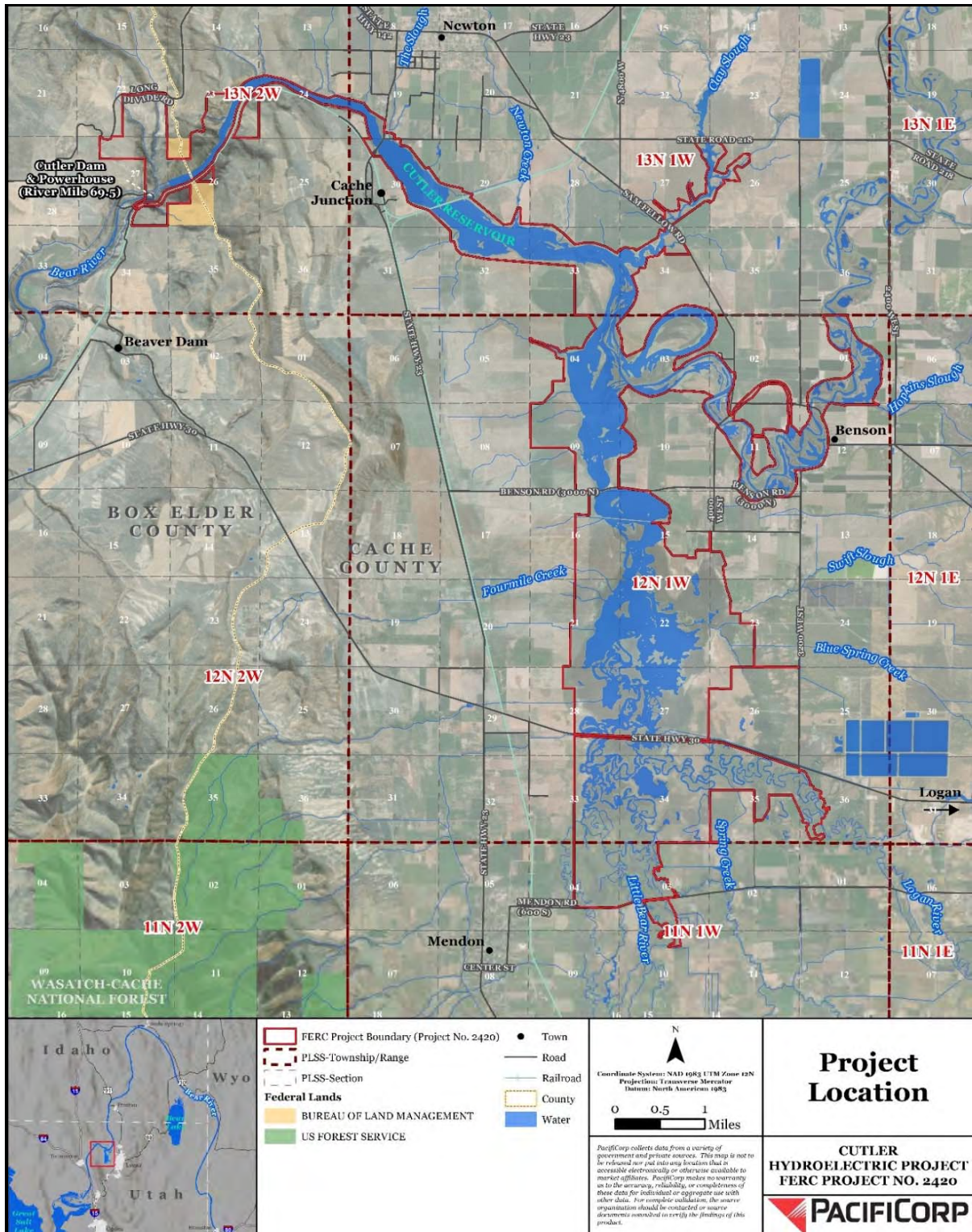
The Project facilities are located in northern Utah in Box Elder and Cache counties, northwest of the city of Logan. The Project's facilities are sited along the Bear River or its tributaries. The Bear River is the largest tributary to the Great Salt Lake, both in length and volume. Project facilities are located on private lands (Figure 1-1).

The Bear River is a 350-mile-long river that forms a large U-shape around the northern end of the Wasatch Mountain Range spanning across southwestern Wyoming, southeastern Idaho and northeastern Utah. The mainstem of the Bear River begins at elevation 8,510 feet at the confluence of Hayden Fork and Stillwater Fork in the Uinta Mountains in Summit County, Utah. The tributary drains mountainous areas and farm lands northeast of the Great Salt Lake and southeast of the Snake River Plains, forming an approximately 7,500-square-mile basin (Figure 1-2).

The Bear River is identified as the longest river in North America that does not reach the ocean. From the Uinta Mountains, the Bear River flows north towards Wyoming, through the town of Evanston, then meanders along the Wyoming-Utah state border, until it turns west into Idaho, past the city of Montpelier where it meets with the Bear Lake Outlet Canal that flows from Bear Lake. At the north end of the Wasatch Range near the city of Soda Springs, Idaho, the Bear River makes a U-turn and heads south past the towns of Grace and Preston, Idaho, and Cornish and Newton, Utah. Once entering Utah, the Bear River meanders through the Bear River Bottoms and turns north again as it flows through the Project. After passing Cutler Dam, the river flows through the Bear River Migratory Bird Refuge and ends in the Great Salt Lake.

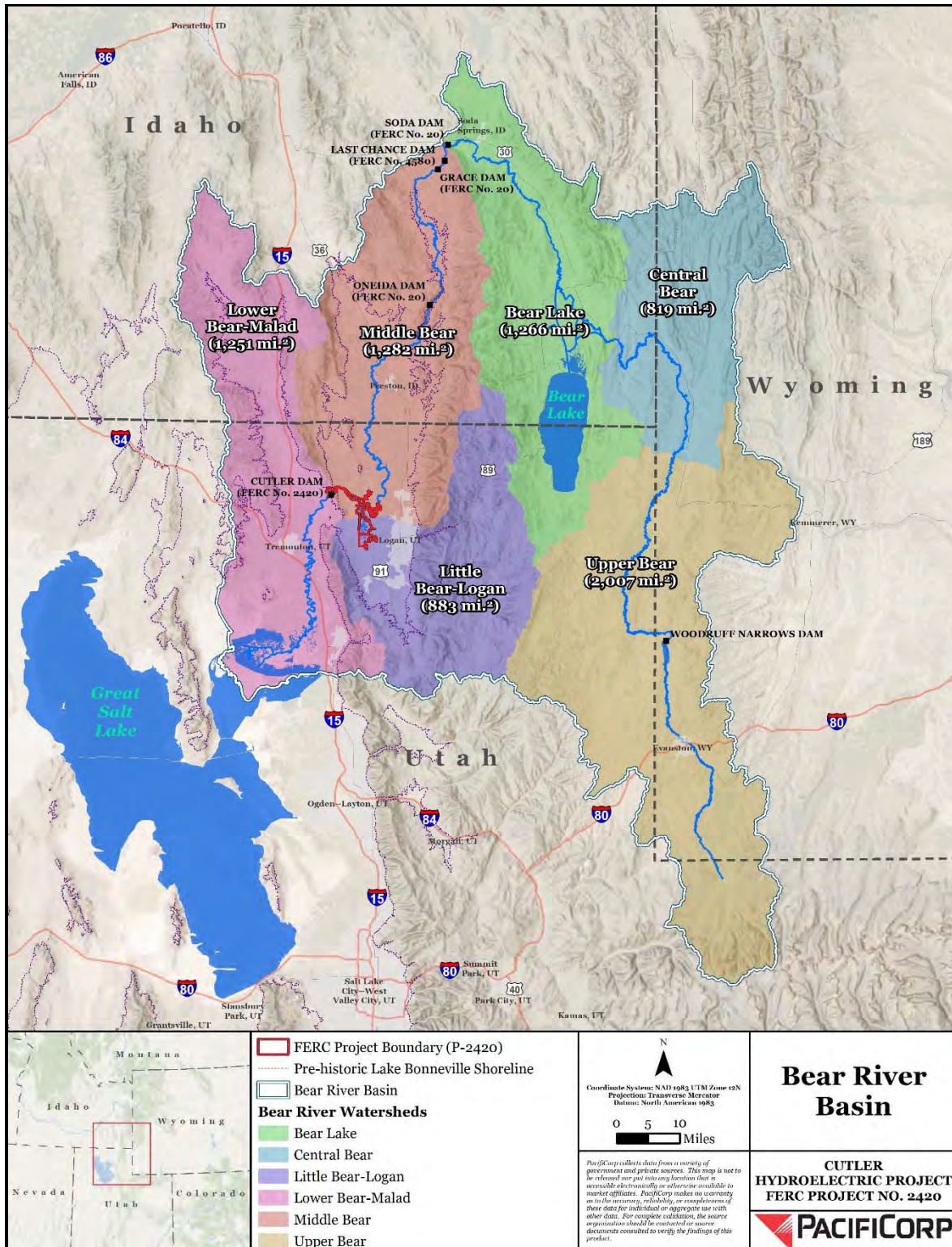
The hydrology of Bear River is heavily influenced by dams and diversions that are used for agricultural and hydroelectric purposes. On the mainstem of Bear River in the Bear River basin downstream of Bear Lake and upstream of the Project, there are three hydroelectric plants and five dams. The Soda, Grace, and Oneida developments were all licensed together 16 years ago as the Bear River Project (FERC No. 20). Additionally, Last Chance (FERC No. 4580), Cutler (FERC No. 2420), Paris (FERC No. 703), and the Lifton Pump Station at Bear Lake, are all owned by PacifiCorp and operated in a coordinated fashion, although all hydropower generated is subordinate to the irrigation water rights that are diverted through the system. The Project is

heavily influenced by the nearby agricultural lands in all three states it traverses; there are an estimated additional 450 irrigation companies that own and operate other water withdrawal and delivery systems within the Bear River watershed.



Source: PacifiCorp 2018

FIGURE 1-1 CUTLER PROJECT LOCATION MAP



Source: PacifiCorp 2018

FIGURE 1-2 BEAR RIVER BASIN AND PRE-HISTORIC LAKE BONNEVILLE SHORELINE

1.2.1 FACILITIES (EXISTING AND PROPOSED)

PacifiCorp is not proposing any modifications to generation facilities for the next license term.

The Project consists of a reservoir with a surface area of approximately 5,459 acres, with storage of approximately 13,200-acre-feet at a normal maximum operating elevation of 4,407.5 feet, mean sea level (msl), a concrete gravity arch dam that has an overall length along the centerline of the crest of 545 feet including two irrigation canal intakes near the top at the abutments (109-foot-high by 7-foot-wide at its narrowest location), a gated-overflow spillway that contains four 30-foot-wide by 14-foot-high radial gates with crest elevation at 4,394.5 feet, a 7-foot-diameter low-level opening located near the base of the dam controlled by a slide gate (currently non-operational due to upstream siltation), an intake tower and cylinder gate with a maximum travel of 17.75 feet to full open, two irrigation canal intakes (on either side of the dam), a 1,157-foot-long by 18-foot-diameter steel flowline, an 81-foot-high by 45-foot-diameter Johnson Differential surge tank, two steel bifurcating penstocks, a brick powerhouse, two General Electric generating units with a total installed capacity of 30 megawatts (MW), two vertical Francis turbines, a 115 kilowatt (kw) emergency generator, and all appurtenant facilities.

A more detailed Project description and photographs of these features are provided in the PAD.

1.2.2 OPERATIONS (EXISTING AND PROPOSED)

PacifiCorp is proposing to modify operations for the next license term that would enable the Project to participate in the western Energy Imbalance Market (EIM).⁶

Since the Project became operational, power markets have undergone changes in sources of generation and how power is marketed and distributed. The rapid growth of alternative power generation requires adjustments to how traditional baseload power is integrated with the new sources. PacifiCorp operates the Project by diverting flows from the Bear River. Although the Project is typically operated in a run-of-river mode, some of the 13,200-acre-foot storage capability of the reservoir can be utilized for minor load-following purposes when sufficient inflows are available. PacifiCorp is considering a suite of operational scenarios described in

⁶ PacifiCorp intends on conducting an operations test in 2020 to better inform the Study Plan results.

Section 5.5 of the PAD that will be evaluated during their licensing studies; an operational plan will be proposed in the draft and final license applications, with ample opportunity provided to stakeholders for comments.

In summary, PacifiCorp proposes to evaluate the impacts of modifying the minimum authorized pool elevation. PacifiCorp will evaluate the full operating range from elevation 4,406.0 feet to elevation 4,395.0 feet (down 11 feet), and adjusting the tolerance range from ± 0.25 foot to ± 0.5 foot (up and down an additional 3 inches). These values represent the maximum range PacifiCorp proposes to explore, for purposes of managing increased daily, weekly, and seasonal reservoir elevation fluctuations. PacifiCorp is not proposing to permanently lower the reservoir an additional 11-feet, but rather to find an operational range that would allow the Project to be responsive to the short-term demands and load changes that have resulted from grid integration of solar and wind generation resources and the challenges of the EIM.

PacifiCorp is not proposing any changes to the operation and maintenance (O&M) of the Project. More information and a detailed description of the current and proposed Project operations are provided in Section 5.5 of the PAD.

1.3 PROVISIONS FOR PERIODIC PROGRESS REPORTS

PacifiCorp will follow the standard FERC Study Plan reporting and meeting sequence. After the proposed studies are conducted, PacifiCorp will provide progress reports and study results to stakeholders. PacifiCorp will file an Initial Study Report (ISR), according to the FERC-approved Study Plan Schedule, which would describe the progress of implementing the Study Plan, schedule, and any changes to the studies or new proposed studies. A Study Plan meeting with stakeholders and the FERC staff will take place within 15 days of the ISR filing, and PacifiCorp will file a meeting summary within 15 days of the meeting. If necessary, a second study season and Updated Study Report (USR) will be conducted.

1.4 IMPLEMENTATION SCHEDULE FOR STUDY PROGRAM

Table 1-1 provides the FERC's required timeline for ILP pre-filing activities. The proposed relicensing schedule was modified after the PAD was filed to accommodate actual filing deadlines based on known dates. The timeline below represents estimated dates for pre-filing

activity (using FERC regulations for filing the Draft and Final License Application). An estimated proposed master schedule for implementation of individual studies that captures the start and completion of each study is provided in the Proposed Study Plan Master Schedule (Appendix B).

TABLE 1-1 CUTLER RELICENSING TIMELINE FOR ILP PRE-FILING ACTIVITIES

| ILP ACTIVITY | ANTICIPATED FILING DATE* | DAY OF THE WEEK |
|--|--------------------------|-----------------|
| Scoping Meeting | 6/27/19 | Thu |
| Comments on PAD, SD1 and Study Requests Due | 7/29/19 | Mon |
| File Proposed Study Plan/FERC Issues SD2 | 9/11/19 | Wed |
| Study Plan Meeting | 10/8/19 | Tue |
| Comments on Study Plan Due | 12/9/19 | Mon |
| File Revised Study Plan | 1/6/20 | Mon |
| Comments on Revised Study Plan Due | 1/21/20 | Tue |
| FERC Study Plan Determination | 2/5/20 | Wed |
| <i>File Study Disputes (if necessary)</i> | <i>2/25/20</i> | <i>Tue</i> |
| <i>Select Third Dispute Resolution Panel Member</i> | <i>3/2/20</i> | <i>Mon</i> |
| <i>Convene Dispute Resolution Panel</i> | <i>3/11/20</i> | <i>Wed</i> |
| <i>File Comments on Study Disputes §5.14(i) NLT than 25 days</i> | <i>3/23/20</i> | <i>Mon</i> |
| <i>Dispute Resolution Panel Technical Conference</i> | <i>3/31/20</i> | <i>Tue</i> |
| <i>Issue Dispute Resolution Panel Findings §5.14(k) NLT than 50 days</i> | <i>4/15/20</i> | <i>Wed</i> |
| <i>Issue Director's Study Dispute Determination §5.14 (l) NLT than 70 days</i> | <i>5/5/20</i> | <i>Tue</i> |
| Conduct First Year Studies | 2020 | |
| File ISR §5.15(c)(1) (1 year, minus 30 days; ISR report filed on day 365) | 2/4/21 | Thu |
| ISR Agency Meeting §5.15(c)(2) | 2/19/21 | Fri |
| ISR Meeting Summary Filed | 3/8/21 | Mon |
| <i>Conduct Second Year Studies</i> | 2021 | |
| <i>File USR** (1 year, minus 30 days; USR report filed on day 365)</i> | <i>2/4/22</i> | <i>Fri</i> |
| <i>USR Agency Meeting</i> | <i>2/21/22</i> | <i>Mon</i> |
| <i>USR Meeting Summary Filed</i> | <i>3/7/22</i> | <i>Mon</i> |
| File PLP/DLA*** (150 days before Final Application due date) | 11/2/21 | Tue |

* If date falls on Saturday or Sunday, deadline was moved to the following Monday

**USR Updated Study Report

***PLP Preliminary Licensing Proposal/DLA Draft License Application

Given the degree of early consultation completed to date (both within the relicensing process and throughout PacifiCorp's additional stakeholder outreach), PacifiCorp determined on a case-by-case basis whether some studies could be implemented prior to the FERC's formal Study Plan Determination. Criteria for early implementation included: 1) need of the proposed study to

inform other studies (i.e., Hydraulic and Sedimentation studies); 2) high degree of confidence that all questions and concerns addressed by the stakeholders have been addressed; and 3) opportunities for completing studies early enough to have robust conversations with relicensing stakeholders on appropriate protection, mitigation and enhancement (PME) measures that may be part of the license application. To date, only one study will likely be completed in 2019 (Threatened and Endangered Species Study as there is only one known federally-listed species in the Project Area, and no habitat for other potential federally-listed species; see the PAD and Threatened and Endangered Species Study Plan for additional discussion regarding threatened and endangered species).

1.5 PROPOSAL FOR STUDY PLAN MEETING

As required by 18 CFR § 5.11(e), PacifiCorp proposes to hold a Study Plan meeting within 30 days after the proposed Study Plan is filed for purposes of clarifying the proposed Study Plan and any initial information gathering or study requests. The Study Plan meeting will be held on Tuesday, October 8, 2019 (location to be determined). Similar to past meetings and workshops, there will be a morning and afternoon session to best accommodate the public's schedule.

1.6 PROPOSED STUDY PLAN MASTER SCHEDULE

PacifiCorp created a master schedule (Proposed Study Plan Master Schedule; Appendix B) for proposed studies that includes the tentative date ranges for the start and completion of each study season, for filing 6-month progress reports, the ISR, and other pertinent dates based on their relevance to the individual proposed study plan. These milestones are outlined in Appendix B. A schedule for 2021 study implementation, if necessary, will be proposed at a later time.

2 TERRESTRIAL AND BOTANICAL PROPOSED STUDY PLANS

2.1 THREATENED AND ENDANGERED SPECIES PROPOSED STUDY PLAN (TERR 1)

2.1.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The Endangered Species Act (ESA) was passed in 1973 to protect those plants, animals, and associated habitats that are in danger of becoming extinct. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Agency (NOAA) National Marine Fisheries Service (NMFS). Terrestrial and freshwater species are the primary responsibility of the USFWS. Species may be listed as endangered or threatened under the ESA. Endangered species are “in danger of extinction throughout all or a significant portion of its range.” Threatened species are “likely to become endangered within the foreseeable future” (USFWS 2017).

Information concerning threatened and endangered species relevant to the Project is summarized in Section 6.7 of the PAD. As described in Section 6.7, one federally-listed species, Ute ladies’-tresses orchid (*Spiranthes diluvialis*), is known to occur in and near the Project Area. A large population occurs near the Project Area in the Bear River Land Conservancy’s Mendon Meadow Preserve while a smaller population occurs within the Project Boundary (SWCA 2018). Other federally-listed species are unlikely to occur in the Project Area due to habitat restriction or range constraints, as described in the PAD.

The nexus between Project operations and effects on threatened and endangered species is how O&M of the Project under a new license could potentially affect federally-listed species, specifically Ute ladies’-tresses orchid. Proposed changes in Project operations will affect water levels, which are an essential parameter in this species’ habitat requirements. These changes are expected to vary across the Project Area and will be studied specifically in areas of suitable habitat for the orchid.

The rationale for this study is that federal projects/actions must comply with the ESA. Under authority of the ESA, the USFWS requires assessment of potential effects of a proposed project or action. Information regarding the presences of Ute ladies’-tresses orchid in the Project Area is necessary to assess potential effects. Therefore, field surveys utilizing survey methodology based

on USFWS recommendations are necessary for this species, as is assessment and disclosure of the potential effects of proposed operational changes on the species and its habitat.

2.1.2 STUDY GOALS AND OBJECTIVES

The Threatened and Endangered Species Study Plan addresses the following goals and objectives:

- Identification of federally listed and other protected plant and terrestrial/aquatic wildlife species potentially occurring in the Project Area, as described in the PAD. Ute ladies'-tresses orchid is the only federally listed species known to occur in or near the Project Area. The occurrence of the species within the study area is based on limited surveys conducted during a single season. This study will more systematically assess and survey the Project Area to estimate the extent of the occurrence of this species within the Project Area.
- Assessment of direct, indirect, and cumulative impacts on federally-listed species resulting from the proposed Project operating scenarios.

2.1.3 REVIEW OF EXISTING INFORMATION

The FERC must comply with the ESA in reissuing a Project license. The ESA and its implementing regulations require the lead federal agency of an undertaking to account for the effects of that undertaking on species listed under the ESA. In addition, certain segments of the public are also interested in rare species, particularly those that are listed under the ESA. This study will review and incorporate existing information related to the Ute ladies'-tresses orchid and its habitat within the Project Boundary. References for studies, reports, and other sources of information analyzed as part of this study are provided in this section as they are identified.

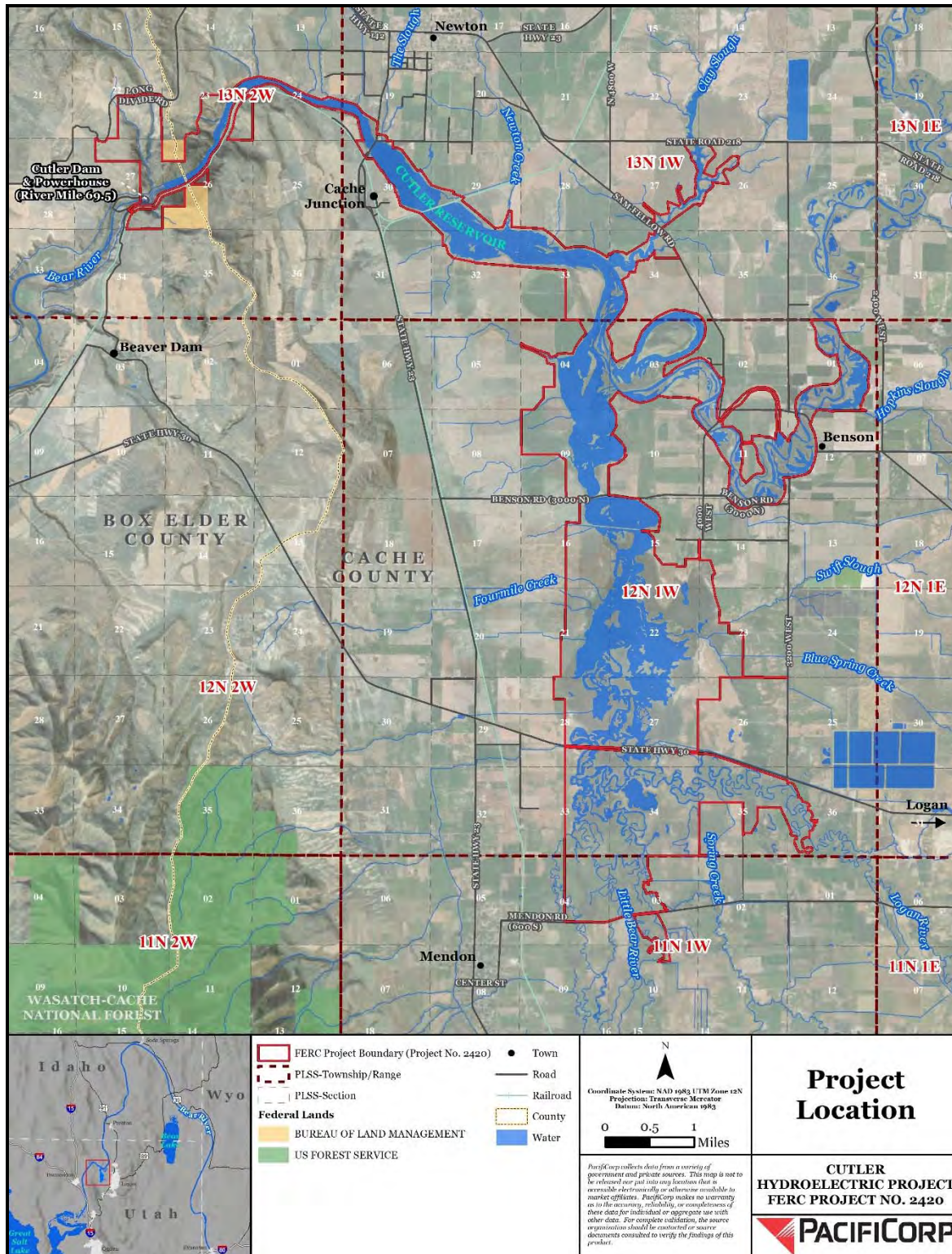
Information sources include but are not limited to the following:

1. US Fish and Wildlife Service. 1992. Interim Survey Requirements for Ute Ladies'-tresses Orchid (*Spiranthes diluvialis*).
2. PacifiCorp. 2019. Pre-Application Document. March 29, 2019.
3. Fertig, W. B., R. Black, and P. Wolken. 2005. Rangewide Status Review of Ute Ladies'-Tresses (*Spiranthes diluvialis*).
4. U.S. Wildflower's database of wildflowers for Utah, <https://uswildflowers.com/wfquery.php?State=UT>.

5. Biotics database. 2005. Utah Division of Wildlife Resources, NatureServe, and the network of Natural Heritage Programs and Conservation Data Centers.
6. Utah National Heritage Program. 2019. Data request/database search.

2.1.4 STUDY AREA

The study area for the Ute ladies'-tresses orchid includes the Cutler Reservoir Project Boundary (Figure 2-1). Surveys will focus on suitable habitat for this species, which include wet meadow and shoreline habitat. All surveyed areas will be located inside the Project Boundary, represented by the red outline below.



Source: PacifiCorp 2018

FIGURE 2-1 STUDY AREA FOR THE UTE LADIES'-TRESSES ORCHID SURVEY

2.1.5 METHODS

The Interim Survey Requirements for Ute ladies'-tresses orchid issued November 23, 1992 by the USFWS provides guidance for conducting surveys for Ute ladies'-tresses orchid (USFWS 1992). This methodology will be adapted to guide surveys within the Project Area. Typically, this survey protocol requires 3 years of surveys because the species may not flower every year. However, because Ute ladies'-tresses orchid is known to be present in the Project Area, a single year of surveys may suffice to confirm the current status of the population.

Following completion of the first year's survey (starting in 2019 and including the flowering window in August 2020), PacifiCorp will determine whether additional survey years are warranted based on consultation with regulatory agencies and stakeholders. Surveys must be conducted during the flowering window, typically late-July through August. Survey timing will be adjusted based on flowering morphology of nearby known populations.

Areas to be surveyed will include potentially suitable habitat based on the literature and the habitat where local populations are known to occur. The Project Area will be reviewed using a combination of aerial photo and field reconnaissance to determine areas where suitable habitat exists. As such areas are identified, they will be included in the detailed field surveys. Surveys are expected to focus on the South Marsh and the North Marsh areas of Cutler Reservoir.

2.1.6 SCHEDULE AND PERIODIC REPORTING

Surveys will focus on the late-July through August timeframe, when the Ute-ladies' tresses orchids are blooming and easier to locate. Existing data will be collected, organized, and used to prioritize field survey locations. Work can be conducted outside of the reservoir drawdown window in October 2019.

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

2.1.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Threatened and Endangered Species Study is within the range of \$40,000 to \$50,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific PME actions.

2.1.8 PROPOSED STUDY PLAN CONSULTATION RECORD

This proposed Study Plan was developed in collaboration with the stakeholders, including members of the public, agency representatives, NGOs and Native American Tribes. The intent of the collaborative process is to achieve consensus, to the degree possible, on the need for specific studies, the key resource questions to be addressed by the studies, the appropriate methodology and level of effort for the study.

No specific comments or suggested modifications were received for the Threatened and Endangered Species Proposed Study Plan TERR 1 (TERR1 Study Plan).

2.1.9 REFERENCES

- SWCA Environmental Consultants (SWCA). 2018. Ute Ladies'-Tresses Reconnaissance Survey Report. Prepared for PacifiCorp. September 2018.
- U.S. Fish and Wildlife Service (USFWS). 2017. Endangered Species: Endangered Species Act Overview. [Online] URL: <https://www.fws.gov/endangered/laws-policies/> Accessed December 6, 2018.
- U.S. Fish and Wildlife Service (USFWS). 1992. Interim Survey Requirements for Ute Ladies'-tresses Orchid (*Spiranthes diluvialis*). November 23, 1992.
https://www.fws.gov/utahfieldoffice/Documents/Plants/SPDI_interimSurveyRequirements_1992.pdf.

2.2 SHORELINE HABITAT CHARACTERIZATION PROPOSED STUDY PLAN (TERR 2)

2.2.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The proposed changes for Project operations may affect the type and amount of shoreline habitat available at Cutler Reservoir, including spreading invasive species. Changed operations may impact nesting birds by exposing isolated areas to terrestrial predators if water levels drop.

This study is necessary to comply with, or respond to federal regulations that protect shorebirds and their habitat, and matters of agency and public interest or concern.

2.2.2 STUDY GOALS AND OBJECTIVES

The Shoreline Habitat Characterization Study Plan addresses the following goals and objectives:

- Quantification of littoral habitat types.
- Characterization of emergent and adjacent wetland and upland vegetation.
- Mapping of invasive species.
- Assessment of the impact of proposed operational changes on these parameters and associated effects on terrestrial and amphibian wildlife.⁷
- Effects of the proposed changes in Project operations to be addressed in this Study Plan include:
 - The effect of reservoir fluctuations on riparian and wetland habitat and associated wildlife, including waterfowl, wetland-dependent birds, amphibian species, and other terrestrial wildlife dependent on riparian/wetland habitat.
 - Potential effects on upland wildlife habitat and associated wildlife.
 - The potential for introduction and spread of terrestrial and wetland/littoral invasive plant species within the Project Boundary.

2.2.3 REVIEW OF EXISTING INFORMATION

Relevant resource management goals in the 1995 Resource Management Plan (RMP) for Cutler Reservoir related to the Shoreline Habitat Characterization Study Plan include protect, enhance, and develop wildlife habitat.

⁷ Effects on fish and other aquatic species and impacts due to changes in littoral or loss of terrestrial habitat through erosion will be addressed in separate studies (see discussion below).

Input from stakeholders at public meetings relevant to this Study Plan focused on the potential for the spread of weeds. Therefore, a significant portion of this study will be dedicated to identifying existing weed infestations and analyzing how infested areas may change or spread as a result of changed Project operations.

This study will review and incorporate existing information related to shoreline characteristics and habitat within the Project Boundary. References for studies, reports, and other sources of information analyzed as part of this study will be provided as they are identified. This information may include but are not limited to:

1. Hydraulic Modeling Study Plan Report (to be completed) will provide locations where land bridges will form at various water levels in areas usually isolated by the current operation's water levels.
2. Sedimentation Study Plan Report (to be completed) will identify areas where sediment movement may impact shoreline habitat areas.
3. Land Use Study Plan Report (to be completed) will identify where shoreline erosion occurs and may expand.
4. Land Protection Plan – Bear River Watershed Conservation Area (USFWS 2013) will identify existing priority land areas and land management objectives.
5. Utah Wildlife Action Plan (UDWR 2015) is a plan for managing native wildlife species and their habitats under the ESA. UDWR Publication 15-14.
6. The Birds of North America (Rodewald, Cornell Lab of Ornithology 2019). Comprehensive resource for information about bird species in the area. Available for download at www.birdsna.org.

2.2.4 STUDY AREA

The shoreline habitat characterization study area lies within the ordinary high-water line (OHWL), which is generally defined by the current reservoir elevation range. It includes all shoreline and littoral habitat as well as any upland islands and peninsulas that might support breeding shorebirds, amphibians, and terrestrial wildlife dependent on riparian/wetland habitat. The invasive plant component may involve uplands beyond the littoral zone. All analyzed areas will be located inside the Project Boundary.

2.2.5 METHODS

2.2.5.1 EXISTING DATA AND LITERATURE REVIEW

The review of existing data will include bird species, amphibians, terrestrial wildlife, and weeds dependent on riparian/wetland habitat that are known to be or are likely present in the study area, and the data pertaining to their reproductive characteristics. Existing data sources may include published literature, studies conducted by PacifiCorp, studies conducted by state or federal agencies, studies conducted by Utah State University, eBird data, Breeding Bird Survey data, and data collected by other groups such as NGOs or non-profit groups.

Information about predator use of islands will be gathered from data review and discussion with managers at the USFWS Bear River Bird Refuge, located approximately 45 miles downstream of Cutler Reservoir. Information on existing weed infestations will be gathered from available sources including PacifiCorp, Cache County, and adjacent landowners.

2.2.5.2 VEGETATION CLASSIFICATION

Vegetation classification will be based on aerial imagery and LiDAR data collected in the fall of 2019. Imagery and ancillary LiDAR data will be processed using ENVI Feature Extraction object-oriented classification algorithms. This will be a broad classification identifying habitat types such as: short herbaceous vegetation, tall herbaceous vegetation, woody vegetation, and bare ground. Identification of some weeds such as *Phragmites* (i.e., invasive weeds) may be possible through this process.

The resulting classification will be field validated to ensure accuracy is sufficient for use in this analysis. The accuracy assessment will be conducted by generating stratified random points within each class, visiting those points in the field to determine the correct class, comparing the field-based class data to the algorithm-based class data, and calculating standard accuracy statistics.

Existing weed information, including that from Cache County, PacifiCorp, and adjacent landowners, will be incorporated along with incidental observations gathered during field surveys for Ute-ladies'-tresses orchids or accuracy assessment field efforts. No separate

systematic on-the-ground inventory of weeds in the Project Area will be conducted, but the annual PacifiCorp weed monitoring maps and data, incidental data collected during Ute-ladies'-tresses orchids surveys, and accuracy assessment efforts should provide coverage of a significant portion of the Project Area.

2.2.5.3 FIELDWORK

Beyond the data collection described above for the accuracy assessment of the vegetation classification and the weed data collected during Ute-ladies'-tresses surveys, some fieldwork will be conducted in 2019 during the proposed drawdown of the reservoir. This work will be focused on collecting data related to the formation and use of land bridges connecting islands in the reservoir to the shore. This would entail the placement and maintenance of approximately 10 cameras at and around important bird nesting sites.

2.2.6 SCHEDULE AND PERIODIC REPORTING

The data generated by the efforts described in Section 2.2.5 will be assessed in conjunction with the effects of proposed operational changes documented through the hydraulics modeling, bathymetry, and sedimentation studies to determine what the overall effects of the proposed changes in Cutler Reservoir operations will be. This will entail three primary analyses: 1) an analysis of how shoreline habitats, and by extension, how the species that use those habitats would be impacted as a result of changing operations, 2) an analysis of the existing weeds in the Project Area and potential changes that could occur as a result of changing operations, and 3) an analysis of the formation and use of land bridges connecting reservoir islands to the shore based pictures taken by cameras at important bird nesting sites.

The Shoreline Habitat Characterization Study Plan Report will be prepared documenting the analysis results. The report will include a summary of all collected information and discussion of the analyses and results. The Study Plan Report will address the following topics:

- Quantification of existing shoreline habitat types
- Current status of invasive plant infestations and potential for spread

- Potential impacts of changes in these parameters on habitat of terrestrial wildlife (primarily migratory birds) and amphibians
- Potential impacts on nesting birds due to exposing isolated areas to terrestrial predators if water levels drop

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, estimated filing date of the 6-month progress report, and the ISR.

2.2.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Shoreline Habitat Characterization Study Plan is within the range of \$60,000 to \$80,000. The proposed study effort is adequate to provide the level of information needed to understand project effects, impacts or benefits to the resource, and to determine the need for any specific PME actions.

2.2.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all Study Plans, and how comments were addressed in the TERR2 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

2.2.9 REFERENCES

- Rodewald, P. (Editor). 2015. The Birds of North America: <https://birdsna.org>. Cornell Laboratory of Ornithology, Ithaca, NY.U.S. Fish and Wildlife Service. 2013. Land protection plan—Bear River Watershed Conservation Area. Lakewood, CO: U.S. Department of the Interior, U.S. Fish and Wildlife Service, Regions 1 and 6. 227 p.
- Utah Division of Wildlife Resources (UDWR) 2015. Utah Wildlife Action Plan Joint Team. 2015. Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listing under the ESA. Publication number 15-14. Utah Division of Wildlife Resources, Salt Lake City, Utah, USA.

2.3 LAND USE PROPOSED STUDY PLAN (TERR 3)

2.3.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The proposed Project operations will allow greater fluctuations in reservoir surface elevation than currently occur, resulting in several potential land-use impacts. Irrigation water withdrawal at existing diversions and pump sites could be hampered, interfering with use of existing water rights if proposed operations changes occurred during the irrigation season. Fences in place to control livestock movement could be bypassed below the OHWL, providing an opportunity for livestock trespass and/or escape. Increased fluctuations in the reservoir elevation could induce increased bank erosion, reducing adjacent agricultural/grazing land and wildlife habitat as well as impacting scenic quality. Scenic quality could be degraded by exposed reservoir bed. Several of these potential effects will vary according to the timing and duration of changes in reservoir elevation.

Sections 7.1.9 and 7.1.10 in the PAD describe the nexus between the proposed Project operation and land use and aesthetic resources, respectively. Irrigation pumps currently withdraw water at many locations along the reservoir shoreline for irrigation purposes. Some irrigators are part of PacifiCorp's Agricultural Lease Program, while others use non-Project-related irrigation, domestic, and industrial water rights. Canal companies that divert from the reservoir will likely not be affected based on the range of elevations that are being considered. Pumped withdrawals could be impacted depending on the location and elevation of each structure, and the actual variability of the reservoir elevations. Surface elevations at the southern end of the reservoir will be relatively slow to respond to a change in pool elevation compared to the north end. However, the overall depth and gradient of the reservoir are shallow. As a result, the horizontal distance between the historic and proposed minimum pool shorelines could be more drastic in lower gradient areas.

Livestock fences are used to manage grazing in pastures adjacent to the Cutler Reservoir. Some fence lines terminate at the shoreline or slightly below the OHWL. This design prevents livestock from moving past the end of the fence into an adjacent pasture. PacifiCorp has altered most of the grazing leases to include a setback distance from the shoreline in support of bank stability and improved water quality. However, there are some grazed areas where this was not

possible. Any pastures without grazing setbacks and buffer or boundary fences that terminate at the shoreline may need to extend fencing to account for the full range of proposed operating pool elevations.

The proposed change in operations could have impacts on reservoir bank erosion and stability. Any increase in bank erosion could lead to loss of shoreline lands and areas used for wildlife habitat, livestock grazing, and agriculture. Eroding banks could also contribute to water quality degradation and potential impacts on aquatic species. Potential impacts on water quality and aquatic species will be addressed in the Study Plans for each of those resources.

Aesthetic resources have improved dramatically in the past 30 years, due primarily to implementation of the Vegetation Enhancement Plan, which is part of the 1995 Resource Management Plan for the Project. Efforts have focused on removal of car bodies from the banks, establishing a vegetated shoreline buffer, bank stabilization, and fencing to exclude agricultural use from the shoreline. Section 7.1.10 in the PAD states “there are currently no known issues regarding scenic quality within the Project Area or associated with the Project facilities or operations.”

The proposed operations could impact scenic quality in several ways. In addition to increased bank erosion, the proposed operating range could expose previously submerged areas of the reservoir bed where shallow, low-gradient conditions exist. Depending on the range of reservoir elevation changes in the proposed operating regime, these areas may appear as barren mud flats. These repeatedly exposed mud flats could also become colonized by invasive weeds, such as *Phragmites*. Eroding banks and shorelines will remove vegetation and potentially increase turbidity in combination with disturbed bed sediment. Each of these impacts could be detrimental to the existing level of scenic and habitat quality at Cutler Reservoir.

2.3.2 STUDY GOALS AND OBJECTIVES

The goals and objectives of the Land Use Study Plan center on characterizing the processes and potential impacts of fluctuating water levels on land use and aesthetic resources. The Study Plan specifically focuses on water withdrawal infrastructure, fences used for livestock management, shoreline erosive features and control structures, and large-scale impacts on aesthetic resources,

specifically scenic quality, from key, high-use viewpoints and areas of frequent recreational use. Addressing impacts on these resources will help PacifiCorp meet resource management goals for Cutler Reservoir (PacifiCorp 1995).

2.3.3 REVIEW OF EXISTING INFORMATION

The 1995 RMP for Cutler Reservoir includes conditions found in Article 402 of the FERC license as well as goals and recommendations from agencies, advisory groups, and the public. Resource management goals in the RMP that are related to this Study Plan include: enhance water quality; protect, enhance, and develop wildlife habitat; enhance scenic quality; and provide agricultural land-use opportunities (PacifiCorp 1995). Reducing erosion from shorelines, river channel banks, and fields will help meet RMP goals for water quality, wildlife habitat, and aesthetic resources. Identifying potential impacts on water withdrawals will help maintain irrigation and agricultural land-use opportunities.

Considerations identified by stakeholders related to this Study Plan are discussed in the FERC scoping document (FERC 2019) and the PAD (PacifiCorp 2019). Other considerations have been gathered during public meetings hosted by PacifiCorp with the intent of identifying specific concerns from stakeholders. Some of the concerns expressed by the public include potential impacts of existing and proposed Project operations on:

- Water withdrawals and the Bear River water rights that support withdrawal at each location
- Discharge from the nearby Logan City Wastewater Treatment Facility (WWTF)
- Reservoir bank erosion and potential loss of shoreline lands that currently include buffers, wildlife habitat, and property leased for agricultural land use
- Channel bank erosion downstream of Cutler Dam resulting from water level fluctuations
- Scenic quality at recreation sites and other high-use view points on and near Cutler Reservoir

2.3.4 STUDY AREA

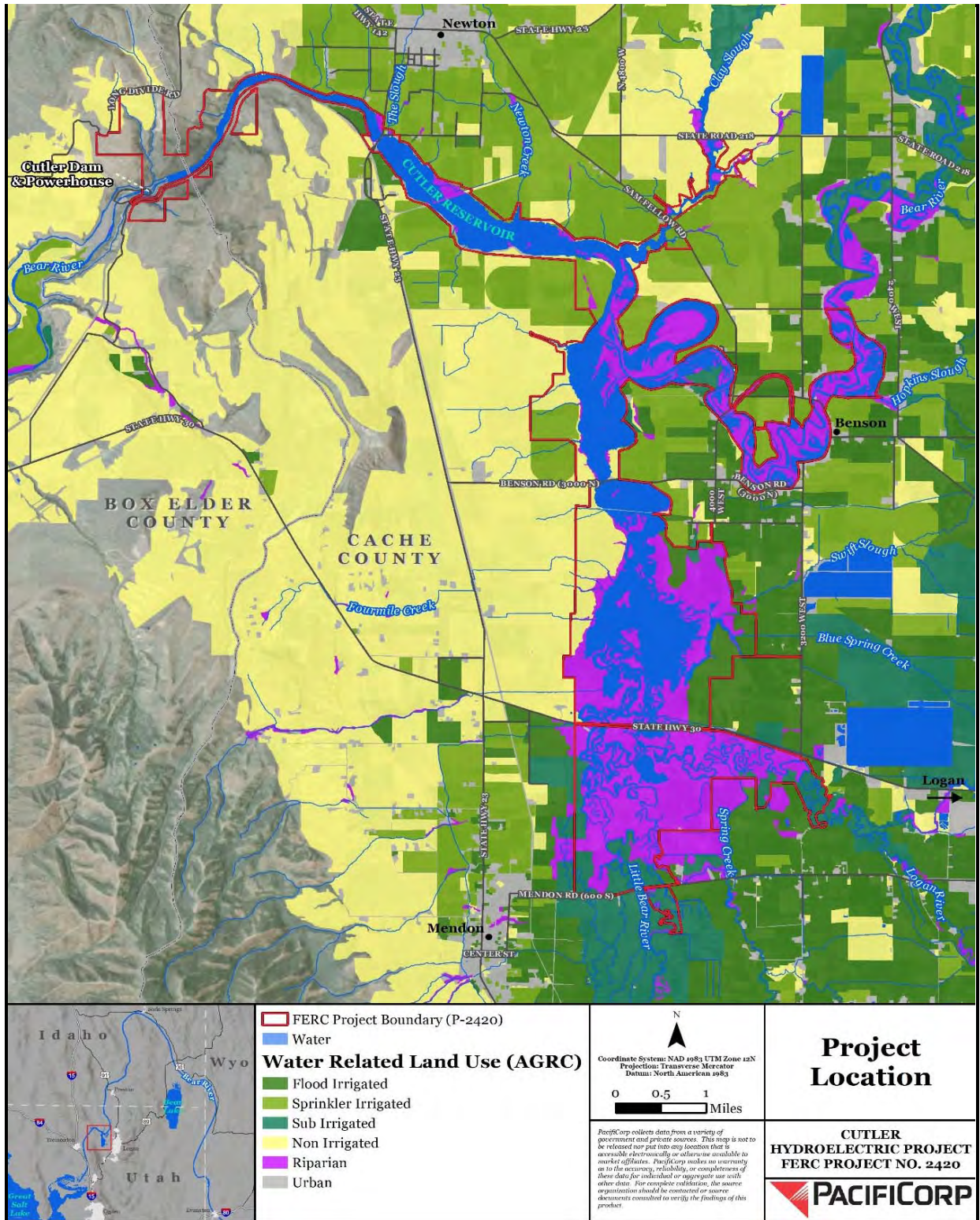
The land use component of this Study Plan focuses on the shoreline of Cutler Reservoir, adjacent areas immediately above and below the OHWL defined by the current range of reservoir elevations, and select locations on the Bear River downstream of Cutler Dam (Figure 2-2)

Existing water withdrawals occur along the reservoir shoreline. Irrigation pumps are typically used to pull water from the reservoir into canals, ditches, pipes, and other infrastructure that distribute water away from the reservoir. The proposed study area for pumped withdrawals includes all points of withdrawal from Cutler Reservoir, typically below the OHWL. The study area incorporates surface structures (e.g., weirs or headgates) that regulate flow into irrigation systems.

Reservoir shorelines, stream channel banks, and other morphologic features that could be impacted by fluctuating water are included in the study area for eroding banks. The location of some existing erosion sites and erosion-control measures are currently known. There could potentially be additional sites where substantial erosion or instability exist. The study area for eroding banks is accordingly defined as the entire reservoir shoreline, reservoir tributaries, and the Bear River downstream of Cutler Dam. Eroding banks downstream of Cutler Dam will be studied at select locations. All other erosion study sites will be inside the existing FERC Project Boundary.

The proposed study area for fences is limited to sites where fences terminate at the water's edge.

The aesthetic resources component of this Study Plan targets developed recreational sites on the reservoir as well as viewpoints outside the Project Boundary where large numbers of viewers experience vistas that include the reservoir.



* Select locations will be monitored on the Bear River below Cutler Dam, not shown in this figure.

FIGURE 2-2 PROPOSED LAND USE STUDY AREA

2.3.5 METHODS

PacifiCorp proposes to assess potential impacts on land and aesthetic resources in four general areas as described below.

2.3.5.1 CHARACTERIZE WITHDRAWAL INFRASTRUCTURE

All water withdrawal infrastructure associated with Cutler Reservoir will be inventoried for location, condition (e.g., active versus inactive)⁸, and water rights. Data collection will include existing records, photo interpretation, and field surveys. Existing coverage of irrigation canals and points of withdrawal will be screened prior to field surveys to identify the best access route to each site.

Field surveys of each site will include georeferenced pictures, a description of the irrigation structure type (e.g., pump, irrigation gate, dam safety components, low-level gate), and condition.

Where possible, the location of withdrawal below the OHWL will be recorded with a Global Positioning System (GPS). Field survey measurement data will be organized into geographic information system (GIS) coverage and a database.

Water rights associated with each withdrawal structure will be primarily determined from location and identifying information collected in field surveys. Based on this information, point of diversion coverage maintained by Utah Division of Water Rights (DWRi) will be consulted to connect each withdrawal structure with the associated water right. Given the age of some infrastructure and the status of the Utah DWRi database, it may not be possible to establish the water right for every diversion.

2.3.5.2 CHARACTERIZE FENCES

All fences that terminate below the OHWL defined by the current reservoir elevation range of Cutler Reservoir will be inventoried for location and condition. Existing fence locations included

⁸ Active versus inactive (e.g., physical appearance and other indicators of active operation).

in PacifiCorp mapping coverage will be used to develop field maps and screen potential field survey sites. Aerial imagery may also be consulted to assist in ensuring no fences are missed.

Each fence that terminates at or below the OHWL will be inventoried. Georeferenced pictures of each site will be taken to indicate general fence condition and how the terminal fence end appears in regard to water surface elevation (WSL). Field notes at each site will include a description of the fence condition and need for repairs or potential retrofit (i.e., extension). Results of the fence inventory will be organized into GIS coverage and a database.

2.3.5.3 CHARACTERIZE EROSION FEATURES AND CONTROL STRUCTURES

Erosion features and erosion-control measures in the Cutler Reservoir shoreline area will be inventoried for location and condition. Currently eroded sites, sites with the highest potential for shoreline and channel bank erosion, and sites where PacifiCorp has undertaken erosion-control measures (i.e., plantings, buffers, and fencing) will first be identified using available annual monitoring database and mapping information, and discussions with PacifiCorp employees who are familiar with the area and past erosion-control efforts. Targeted field surveys of these sites will follow. Aerial imagery will be consulted as necessary.

The Bear River downstream of Cutler Dam will be studied at representative locations to identify potential impacts from fluctuating water levels. These areas will be monitored during experimental releases from Cutler Dam in 2020 to simulate discharge under the proposed change in reservoir management. The results of the channel erosion field survey will be used in combination with modeled reservoir discharge from Cutler Reservoir to identify potential bank erosion during different times of the year and at different locations.

Field surveys of erosion features will include georeferenced photos; GPS locations; field estimations of height and length; and observations of instability, slumping, cracks, and recent disturbance by livestock or recreational use. Existing erosion control structures will be identified in the field. Each structure or other type of measure will be inventoried with georeferenced photos and additional GPS measurements. Needs for repair or retrofit of control measures will be made with consideration of potential impacts due to increased reservoir fluctuations. All field survey results will be organized in a GIS coverage and a database.

2.3.5.4 CHARACTERIZE VISUAL AESTHETICS

Current visual aesthetics will be documented with a series of photographs, using photographic techniques to simulate the functioning of the human eye. Photo points will include all 15 developed recreation sites operated by PacifiCorp on the reservoir as well as two viewpoints outside the Project Boundary from which public travelers are exposed to panoramic views of the reservoir and its surroundings. Single images reflecting the visitor's primary view will be recorded at each recreation site. The viewpoints outside the Project Boundary are on Highway 30 where it turns westward to drop into Cache Valley and on the Long Divide Road east of the summit dropping down toward Plymouth. These are the only routes into the valley offering views of Cutler Reservoir in the valley bottom.

2.3.6 SCHEDULE AND PERIODIC REPORTING

An ISR will be prepared documenting the study analysis results. The report will include a summary of all collected information, followed by discussion and interpretation of the analyses and results. Some topics will use the results of LiDAR, hydraulic modeling, and the sediment study to determine shoreline and water depth in the vicinity of potentially affected resources resulting from proposed operation scenarios.

All field survey data will be organized in a GIS project and spreadsheets. Field photos will be linked to GIS coverage. Analysis of data will identify direct, indirect, and cumulative impacts on these resources resulting from the proposed Project operations. The topics and results of analysis in the report will include the following:

- Water withdrawal infrastructure (as necessary)
- Fences
- Erosion features and control structures
- Aesthetic resources

To assess impacts on water-withdrawal infrastructure, results of hydraulic modeling will be used to determine a WSL at the Cutler Dam where each withdrawal site will be impacted. The results will largely be a listing of withdrawal points affected at critical elevations that reflect potential management scenarios for maximum reservoir drawdown below full pool, including but not

limited to, 1.5 feet, 3 feet, and full drawdown levels. Discussion will introduce other factors such as drawdown timing and duration. The current FERC license requirements for managing Cutler Reservoir require that water rights are met under any reservoir management scenario. Results from the impact analysis on water-withdrawal infrastructure will identify critical minimum surface elevations and help ensure this requirement is met.

Planned hydraulic modeling will be used to determine the elevation for each fence survey site when the terminal end of the fence will be exposed, leaving enough exposed bed surface for livestock to pass around the end of the fence. Results will be reported in the form of a listing of fences affected at the 3-foot and full drawdowns (as measured at Cutler Dam). Discussion will introduce other factors such as drawdown timing and duration.

Potential effects on erosion features and control structures will be determined on the basis of their current condition and the anticipated impacts of proposed operational changes, as evidenced by the 3-foot and full drawdown scenarios. Interpretation will address issues such as the potential for exposing erodible features that have previously been submerged, downstream bank erosion including impacts from ice movement, and potential for undercutting or otherwise destabilizing erosion control measures.

Impacts on aesthetic resources, specifically scenic quality, will be completed using information on the amount and extent of exposed areas resulting from a 3-foot and a full drawdown of the reservoir completed in October 2019. Baseline photographs of the reservoir at popular recreation sites around the reservoir and other scenic viewpoints (see Methods discussion above) will be compared to duplicates from the same viewpoints, using the same equipment and methods, during the two phases of drawdown.

The methodology used to describe and interpret differences among the photos will be derived from the publication *Landscape Aesthetics: A Handbook for Scenery Management* (USFS 1995), *Agriculture Handbook 701*, developed by the U.S. Forest Service (USFS) for similar ecosystem management applications. Scenic integrity objectives will be developed that incorporate PacifiCorp's RMP, existing landscape character, and public expectations for Cutler Reservoir's visual aesthetics. Baseline and drawdown photos will then be assessed relative to these scenic

integrity objectives using the basic landscape variables of form, line, color, and texture as they occur in this setting. Interpretation will address the effects of seasonality.

All study results will be shared with the recreation and shoreline habitat studies, as well as others as appropriate, to determine the full impact of proposed changes on each resource.

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

2.3.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Land Use Study Plan is within the range of \$85,000 to \$125,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

2.3.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the TERR3 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

2.3.9 REFERENCES

Federal Energy Regulatory Commission (FERC). 2019. Scoping Document 1. Cutler Hydroelectric Project Utah. Project No. 2420-054.

Kleinschmidt Associates (Kleinschmidt). 2018. Cover page photo of the Cutler Reservoir. Matthew Harper.

PacifiCorp. 2019. Cutler Hydroelectric Project FERC No. 2420 Pre-Application Document Volume I – Main Document. March 2019.

PacifiCorp. 1995. Resource Management Plan for the Cutler Hydroelectric Project FERC No. 2420. Prepared by PacifiCorp. Assisted by EDAW, Inc, Ecosystem Research Institute, and VESTRA Resources. July 1995.

U.S. Forest Service. (USFS). 1995. Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook 701. USDA Forest Service.

3 FISH AND AQUATIC PROCESSES PROPOSED STUDY PLANS

3.1 FISH AND AQUATIC PROPOSED STUDY PLAN (AQ 1)

3.1.1 PROJECT NEXUS AND RATIONALE FOR STUDY

This Fish and Aquatic Resources Study Plan has been prepared to evaluate the environmental conditions, including proposed changes in operations, of the Project for the FERC relicensing. Operation of the Project as proposed may have direct, indirect and/or cumulative effects on fish and aquatic resources.

The rationale for this study includes:

- Future operations may increase levels of reservoir fluctuations and depth of reservoir drawdown. Such actions may affect the aquatic organisms and their habitat; and,
- Information is lacking on benthic invertebrates and mollusks regarding their presence and potential exposure to proposed Project operations.

3.1.2 STUDY GOALS AND OBJECTIVES

The goal of this study is to determine the status of aquatic organisms and their habitat and characterize the benthic invertebrate and mollusk community within the Project Area; to evaluate the effects of a planned reservoir drawdown on the aquatic community; and to relate the drawdown effects to the proposed Project operational changes and the potential effects on the aquatic community within the reservoir and the reservoir zone of influence in the main tributaries.

Objectives will include:

- Summarize existing information on the aquatic organisms and their habitat residing in the Cutler Reservoir and its tributaries including the Bear River up to 2-miles downstream of Cutler Dam.
- Determine potential effects of the proposed fall 2019 reservoir drawdown on fish, mollusks, and macroinvertebrates and their habitat in Cutler Reservoir and downstream in the Bear River (e.g., stranding/displacement).

- Based on observations during the fall reservoir drawdown, determine potential effects of proposed Project operations on resident fish, macroinvertebrate, and mollusk habitat in Cutler Reservoir and the Bear River downstream of Cutler Dam.
- Provide information for National Environmental Policy Act (NEPA) analysis of the affected environment.

3.1.3 REVIEW OF EXISTING INFORMATION

In preparing this Study Plan, PacifiCorp reviewed existing information on aquatic species or relevant management plans for fishery, freshwater mollusks, and the benthic community (Budy et al. 2011, 2007, 2006; Dees 2007; Hovingh 2004; PacifiCorp 2018; Rogers 2017; SWCA 2010; USFWS 2001; UDNR 2017, 2000; UDWR 2019, 2016a, 2016b, 2009; USU 2018; and Wang et al. 2007). Results of this study will inform an evaluation of the proposed action for constancy with these plans.

3.1.4 STUDY AREA

The study area for aquatic resources contains all Project features (encompassing the Project Boundary), which extends, for the purposes of characterization and analysis, from the edge of the Project Boundary and within the reservoir zone of influence of each major tributary to the reservoir. The study area also includes the Bear River up to 2-miles downstream of the dam.

3.1.5 METHODS

3.1.5.1 EXISTING INFORMATION ON THE FISHERIES RESOURCE

Existing information on the fisheries resources in the Study Area will be collected and summarized. In addition, the Utah Division of Wildlife Resources (UDWR) completed an electrofishing survey of the Bear River downstream of Cutler Dam in June 2019. This work will serve to establish the current fishery community in the Bear River downstream of the Project and will be included in the summary document.

3.1.5.2 EFFECTS OF THE FALL RESERVOIR DRAWDOWN ON THE AQUATIC COMMUNITIES

A drawdown of Cutler Reservoir is planned for October 2019 for the purpose of obtaining LiDAR and bathymetry data of the reservoir data to populate a model that will inform PacifiCorp

in determining a range of alternatives for future operations. The drawdown will provide a unique opportunity to observe drawdown effects on the different resources and to relate those effects to proposed future operations.

For the fishery resources, observations of any stranding or isolation will be recorded in various locations throughout the reservoir during the drawdown and at the lowest reservoir elevation. Location of stranding areas and isolated pools will be identified and georeferenced. Because the isolated pools will likely be very turbid due to fish milling around, the field crew will seine each pond to determine fish presence and species. Species found stranded or in isolation pools will be identified, counted, and released to the main reservoir. If the number of fish is too great, then the numbers and percentage by species will be estimated. Also, if there are too many pools to seine or the pools are too large, then pools to sample will be randomly selected. In addition, large pools will be subsampled. This effort will require a minimum of four field personnel walking or boating to various sites in the reservoir to make observations.

UDWR proposes to locate and sample mollusks species in the reservoir drawdown zone and note elevations such that potential effects of proposed operations can be determined. UDWR will be requested to provide their data, georeferenced locations, and collection times which will be referenced to recorded reservoir elevations

A bioassessment of benthic macroinvertebrates (described below) will allow for a determination of proposed operations on this community.

3.1.5.3 RAPID BIOASSESSMENT OF BENTHIC MACROINVERTEBRATES

PacifiCorp will employ the Rapid Bioassessment technique (David et al. 1998) to determine the health of the benthic macroinvertebrate community. Survey sites will be established in each of the four reservoir units, as identified in the 2018 Cutler Hydroelectric Project Resource Management Plan Five-year Monitoring Report (PacifiCorp 2018). These units are delineated as: the South Marsh Unit, North Marsh Unit, Reservoir Unit, and Cutler Canyon Unit. A fifth unit was added as the Riverine Unit and identified as the 2-miles of Bear River downstream of Cutler Dam (Figure 3-1). Each unit will have between one and seven transects depending on the zone length. Transect locations will be identified for each unit. Potential study transects will be

selected in the field depending on accessibility. While locating the transects, investigators will take care to select sites that will not become dewatered during the drawdown. The protocol for this technique requires investigators to choose several representative transects in each unit and then randomly select which transect to sample in each unit. Each transect will have a minimum of four sampling sites along the transect line.

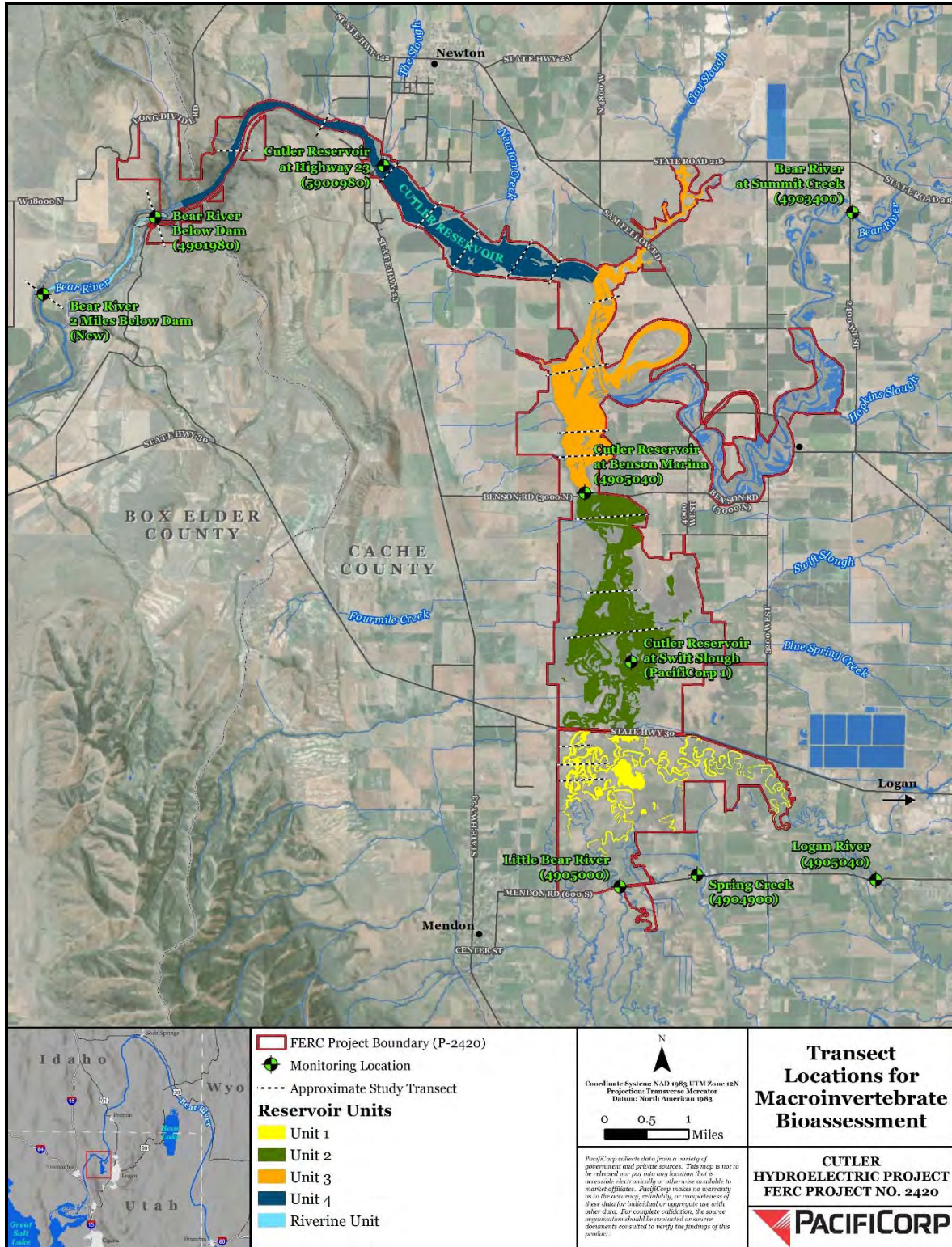


FIGURE 3-1 TRANSECT LOCATIONS FOR MACROINVERTEBRATE BIOASSESSMENT

Samples will be collected using either a kick-sampling method or a Ponar dredge depending on the depth. Each sample will be rinsed clean and the detritus removed to assure samplers that they

have enough organisms. Any detritus, rocks, wood, or other media are to be thoroughly cleaned and rinsed to remove any organisms that are clinging to those pieces. In addition, the samples will be washed through graduated sieves to remove silt and mud such that the sample is clean for processing in the lab. A critical component of a successful rapid bioassessment is for samplers to insure, in the field, that they collect at least 100 organisms at each sample site on a transect. All samples will be preserved in 95 percent ethanol and taken to a laboratory setting to sort and identify organisms. Organisms will be sorted to family for this exercise.

There will be a benthic macroinvertebrate survey prior to the drawdown. The baseline Rapid Bioassessment will occur in early October 2019 prior to the drawdown period. Transects will be selected using stratified random sampling with the strata being the four reservoir units and one riverine unit that were established for PacifiCorp's Cutler RMP monitoring efforts (PacifiCorp 2018). Endpoints for each transect line will be georeferenced, and two people are anticipated to conduct this work over 3 days. This study requires personnel to have specific training or certification in Rapid Bioassessment technique. Equipment needed includes GPS locator, small boat, kick net, Ponar Dredge, sample vials, graduated sieves, buckets, field notebook, small tools, and small brushes to clean substrates such as rocks, wood, and aquatic vegetation.

Following the reservoir drawdown to its lowest level, the Rapid Bioassessment study will repeat at the same locations as the baseline effort, recognizing that some sites will be shallower. If any site is dewatered, then sampling will move perpendicular to the shoreline along the transect line until adequate depth is reached for sampling (at least 1 foot).

3.1.5.4 FRESHWATER MOLLUSK SURVEY

During the drawdown planned for October 2019, a crew from UDWR plans to collect mollusk specimens. The crew will specifically plan to assess what native bivalves are present in the reservoir. The crew will look for non-native bivalves. PacifiCorp will assist UDWR with the effort and will note where native and non-native species are located within the potential operational zone and record reservoir elevations that are critical for bivalve survival.

3.1.5.5 DETERMINE POTENTIAL EFFECTS OF PROPOSED PROJECT OPERATIONS ON THE AQUATIC COMMUNITIES

Using a synthesis of existing information, collection of new information, and observations during the fall reservoir drawdown, an analysis of the potential effects of PacifiCorp's proposed operations on the aquatic communities will be completed.

3.1.6 SCHEDULE AND PERIODIC REPORTING

A Study Plan Report will be prepared documenting the analyses and results of the fish and aquatic community; also included will be a summary of all collected information and discussion of the findings. Specifically, the report will address the following:

- A summary of existing information on the fishery in Cutler Reservoir
- Information on the benthic macroinvertebrate and the mollusk communities including species presence and the extent of exposure to proposed Project operation
- A description and analysis of how proposed operations may affect the aquatic communities using elevation data from the reservoir drawdown and results from the reservoir modeling

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for individual studies implementation for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

3.1.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Fish and Aquatic Study Plan is within the range of \$65,000 to \$75,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

3.1.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all Study Plans, and how comments were addressed in the AQ1 Study Plan. If stakeholder comments were not

incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC’s Study Plan Criteria (18 CFR § 5.9).

3.1.9 REFERENCES

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3.2 WATER QUALITY PROPOSED STUDY PLAN (AQ 2)

3.2.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The Water Quality Study Plan is part of the overall Cutler Relicensing Study Plan to evaluate the environmental conditions, including proposed changes in operations, of the Project for the FERC relicensing. Continued operation of the Project as proposed may have direct, indirect and/or cumulative effects on water quality resources.

The rationale for this study includes:

- There is uncertainty as to how the proposed Project operations may affect water quality within the FERC Project Boundary and downstream of Cutler Dam; increased levels of reservoir fluctuations may affect water quality, especially turbidity, total phosphorus (TP) release from the reservoir sediments, and dissolved oxygen (DO);
- There is a need to determine the effects of the scheduled fall 2019 reservoir drawdown on water quality; especially TP, total suspended solids (TSS), and DO; and,
- Water quality information from past monitoring efforts by PacifiCorp, USU, and Utah Division of Water Quality (UDWQ) is readily available. However, because several entities have collected and stored data separately, PacifiCorp proposes to synthesize all existing data and collect additional data during the proposed 2019 drawdown to provide a complete understanding of water quality conditions in Cutler Reservoir and the surrounding aquatic environment, including the 2-mile stretch of Bear River downstream of Cutler Dam.

3.2.2 STUDY GOALS AND OBJECTIVES

The goal of this study is to characterize water quality within the reservoir and zone of influence in the main tributaries, including the Bear River for 2-miles downstream of Cutler Dam.

Objectives will include:

- Determine potential effects of continued and proposed Project operations on water quality of Cutler Reservoir and the Bear River downstream of Cutler Dam
- Determine the effects of the fall 2019 drawdown on water quality in the reservoir and downstream of Cutler Dam and relate those effects to the proposed operations
- Synthesize existing water quality information including PacifiCorp's 5-year Water Quality monitoring reports (PacifiCorp 2018), USU publications, and UDWQ periodic

water quality monitoring and the total maximum daily load (TMDL) study to characterize the overall Cutler Reservoir water quality environment

- If applicable, provide possible solutions to water quality problems identified
- Provide information for NEPA analysis of the affected environment

3.2.3 REVIEW OF EXISTING INFORMATION

Of all the studies and monitoring that has occurred on the Bear River and Cutler Reservoir, perhaps the most important and relevant water quality management issue is the TMDL study that was completed by SWCA for the UDWQ in 2010 (SWCA 2010). That study identified excessive TP and low DO as pollutants of concern and developed target levels for the TMDL study area. The impaired beneficial uses were:

- Class 3B: Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain, and
- Class 3D: Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.

Target allocations were set at the Southern Cutler Reservoir for the summer season to 16,121 kilograms (kg) of TP per season and the winter season to 12,091 kg TP per season, and at the Northern Cutler Reservoir for the summer season to 29,976 kg TP per season and the winter season to 25,713 kg TP per season.⁹

The defined target endpoints for Cutler Reservoir were set at:

Dissolved Oxygen

- 1-day minimum DO of 3.0 milligrams per liter (mg/L) throughout the water column
- 7-day average DO to be maintained above 4.0 mg/L
- 30-day average DO to be maintained above 5.5 mg/L

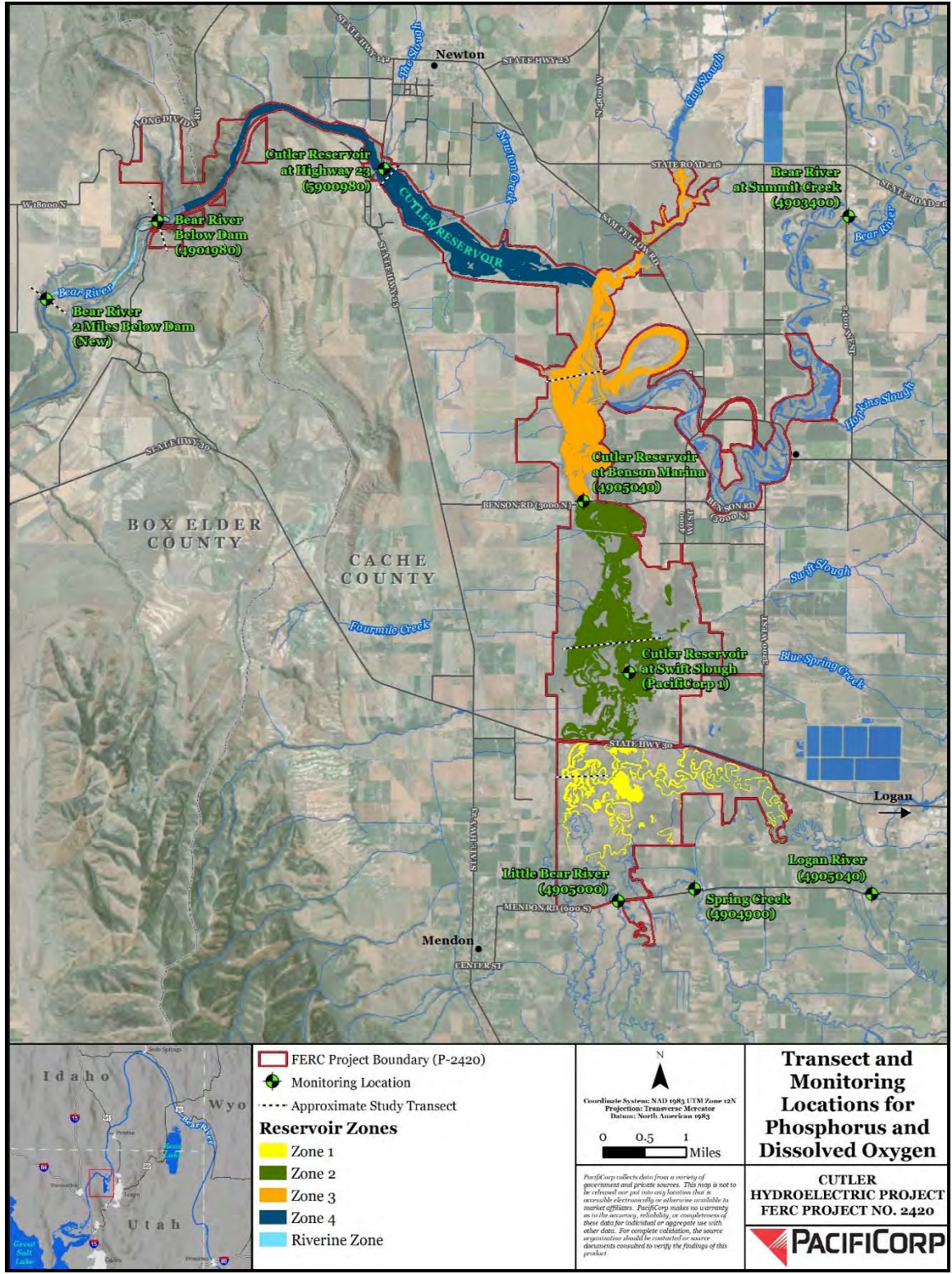
⁹ In the TMDL, the Northern Reservoir and the Southern Reservoir are separated by Benson Road.

Total Phosphorus

- TP concentration of no more than 0.075 mg/L at Cutler Dam outfall throughout the year
- Mean seasonal (May–October) TP concentration of less than 0.07 mg/L in the Northern Reservoir
- Mean seasonal (May–October) TP concentration of less than 0.09 mg/L in the Southern Reservoir

3.2.4 STUDY AREA

The study area for water quality contains all Project features (encompassed by the Project Boundary), which extends, for the purposes of characterization and analysis, from the edge of the Project Boundary up each major tributary within the reservoir zone of influence. The study area also includes the Bear River up to 2-miles downstream of the dam.



* In the TMDL, the Northern Reservoir and the Southern Reservoir are separated by Benson Road.

FIGURE 3-2 TRANSECT AND MONITORING LOCATIONS FOR PHOSPHORUS AND DISSOLVED OXYGEN

3.2.5 METHODS

3.2.5.1 SEDIMENT CHARACTERIZATION

Core samples of reservoir sediments will be collected and analyzed for the presence and concentration of nutrients and/or contaminants that may be stirred up and released into the water column during periodic drawdowns under the proposed Project operation.

This work will be conducted by the sediment modeling crew and shared for other resource area analyses (refer to Sediment Analysis Study Plan methods). Any relevant TP, dissolved TP and orthophosphate data from the core analysis will be provided and incorporated into this water quality analysis.

3.2.5.2 COLLECTION OF PHOSPHORUS AND DISSOLVED OXYGEN SAMPLES DURING THE FALL 2019 DRAWDOWN

For the purpose of making direct comparisons to data previously collected over the past 23 years, sampling transects for the drawdown will be established at the same reservoir water quality sampling stations used for PacifiCorp's monitoring reports. One exception is that a sampling station will be established 2-miles downstream of the Cutler Dam. Table 3-1 lists the proposed transect locations and number of samples per transect.

TABLE 3-1 SAMPLING TRANSECT LOCATIONS QUANTITIES

| TRANSECT | NUMBER OF SAMPLES ALONG TRANSECT |
|-------------------------------------|----------------------------------|
| Cutler Reservoir at Swift Slough | 5 |
| Cutler Reservoir at Benson Marina | 3 |
| Cutler Reservoir at Highway 23 | 3 |
| Bear River downstream of Cutler Dam | 3 |
| Bear River 2 miles below Cutler Dam | 3 |

Water samples will be collected to analyze TP, orthophosphate and DO at each sampling point along a transect near the surface and near the bottom. Total phosphorus and orthophosphate will be analyzed in an analytical laboratory while DO will be measured *In situ* using a DO probe. The dataset will incorporate sediment core analysis on phosphorus including TP, dissolved TP and

orthophosphate. This procedure will occur one week prior to reservoir drawdown and repeated within 2 days following the drawdown to the reservoir's lowest elevation.

3.2.5.3 SYNTHESIZE EXISTING WATER QUALITY DATA

PacifiCorp has collected and analyzed water quality in Cutler Reservoir and four tributaries every five years since 1996 (PacifiCorp 2002, 2008, 2013, 2018, 2019). All the data from these monitoring reports was summarized in the 2019 report. UDWQ has monitored water quality in the Bear River and Cutler Reservoir since about 1979 but much of that data has not been summarized and provided in a regular reporting cycle. USU has produced a number of reports, Master's theses, Doctoral dissertations, and faculty publications that provide a good data set that will be incorporated into a synthesis of all the existing data (e.g., Budy, et al. 2011; Dees 2007; Wurtsbaugh and Lockwood 2007) that will include side-by-side comparisons at similar sampling sites used in the past data collection efforts. If applicable, trend graphs may be incorporated in the synthesis report in an attempt to document any improvements or decrements in water quality conditions over the past several decades.

The collective data will be analyzed across seasons at sites that correspond with PacifiCorp's sampling sites; locations of these sites are also shown in Figure 3-3. These sites are:

- Logan River
- Spring Creek
- Little Bear River
- Cutler Reservoir at Swift Slough
- Cutler Reservoir at Benson Marina
- Bear River at Summit Creek
- Cutler Reservoir at Highway 23, and
- Bear River below Cutler Dam

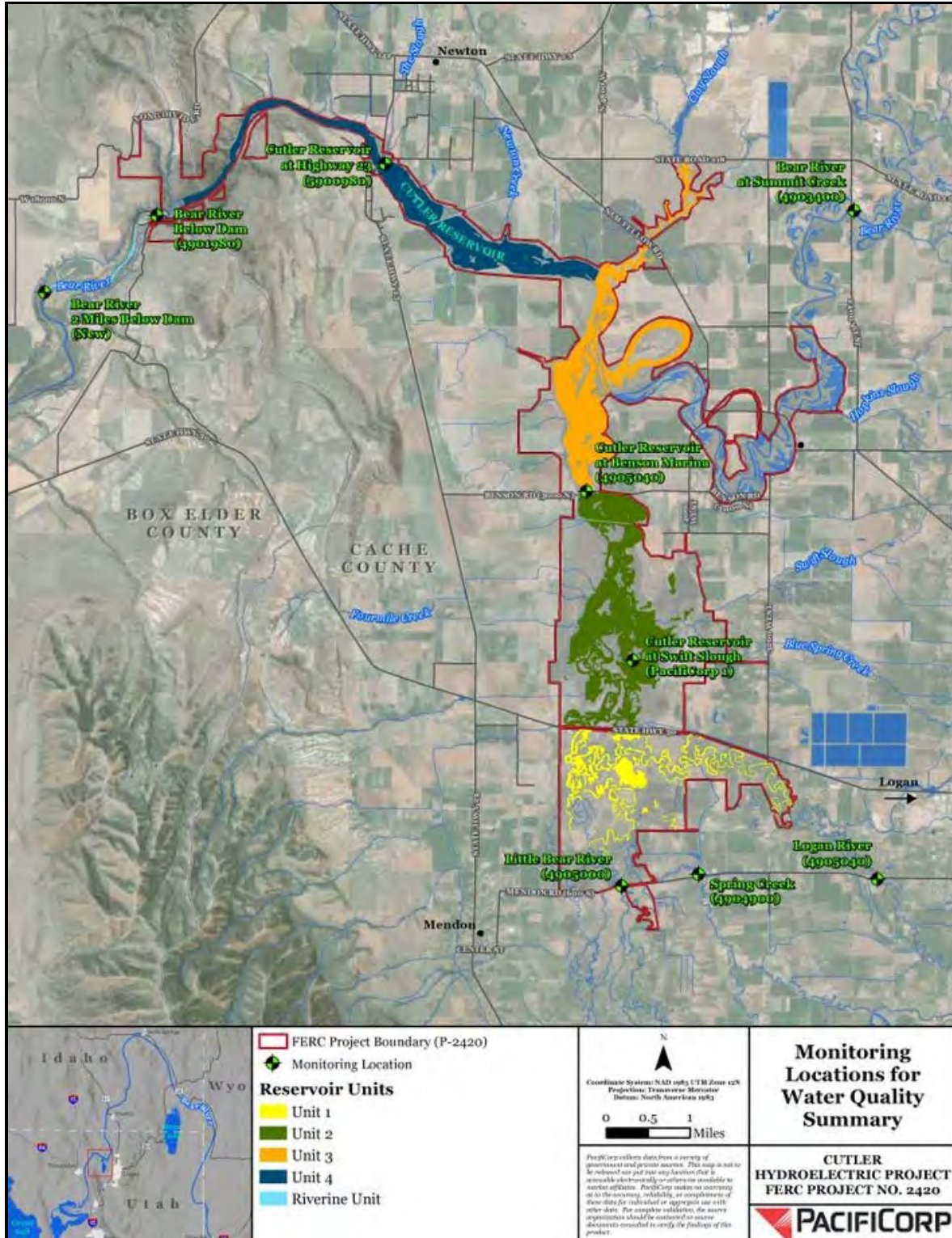


FIGURE 3-3 MONITORING LOCATIONS FOR WATER QUALITY SUMMARY ANALYSIS

A Study Plan report will be prepared documenting the analyses and results of the Water Quality Study; also included will be a summary of all collected information and discussion of the findings. Specifically, the report will address the following:

- Analysis of the reservoir sediments and the level of concentration of nutrients and/or contaminants and the extent to which they could enter the water column with the proposed Project operations
- A description and analysis of how proposed operations may affect water quality within the study area

3.2.6 SCHEDULE AND PERIODIC REPORTING

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

3.2.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Water Quality Study Plan is within the range of \$55,000 to \$65,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

3.2.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the AQ2 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

3.2.9 REFERENCES

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3.3 HYDRAULIC MODELING PROPOSED STUDY PLAN (AQ 3)

3.3.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The Hydraulic Modeling Study Plan will be used to evaluate the existing hydraulic conditions of the Project as well as assess the feasibility and potential impacts that may result from the potential change in operations as described in the PAD (PacifiCorp 2019).

A detailed hydraulic model of the Project has not yet been created. Proposed changes in the operation of the Project would change the way in which the system functions hydraulically; potentially affecting inundation boundaries, flow patterns, sediment transport capacity, and other hydraulic behaviors of Cutler Reservoir. Therefore, it is important to create a tool to evaluate potential Project operating scenarios, and analyze the potential effects of those scenarios.

To assess potential hydraulic impact from changes in Project operation, a baseline or existing conditions hydraulic model must also be established.

3.3.2 STUDY GOALS AND OBJECTIVES

The purpose of the Study Plan is to develop and collect data for calibration of both 1-dimensional (1D) and 2-dimensional (2D) hydraulic models of the Project Area to be used for hydraulic and sediment transport analysis. This includes portions of the Bear River upstream and downstream of the reservoir. A calibrated hydraulic model will provide a tool that could be used to predict impacts to the hydraulics and sediment transport for any changes to Project operation.

3.3.3 REVIEW OF EXISTING INFORMATION

This Study Plan will 1) review and incorporate existing or recently collected information related to any spatial, terrain, hydrologic and sediment data, and hydraulic modeling that has been previously completed within the Project Area; and 2) propose a hydraulic model to be used to address questions related to the impact of proposed changes in Project operations on water quality and quantity, as well as sediment transport and mobilization. In addition to informing most all of the other study plans, the results of this modeling effort will also inform discussions regarding potential impacts on water quantity and water delivery in the Project Area and the Bear River a short distance downstream of Cutler Dam.

The existing data will be reviewed and incorporated into the proposed hydraulic model, as appropriate. The following is an initial, but not necessarily complete list of data sources to be analyzed as part of this Study Plan (pending data availability):

- Hydraulic models of the Project Area
- Previous LiDAR and bathymetric surveys
- Bridge and other infrastructure hydraulic data
- U.S. Geological Survey (USGS) and PacifiCorp streamflow gage data
- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) data
- Other hydrological data or reports

3.3.4 STUDY AREA

The study area for the hydraulic modeling effort would include all facilities within the current Project Boundary, as well as portions of the Bear River downstream of Cutler Dam and upstream of the confluence with the Cutler Reservoir. The upstream and downstream extents of the original hydraulic model of the Project may be extended based on final model output deliverables and preliminary model results which incorporate updated data.

3.3.5 METHODS

To accomplish the goals and objectives of this study, PacifiCorp is proposing a variety of data review and collection to compile structural, spatial, terrain, and hydrologic data sets for the Project. More specific details on the methodology, timing and execution of the data collection effort are provided in Section 3.3.5.1 and in the Drawdown Elevation and Model Calibration Data Acquisition Plan (DEMCDAP) for the proposed 2019 drawdown.¹⁰ Details on the methodology, timing, and execution of the sediment data collection are provided in the Cutler Sedimentation Plan. Once compiled the data sets will be used as inputs and calibration data for a U.S. Army Corps of Engineers (USACE) HEC-RAS hydraulic model. The calibrated model will be used to develop an understanding of the existing hydraulic conditions, and then used to estimate the impacts of potential changes to Project operation on the hydraulic conditions,

¹⁰ Available once completed, upon request.

sediment transport capacity, and water, as well as answer questions posed by other proposed studies.

3.3.5.1 DATA COLLECTION

Updated LiDAR and aerial imagery will be collected during a drawdown of the reservoir to create a detailed terrain surface of the exposed reservoir bed that can be used for hydraulic model development. Detailed bathymetry data will be collected to supplement the areas of the reservoir bed that are still inundated at the maximum drawdown and are therefore not able to be surveyed using LiDAR. Pressure transducers will be placed at multiple locations to collect stage (elevation) data within the reservoir before the drawdown event. This data, along with the aerial images collected from the LiDAR survey, will be used to calibrate the model. Sediment core samples, suspended sediment concentrations, and depth to bedrock (where feasible) will be collected during and before reservoir drawdown. These data will be used as sediment transport model parameters as well as for calibration of the sediment transport model. More specific details on the sediment data collection are provided in the Cutler Sedimentation Plan and the DEMCDAP. Detailed evaluation of the hydrologic data gathered from surrounding existing USGS stream gages, PacifiCorp stream gages, and computed inflows to quantify groundwater contributions will be used to develop inflow hydrographs to the hydraulic model.

3.3.5.2 MODEL CONSTRUCTION

Using the updated LiDAR and bathymetry, both 1D and 2D hydraulic models of the Project and necessary surrounding reaches will be constructed. Creation of 1D and 2D hydraulic models will begin with creating a model base geometry, which is defined as 1D cross sections and 2D mesh areas that represent the reservoir, upstream tributaries, and downstream reaches. Once the base geometry is set up, the Cutler Dam structure will be added including the dam crest, spillway, gates, canals, and other features significantly affecting system hydraulics. The 1D model will be used to analyze sediment transport within the reservoir and the 2D model will analyze flow behavior, inundation boundaries, and other hydraulic characteristics of the Project Area.

3.3.5.3 MODEL CALIBRATION

The model will be calibrated based on data collected during the 2019 reservoir drawdown and will be performed in two phases. First, the model will be calibrated based on the hydraulics of the reservoir. This will include adjusting hydraulic parameters within the model to reproduce observed stage and flow recorded at USGS gage locations to reproduce observed discharges through Cutler Dam, inundation boundaries within the Project Area, and WSL data at specific points within the reservoir. Aerial photos collected during the drawdown will be used to verify the inundation boundaries during the drawdown. The second phase of model calibration will be calibrating the sediment transport within the reservoir. This will include adjusting the hydraulic and reservoir bed parameters to match the estimated sediment loading moving through the system during the drawdown. The sediment load will be estimated based on suspended sediment data collected downstream of Cutler Dam, and calculating sediment volume lost from the reservoir bed during the drawdown, based on the pre- and post-terrain surfaces developed from the LiDAR and bathymetry.

3.3.5.4 MODEL IMPLEMENTATION

Once the model is calibrated, it will be used to develop an improved understanding of the existing hydraulic, sediment transport, and water quality conditions under current operating procedures. The calibrated model will be used to estimate the impacts of potential changes to dam operation on channel hydraulics, sediment transport capacity, inundation boundary, and water quality. The model could also be useful in answering questions posed by other proposed studies. Finally, the calibrated model could be used to explore the feasibility and effectiveness of possible mitigation alternatives proposed by PacifiCorp or other stakeholders.

3.3.6 SCHEDULE AND PERIODIC REPORTING

A hydraulic modeling report will be prepared documenting the results of the hydraulic, sediment transport, and water quality evaluations and include a summary of all collected information and discussion of the analyses. The report will address the topics below:

Data Collection

- What data was collected
- Why the data was collected
- When the data was collected
- How the data was collected
- How the data was used in the modeling effort

Model Construction

- Model geometry
 - 1D HEC-RAS model creation and application
 - 2D HEC-RAS model creation and application
 - Manning’s roughness values (a representation of the conveyance areas resistance to flow--an increased Manning’s roughness will decrease velocities across that section)
 - Digital terrain data set
 - Structural data used in the model

Model Calibration

- What data was used for calibration
- Calibration results

Model Implementation

- Existing conditions (operation) results
- Proposed operational change results and impacts to reservoir hydraulics
- Proposed operational change impacts to other topics (to be determined)

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

3.3.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Proposed Hydraulic Modeling Study Plan is within the range of approximately \$130,000. Related preliminary data collection for the LiDAR and bathymetry will add an approximate \$335,000 to the overall cost of this study. The Study Plan would require four months to complete from the delivery of the final combined LiDAR/bathymetric terrain data set. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

3.3.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the AQ3 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

3.3.9 REFERENCES

PacifiCorp. 2019. Cutler Hydroelectric Project FERC No. 2420 Pre-Application Document Volume I – Main Document. March 2019.

3.4 SEDIMENTATION PROPOSED STUDY PLAN (AQ 4)

3.4.1 PROJECT NEXUS AND RATIONALE FOR STUDY

There have been few studies on sediment movement and the resultant potential effects on existing resources within the Project Boundary. In the PAD, Water Resource Section 6.3.10 outlines some of the concerns with sediment given the shallow nature of the southern and northern reservoir regions, with average depths of 1.8 feet and 3.6 feet, respectively. Movement of bed sediments may increase TSS and phosphorus in the water column affecting a number of resources.

The shallow depth and highly silted environment of the reservoir result from the continued import of fine sediment from the Bear River and spring runoff from tributaries entering the southern portion of Cutler Reservoir. Millions of tons of fine sediment were deposited in the Bear River, largely as a result of accelerated erosion due to irrigation practices over a century ago (Clyde 1953). Clyde (1953) estimated that as a result of this bench erosion and gully formation the Bear River bed elevation was raised in excess of 12 feet in places upstream of the Project, and some 6 million tons of sediment were deposited into Cutler Reservoir prior to 1950. Today the Bear River continues to transport these fine material deposits along with bank material into the reservoir.

The nexus for this study is consideration of proposed changes in Project operation that could have the potential to resuspend and mobilize bed sediments in key areas of Cutler Reservoir. Changing reservoir surface elevations may accelerate water velocity in reservoir areas that are prone to bed scour or potentially increase lateral scour and bank erosion. During periods of lowered elevation, and the potential complete or partial removal of the historic Wheelon Dam, shifts in deposited material may occur, leading to deposition in deeper zones. The internal movement of sediment could lead to the movement of phosphorus and other pollutants currently bound in bed sediment and affect water quality.

This study will improve the understanding of existing conditions as well as identifying the spatial and temporal extent of potential re-suspension and mobilization of bed sediments, with associated water quality effects, in Cutler Reservoir associated with operational changes. The

study will also address the practicability of dredging as a sediment management measure and assess its environmental effects.

3.4.2 STUDY GOALS AND OBJECTIVES

The Sediment Study Plan outlines a three-tiered study designed to address sediment composition, sediment deposition, and phosphorus in sediment throughout Cutler Reservoir.

The objective for defining sediment composition in the Project is to assess the role of potential sediment mobility under a range of operating conditions. Data collected will help provide the foundation for the sediment transport model discussed in the Hydraulics Study Plan. The combination of data collection and modeling will provide a management tool for PacifiCorp to model a range of operational conditions, and examine the effects on sediment.

Defining the volume and location of accumulated sediments in the reservoir will provide a detailed understanding of sediment deposition. A base map will be generated and used to determine pre-reservoir bed elevations and sediment depth. This will aid in decision-making processes and developing options to control sediment movement.

A final component of the sediment study is examining phosphorus composition and distribution in the Project Area. Phosphorus movement in the reservoir could affect water quality.

Phosphorus is one of the identified pollutants in the Middle Bear River and Cutler Reservoir Total Maximum Daily Load.

3.4.3 REVIEW OF EXISTING INFORMATION

Currently, there are no Resource Management Goals in the 1995 RMP for Cutler Reservoir that are directly related to sedimentation, although there are for the related resource issues of water quality and scenic resources. The outcome of this study will provide valuable insight into management options for other resource areas (e.g., hydraulic resources, water quality, and aquatic resources).

This Study Plan will complete a literature review and incorporate existing information related to sedimentation within the Project Boundary. References for studies, reports, and other sources of

information analyzed as part of this study are provided in this section as they are identified.

Below is a partial list of these readily available information sources:

- Middle Bear River and Cutler Reservoir Total Maximum Daily Load (TMDL). Utah Division of Water Quality (2010).
- Utah Division of Water Quality database (AWQMS). 2019.
- United States Geological Survey database (NWIS). 2019.

3.4.4 STUDY AREA

3.4.4.1 SEDIMENT CORING AND COMPOSITION

The sediment distribution analysis will encompass the wetted surface area of Cutler Reservoir with an attempt to survey all critical areas located inside the Project Boundary. Areas assessed for sediment composition will be divided into a number of strategic zones, based on factors such as inflow, cutting potential, constrictions that increase velocities, potential for erosion at different elevations, and other factors defined by PacifiCorp's resource specialists.

Strategic study reaches within the Project Boundary are defined as follows (Figure 3-4):

- Wheelon Reach from Cutler Dam to Wheelon Dam, to account for sedimentation at the base of Cutler Dam.
- Canyon Reach from Wheelon Dam to the Highway 23 bridge, to assess the effects of the historic dam as a factor in sediment accumulation.
- Reservoir Reach from Highway 23 bridge upstream to the Bear River Unit, accounting for the formation of large bars with areas of lateral flow, continued deposition, and susceptibility to erosion under lowered elevations.
- Bear River Inflow Reach to the Project Boundary. The Bear River is highly channelized in this area and continues to lose volume due to forming natural levees that isolate areas of the reservoir except during high spring flows. Lowered elevations could erode this highly channelized area.
- North and South Marsh Reach from Benson Marina and open water habitats south to the Logan River and southern tributaries.

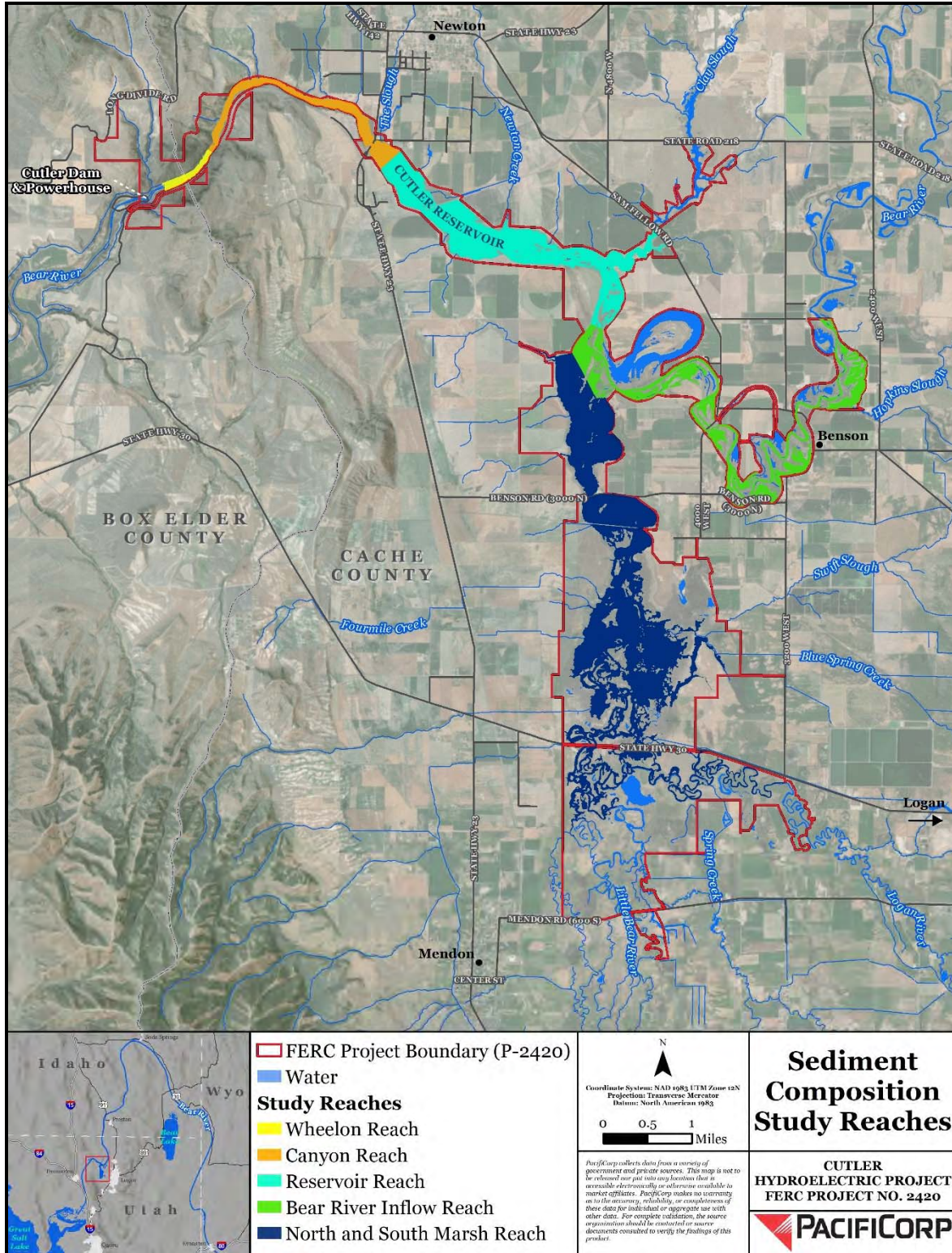


FIGURE 3-4 SEDIMENT COMPOSITION STUDY REACHES

To better understand the interaction between phosphorus in bed sediments and lake habitat, additional data collection is proposed. Three areas are defined and will be the primary focus of this study (Figure 3-5):

- The south portions of the reservoir, which include the Highway 30 to Benson Marina area and the Logan and Little Bear inflow areas (defined in the Cutler RMP as the North and South Marsh Resource Management Areas, respectively). This area has a number of National Pollutant Discharge Elimination System (NPDES) permit dischargers and most likely will have the highest concentration of phosphorus in the system. A number of sample sites will be developed to identify sediment movement and potential sources of phosphorus (both external and internal) that could be contributing to the high concentrations found in the reservoir. Sites will include the Logan inflow, the Spring Creek/Little Bear inflow, the large area south of the Railroad Trail and fishing bridge (the North Marsh) where inflow from the Logan WWTF enters the reservoir, and Benson Marina between the fishing bridge and the confluence with the Bear River (Main Reservoir Resource Management Area).
- The Bear River Resource Management Area upstream of any influence from the southern tributary areas of the North and South marshes. This area has the greatest inflow, a high number of cattle feeding operations, and extensive surface runoff from agricultural operations. Sample sites will include areas above and below pollutant sources to understand the changes that occur through the marsh and reservoir.
- Cutler Canyon and Main Reservoir Resource Management Areas combine inflows from the North and South Marsh as well as the Bear River with the addition of Clay Slough inflows. This area combines the vast majority of all inflow and potential dischargers into the system. Samples that are collected here will help develop an understanding of phosphorus distribution in the system. Sample sites will include Clay Slough and sites below Newton Creek inflow, Reservoir at Highway 23, and near the Wheelon Dam.

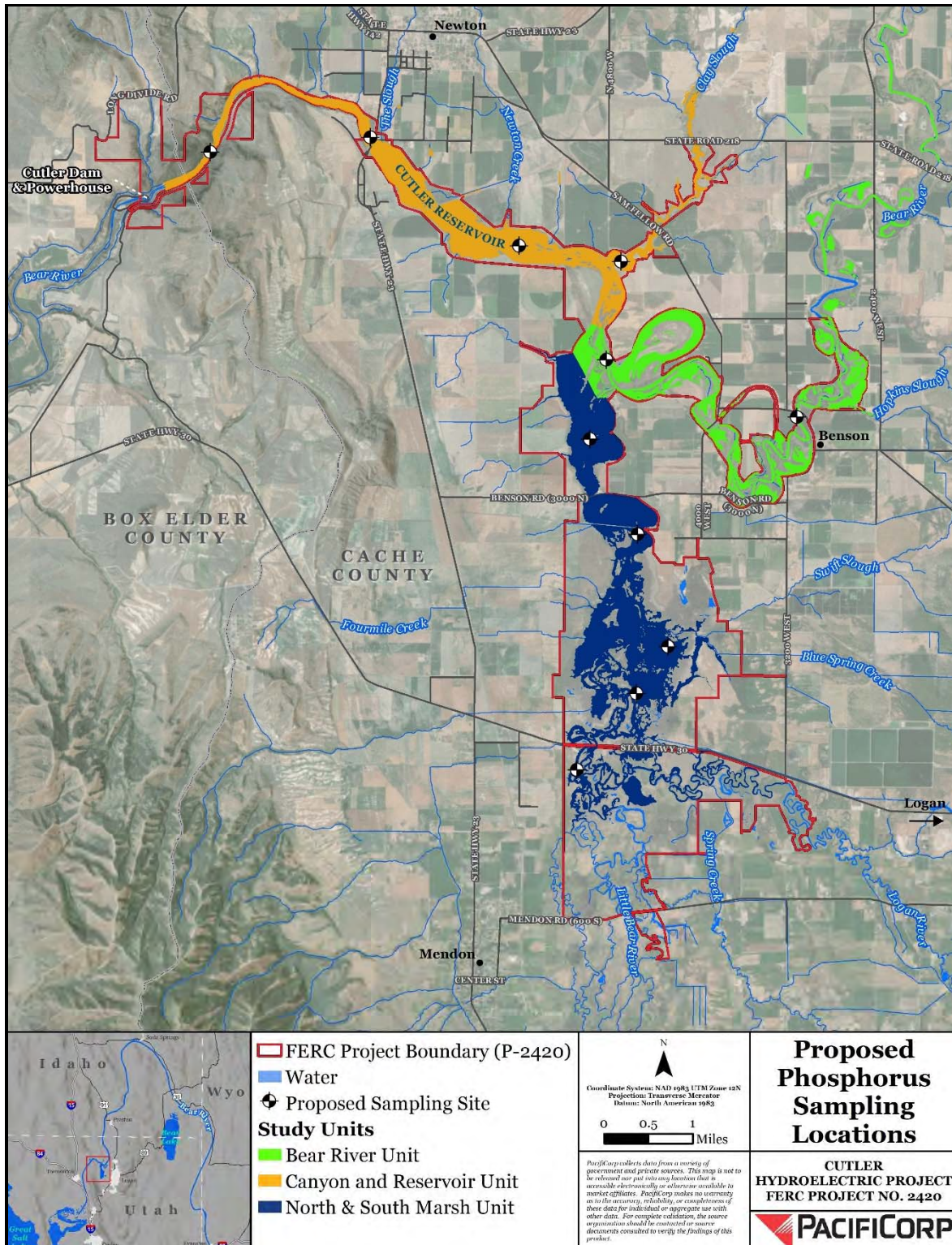


FIGURE 3-5 PROPOSED PHOSPHORUS SAMPLING LOCATIONS

The study area for sediment deposition will include all wetted habitats within the Project Boundary traversable by boat.

3.4.5 METHODS

The scope of the sediment study includes several elements, as outlined below.

The reservoir has been divided into five key areas, as discussed above. A stratified random design with a sample size weighted according to surface area will be used to survey these defined sections of the reservoir. The number of samples will provide sufficient coverage to describe the bed sediment throughout the reservoir and in each key area.

Because Cutler is very shallow, a vibrating corer is the best option due to its mobility and the shallow depth of most of the reservoir. The vibrating corer generates acoustic vibrations that mobilize sediment in contact with the core rod, allowing it to penetrate to the point of rejection. Depending on sediment type and sediment layering, this is typically around 20 feet to 25 feet in clays and silts. Historical data suggests the original channel bed elevations at Benson Bridge, Logan River, Highway 23 bridge, and Wheelon Dam were 4,388.0, 4,388.0, 4,384.0, and 4,388.0 feet National Geodetic Vertical Datum 1929 (NGVD29) respectively (Clyde 1953). Given the WSL of Cutler (4,407.5 feet), bed elevations suggest all areas upstream of Wheelon Dam could have an expected maximum depth of deposited sediment of 19.5 feet at most sites and up to 23.5 feet at Highway 23 bridge. These depths are well within the penetrative capacity of a vibrating corer.

It is anticipated that reservoir coring will take place in spring 2020 upon Study Plan approval. During sampling, daily field notes will be collected and at a minimum will include:

1. Date, time, location, weather conditions, sample identification (ID), and GPS location.
2. Depth of water in feet and inches, core barrel length in feet, and depth to rejection or bottom depth of sediments in feet and inches.

Core samples that are collected for analysis will include the following inspection and physical parameters:

1. Once cores are removed from the tubes, a preliminary inspection for sediment type using the Wentworth scale will be used to classify cores. Any stratification or changes in sediment type will be noted from top of the reservoir bed down to the closest inch.

2. Samples taken for particle size analysis will be classified using the Unified Soil Classification System (USCS). Notes will be taken if the sample represents a specific core depth or a composite sample within the core. All core depth measurements will be noted in feet. To determine the percentage of grain size, USCS standard sieves will be used down to a No. 230 or 63 μ sieve. Finer material will be classified using a hydrometer. Prior to hydrometer measurements, each sample will be tested for percent organic material. Sediment samples with more than 30 percent organic material will not be measured for grain size with a hydrometer due to error probability.
3. To test for elasticity or shear strength, sediment cores will be measured in the field using a shear vane.
4. A small percentage of the cores be tested at depth for the following ions; calcium carbonate (CaCO₃), iron (Fe), aluminum (Al), and TP. CaCO₃ exerts a great influence on phosphate fixation through surface absorption. CaCO₃ can also limit the solubility of phosphate. Fe and Al are two ions that can fix phosphorus through cation exchange, greatly reducing the solubility of phosphorus in oxic conditions.
5. Three samples sites will be tested for a range of pesticides including dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyl (PCBs), and Resource Conservation and Recovery Act (RCRA)¹¹ metals in bed sediments. Locations will include Benson Marina, Highway 23 bridge, and Wheelon Dam. Samples will be composite samples throughout the sediment core.

3.4.5.1 DISTRIBUTION OF PHOSPHORUS IN SEDIMENT

Phosphorus is a key issue regarding water quality in the Project Area. Cutler Reservoir has become a sink for excess external loading of phosphorus that is not consumed biologically, and now carries a significant internal load of phosphorus as well. Phosphorus is passed through the Bear River system as a result of surrounding land-use practices combined with surface runoff and NPDES discharges. This accumulation of phosphorus over the decades has pooled in the bed sediments of the reservoir. The proposed operational changes could affect velocity and resuspend sediments which could exacerbate the existing high concentrations found in the water column, and in turn affecting the phosphorus load of water leaving the reservoir.

Phosphorus in the upper 4-inches of sediment is most often associated with whole lake metabolism. Phosphorus mobilization can occur down to 10-inches, but the actual depth is dependent on sediment characteristics (Søndergaard et. al. 2003). Loosely bound sediment or

¹¹ Resource Conservation and Recovery Act

floc typically has an interstitial void with a large portion of sediment volume composed of water between the particles. This upper region of sediment is highly mobile and poses the greatest potential for resuspension, either from wind-driven mixing in shallow areas or from operational changes in WSL and water velocity.

Phosphorus samples will be collected seasonally (four sampling events) to better understand the dynamics and changes that may occur in the system. Temperature, flow, storms, and discharge load may affect the concentrations and metabolism of the reservoir seasonally.

Sampling will occur from a boat to minimize disturbance to the water column or reservoir bed. Each proposed site will include a single vertical sample separated into multiple layers for analysis. A single 4-inch acrylic tube will be gently lowered through the water column and into the bed sediment. The top will be capped to create a vacuum for extraction. Upon removal, the bottom will be capped to eliminate sediment loss and carefully mounted vertically to not disrupt the sediment-water interface. Vertical holes in the tube will drain reservoir column water to the sediment-water interface. Reservoir water will be preserved for phosphorus analysis, including TP and ortho-phosphate (reactive), and will be field filtered using a 0.45- μm filter for total dissolved phosphorus (soluble).

Beginning at the sediment-water interface down to 4-inches, water will be drained from the bed sediments to extract water in the pore spacing¹² in the sediment. If insufficient water is in the pore spacing, water in the sediment column down to 10-inches may be collected. Water in the pore spacing will be field filtered using a 0.45- μm filter and preserved for measurement of total dissolved phosphorus.

As much water as possible will be drained from the sediment core to remove any soluble phosphorus. Sediments will be preserved for TP analysis. All samples will be delivered on ice to a certified lab for analysis.

All equipment will be cleaned and rinsed with deionized water between sample sites. Vacuum flasks and/or geopumps will be flushed, and new filter papers will be used. Field notes at each

¹² Pore space is defined by porosity of a material possessing free space between the mineral grains, expressed as percentage.

site will include: date, time of sampling, location ID, weather conditions, and samplers name. Additional measurements of field conditions may include air temperature, water temperature, DO, and pH to log conditions while sampling.

3.4.5.2 DISTRIBUTION OF SEDIMENT DEPOSITS IN CUTLER RESERVOIR

To address the distribution and depth of sediments within the reservoir, a low-frequency echosounder is proposed to collect a significant number of sub-bottom recordings. Acoustic sub-bottom profiling draws upon low-frequency sounders in a range up to 50 kilohertz (kHz) to penetrate deep into bed sediments. Coupling the soundings with sediment core analysis greatly expands the resolution of sediment core data for a more accurate picture of sediment types and distribution throughout the reservoir.

Three-frequency (28/50/200 kHz), survey-grade echo-sounding equipment will be used to map the reservoir bathymetry, sediment distribution, and sediment thickness. The 200 kHz is the industry-standard acoustic frequency for mapping the reservoir bed, while the 28 and 50 kHz frequencies penetrate deeper into the sub-bottom to define historical bed elevations and river channels. An example of this type of equipment is the BBS-3 portable echo sounder with a depth resolution of up to 0.15 centimeters (cm). These echo sounders will be mounted to shallow-draft craft for use in as little as 0.4 meter (m) water depth. All equipment will be mounted to a boat that will travel numerous transects in the reservoir to map the fine bed detail and simultaneously measure the sub-bottom substrate depth.

Acoustic echo sounding interfaced with a real-time RTK GPS unit will allow entire lake mapping that is both highly detailed and spatially accurate, typically 2-cm-horizontally and 3-cm-vertically. Utilizing existing WSL benchmarks such as the dam WSL or Benson Marina stilling basin WSL will provide accurate reference points to measure and cross-reference elevation data collected during the surveys. These reference points will be measured daily. To maintain water surface accuracy, shoreline measurements will be taken periodically throughout the day as reference points in the area being surveyed.

Two hours before the beginning of any data collection, the reference GPS base station will allow for stabilization. Guidelines for selecting areas suitable for reference base stations are as follows:

- Flat or gently sloping for 25 to 30 feet in all directions
- Free of obstructions for 25 to 30 feet in all directions
- A clear view of the sky with no overhanging branches or powerlines
- Documentation of each site will be completed with photographs free of objects or people

Before any survey work begins, the echosounder will be referenced and calibrated using a bar check or stadia rod. Any deviations in depth will be noted, resolved, and recalibrated before beginning survey work.

3.4.6 ANALYSIS AND REPORTING

A report containing the sediment data collection and analysis will be completed. Data sets generated from the sediment data collection will be used in other resource analyses (e.g., Hydraulics, Land Use, Scenic Resources and Water Quality Study Reports). Data sets, analysis, and reports are described below.

3.4.6.1 SEDIMENT COMPOSITION AND CORING

Sediment core logs will be generated for all core samples, and much of the sediment core data processed will be used directly in the sediment transport model. A portion of the sediment report will discuss the results of sediment measurements throughout the reservoir including USCS classification as a percentage and concentrations of TP at depth, total organic matter, and analysis for pesticides, PCBs, and heavy metals.

3.4.6.2 DISTRIBUTION OF PHOSPHORUS IN SEDIMENT

The primary focus of this analysis is explore the exchange of phosphorus between bed sediments and the water column and the potential for resuspension under a range of operating conditions. The analysis will explore the dynamics of dissolved phosphorus in the interstitial voids of floc sediment, the interaction with the water column, and the potential effects if sediment movement were to occur from a change of operation. Insoluble phosphorus concentrations in bed sediments will be examined and compared to results from core samples taken for phosphorus at varying depths, and a discussion on the absorption and binding potential of ions analyzed on phosphorus will be included.

3.4.6.3 DISTRIBUTION OF SEDIMENT DEPOSITS IN CUTLER RESERVOIR

Analysis of sub-bottom profiling will be used to create a digital map of sediment depth within the reservoir. The analysis will estimate the volume and location of bed sediment based on survey results. Strategic areas of the original reservoir bed may be joined with current bathymetry to estimate water volume increases for various dredging scenarios. This layer output file may also be loaded into the hydraulics and sediment model to illustrate the dynamics and infill that may occur if the decision were made to dredge in some areas of the reservoir.

3.4.7 SCHEDULE AND PERIODIC REPORTING

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

3.4.8 LEVEL OF EFFORT AND COST

The estimated cost of conducting the sediment coring and composition is within a range of \$60,000 to \$100,000 based on the number of cores collected, number of samples processed, and analytes selected. To complete the seasonal analysis of sediment phosphorus throughout the reservoir, the anticipated cost is within a range of \$25,000 to \$35,000. Analysis of the distribution of sediment throughout Cutler Reservoir based upon coring data and sub-bottom reading, and the level of analysis to include a range of operation scenarios is an additional estimated cost within a range of \$25,000 to \$50,000. The total cost of this study has a range of \$110,000 to \$185,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

3.4.9 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all Study Plans, and how comments were addressed in the AQ4 Study Plan. If stakeholder comments were not

incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

3.4.10 REFERENCES

- Clyde, Calvin G. 1953. Sediment Movement in Bear River, Utah. Thesis submitted for Degree of Civil Engineer, Graduate Division, University of California. Berkeley, California. June 1953.
- PacifiCorp. 2019. Cutler Hydroelectric Project FERC No. 2420 Pre-Application Document Volume I – Main Document. March 2019.
- Søndergaard, M., Jensen, J.P., Jeppesen, E. 2003. Role of internal loading on phosphorus in shallow lakes. *Hydrobiologia*. 506-508: 135-145.
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4 HUMAN ENVIRONMENT PROPOSED STUDY PLANS

4.1 RECREATION RESOURCES PROPOSED STUDY PLAN (REC 1)

4.1.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The Project operates and maintains 15 recreation facilities within the Project Boundary. These facilities consist of boat launches, picnic areas, canoe trails, and hiking trails. PacifiCorp implements a recreation site development and monitoring program as part of the current license to improve public access and provide recreation facilities inside the Project Boundary. Future operation of the Project will continue to affect recreation opportunities, use patterns, access, and facilities. Changes in Project operations could affect the timing and quality of recreation opportunities and access to Project waters as well as aesthetic resources. This study will establish a baseline of current recreation use and aesthetic resources. This information will form the basis for a recreation plan and potential new license articles to address impacts to recreational and aesthetic resources in the Project Area due to any changes in Project operations.

When making a decision regarding reissuance of a new license for the Project, the FERC considers the recreational and other non-developmental values of the Project, as well as power and developmental values. Part of this decision process is the FERC's determination of any conditions that should be included in a new license to be best adapted to improve or develop Project waters for all beneficial public uses. Reasonable consideration of the effects of continued Project operation pertaining to recreational opportunities and access in the Project Boundary is in the public interest.

4.1.2 STUDY GOALS AND OBJECTIVES

The goals of the Recreation Resources Study are to identify the existing recreation opportunities, facilities and visitor use that may be affected by operation of the Project, and develop measures that could be implemented to mitigate Project effects and/or enhance recreation activities. The specific objectives to meet the goals of the study include:

- Describe existing recreation opportunities and facilities in the Project Boundary
- Quantify visitor use and carrying capacity for Project recreation facilities

- Evaluate if or how changes in Project operations could affect recreation opportunities, patterns in visitor use, public access to the reservoir, and recreation facility usability
- Identify current and projected trends in recreation based on recent or newly conducted surveys and interviews and consultation with stakeholders, regional and statewide plans, and other available data
- Evaluate how changes in Project operations may affect existing visual resource conditions in the vicinity of the Project
- Evaluate how other proposed ongoing actions may affect existing recreation facilities (widening State Road 30)

4.1.3 REVIEW OF EXISTING INFORMATION

Existing management plans and reports will be used in the development of a baseline understanding of current recreation resources and known recreation use trends. Relevant management plans will include the following:

- PacifiCorp Recreation Site Development Program for Cutler Hydroelectric Project (part of the existing PacifiCorp Cutler Recreation Management Plan)
- PacifiCorp FERC Form 80 Reports for Cutler Hydroelectric Project
- PacifiCorp Resource Monitoring Report for Cutler Hydroelectric Project
- USFWS Bear River Migratory Bird Refuge Comprehensive Management Plan, 1997
- Utah Department of Natural Resources. Final Bear River Comprehensive Management Plan. October 2017.
- 2014 Utah State Comprehensive Outdoor Recreation Plan (SCORP) (Utah DNR 2013) (SCORP to be updated in 2019).
- 2010 Utah Boating Program Strategic Plan (Utah DNR 2010).

4.1.4 STUDY AREA

The study area for this plan (Figure 4-1) is the area inside the Project Boundary, including the portion of the Bear River directly downstream of the powerhouse.

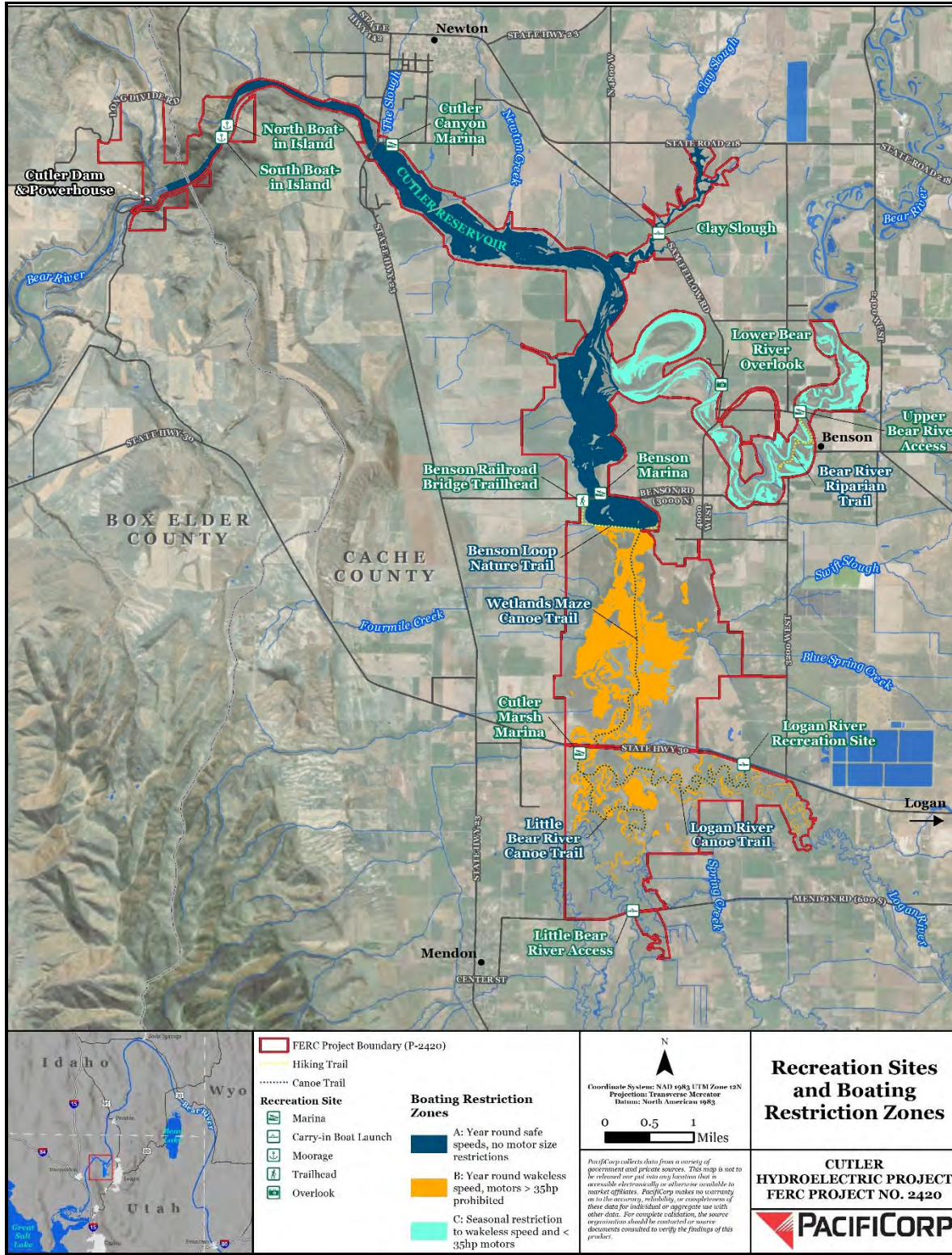


FIGURE 4-1 RECREATION STUDY PLAN AREA

4.1.5 METHODS

This section describes the study methods for evaluating recreation opportunities, facilities, visitor use, and aesthetic resources in the Project Boundary under current operating conditions as well as potential changes in Project operations. The proposed study methods are consistent with professional practices and the FERC study requirements under the ILP (FERC 2004) and have been employed at other hydroelectric projects and recreation sites throughout the United States.

Recreation planners will gather information on recreation opportunities, facilities, and visitor use in the Project Boundary using a combination of data collection methods that include the following:

- Desktop Recreation Assessment
- Project Site Assessment
- Recreation Use Counts
- Visitor Survey
- Structured Interviews
- Evaluate Effects of Proposed Project Operational Changes

Using this information, PacifiCorp will complete a Recreation Needs Analysis which will become the Recreation Management Plan. Each method is described below.

4.1.5.1 DESKTOP RECREATION ASSESSMENT

Initially, recreation planners will complete a Desktop Recreation Assessment to identify existing recreation opportunities and facilities in the Project Area using methods described by Whittaker, Shelby and Gangemi (2005). Information sources for this assessment will include local, state, and federal recreation plans (listed in Section 4.1.3), recreation guidebooks, maps, tourist information, magazine articles, online descriptions of recreation opportunities and trips, reservoir elevation data, and fishing regulations. The assessment will include existing comprehensive plans applicable to the Project Area. The information obtained in the desktop assessment will be synthesized in a narrative summary describing recreation opportunities, facilities, and restrictions in the Project Boundary with accompanying maps.

4.1.5.2 PROJECT SITE ASSESSMENT

In the Project Site Assessment, recreation planners will observe the recreation opportunities and facilities identified during the Desktop Recreation Assessment. Site visits will be timed to coincide with conditions suitable for recreation activities for first-hand observations. During the site visits, recreation planners will evaluate the potential effect of Project operations on recreation opportunities and facilities. Recreation planners will assess effects of the reservoir drawdown on recreation opportunities immediately downstream of the Project.

At each site, the following information will be collected and documented:

- Recreation facility
- Recreation amenities
- Assessment of facility condition
- Handicap access
- Photographs

An analysis of physical capacity at each recreation site will be completed. This analysis will include an assessment of the physical space available versus actual use, comparing off-peak and peak use and seasonal use patterns.

4.1.5.3 RECREATION USE COUNTS

Visitor use will be monitored using a combination of traffic counters, trail counters, and cameras at select sites. Visitor use data will be supplemented with existing data from routine monitoring as specified in PacifiCorp's Five-Year Resource Monitoring Report (PacifiCorp 2018).

4.1.5.4 VISITOR SURVEY

The visitor survey will be conducted online and designed to query respondents on recreation use patterns and recreation needs in the Project Boundary. The online survey will be organized into four sections: 1) background demographic information; 2) recreation use patterns in the Project Boundary; 3) Cutler recreation facilities used; and 4) recreation needs. Recreation pursuits in the Project, use patterns, facilities, and recreation needs will be tallied from survey questionnaires.

The survey questionnaire design will follow accepted practices outlined in Whittaker et al. (1993) and Whittaker, Shelby, and Gangemi (2005).

The online survey will be open to all members of the public with the intent of getting a broad participant demographic. PacifiCorp will announce the availability of the online survey to stakeholders on the Project service and mail list as well as the Project website. In addition, postcards will be placed at recreation facility sign boards in the Project explaining purpose of survey and link to survey portal. This open-ended distribution method does not permit calculation of a survey response rate. An online survey sample size has not been established.

4.1.5.5 STRUCTURED INTERVIEWS

Structured interviews will be conducted with stakeholders representing recreation organizations as well as individuals with direct knowledge of recreation activities and use patterns within and adjacent to the Project Area (Whittaker et al. 1993 and Whittaker et al. 2005). The structured interviews will be complimentary to the visitor survey. Structured interviews provide additional information not captured through online survey tools. Where opportunities arise, structured interviews with individuals pursuing recreation opportunities in the Project Boundary will be conducted.

4.1.5.6 ASSESSMENT OF PROJECT OPERATIONAL CHANGES

Project operational changes and associated changes in reservoir pool elevations will be evaluated to determine potential effects on recreation opportunities, facilities, and visitor use. Cutler Reservoir will be topographically mapped using a combination of LiDAR and bathymetry. The topographic data will be used to evaluate reservoir access at existing boat ramps and carry-in launches under various Project operational regimes and associated reservoir water elevations. The study will analyze potential changes in water-based recreation opportunities associated with changes in reservoir pool elevations such as motorized and non-motorized navigation. The analysis will consider the seasonality of proposed operational changes relative to recreation use as well as the rate of reservoir drawdown.

4.1.6 SCHEDULE AND PERIODIC REPORTING

The Recreation Resources ISR will document the analysis and results in compliance with the FERC ILP guidance. This report will include a summary of all information collected and discussion of the findings. Specifically, the report will address the following:

- Information on recreation opportunities, facilities, and visitor use within the Project Boundary
- Assessment of impacts of proposed operational changes on recreation opportunities, facilities, and visitor use as well as aesthetic resources in the Project Boundary
- Analysis of recreation needs in the Project

The report and analysis will identify existing and future recreation needs in the Project based on the recreation facility inventory, carrying capacity analysis, current and projected demand, as well as an assessment of recreation trends to determine if the existing Project recreation facilities fulfill intended purpose and meet recreation needs at the Project. The results of this analysis will be used in the development of any necessary recreation resource enhancement measures.

PacifiCorp will synthesize the information gathered in the respective phases of the Recreation Study into a Recreation Management Plan. The Recreation Management Plan submitted as part of the license application and is expected to be incorporated into a new license. Implementation of the Recreation Management Plan will be initiated upon issuance of the new Project license by the FERC.

The recreation studies will be completed in one study year. Based on the results provided in the ISR, relicensing participants may request modifications to the recreation study and/or new studies; however, any proposal must demonstrate that the studies that were conducted were not consistent with the approved Study Plan or that the studies were conducted under unusual environmental conditions.

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

4.1.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Recreation Resources Proposed Study Plan is within the range of \$100,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

4.1.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the REC1 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

4.1.9 REFERENCES

- Federal Energy Regulatory Commission (FERC). 2004. A Guide to Understanding and Applying the Integrated Licensing Process Study Criteria.
- PacifiCorp. 2018. Resource management plan five-year monitoring report (2013-2017) for the Cutler Hydroelectric Project (FERC No. P-2420). Prepared for Federal Energy Regulatory Commission, Portland Regional Office, Portland, Oregon.
- U.S. Fish and Wildlife Service. 1997. Bear River Migratory Bird Refuge Comprehensive Management Plan.
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- Whittaker, D., B. Shelby and J.T. Gangemi. 2005. *Flows and Recreation: A Guide to Studies for River Professionals*. Hydropower Reform Coalition, Washington, DC.
- Whittaker, D., B. Shelby, W. Jackson, and R. Beschta. 1993. *Instream flows for recreation: a handbook on concepts and research methods*. U.S. Department of Interior, National Park Service, Anchorage, AK.

4.2 CULTURAL RESOURCES PROPOSED STUDY PLAN (CULT 1)

4.2.1 PROJECT NEXUS AND RATIONALE FOR STUDY

Existing information concerning the subject of this study proposal is summarized in Section 6.12 of the PAD. As is described there, a few archaeological and historic architectural resources are known within the Project Boundary (not all of which have been formally documented), but only limited cultural resources inventory has been conducted to-date within the Project Boundary. For this reason, it can be expected that there are additional historic and archaeological sites within this area that have not been previously recorded. Based on the previously documented cultural resources in the Project Boundary and an understanding of the area's prehistory and history, it can be expected that undocumented historic and archaeological sites will be related to a variety of prehistoric, ethnohistoric and historic activities, including Native American occupation and Euro-American exploration, settlement, irrigation, and transportation.

Because the cultural resources inventory within the Project Boundary has been limited, there is a need for additional inventory to determine what cultural resources the Project existing and proposed operations may impact and what the nature of those impacts might be.

The nexus between Project operations and effects on cultural resources is discussed in Section 7.1.11 of the PAD. As noted, current operations under the existing license and proposed operations under the relicensing could have impacts on cultural resources due to fluctuating reservoir levels and wave action from wind-blown or human-caused waves, either of which may result in erosion of cultural resources located along shorelines. It is unknown whether a new lower elevation limit will result in exposure or the potential removal of the historic Wheelon Dam that was inundated by Cutler Reservoir, but if so, deterioration of that structure may be increased. To the extent that river flow fluctuations downstream of the dam or upstream of the reservoir are increased under the proposed operations, erosional effects on cultural resources may increase. Historic resources (e.g., those that comprise the Cutler Hydroelectric Power Plant Historic District (District), Wheelon Dam, or significant irrigation canals) require continued maintenance, repair, upgrading, or removal to meet safety and operational requirements, and those activities may alter important historical characteristics of these resources. Recreational use may have either unintentional (e.g., trampling) or intentional (e.g., looting or vandalism) impacts

on cultural resources. And finally, agricultural activities conducted under PacifiCorp's agricultural leasing program may affect archaeological or historic resources.

Relicensing requirements related to cultural resources are anticipated to be implemented primarily through an Historic Properties Management Plan (HPMP), which will specify management actions designed to resolve all existing and potential Project-related adverse effects on historic properties. Study results will directly inform the HPMP by more completely identifying the cultural resources that will be subject to management actions outlined in the HPMP, and by indicating what management actions will be most useful for avoiding, minimizing, or mitigating effects on cultural resources.

4.2.2 STUDY GOALS AND OBJECTIVES

The goals and objectives of this Study Plan are to more completely identify those cultural resources that are potentially subject to effects from Project operations under the renewed license. Better understanding of the nature of these resources will inform the management actions to be outlined in the HPMP.

Three general categories of studies related to cultural resources are proposed: archaeological, historic architectural, and ethnographic. The information to be obtained from these studies will include that contained in standard cultural resource recording forms (e.g., Utah Archaeology Site Forms [UASFs], an amended National Register Registration Form), consisting of locational and descriptive information about each identified resource and its setting, as well as an evaluation of its National Register of Historic Places (NRHP) eligibility with the applicable NRHP significance criterion/a noted. In addition, further information on the general historic and prehistoric context of cultural resources in the area will be obtained to assist in NRHP eligibility evaluations. Ethnographic information will be obtained by a qualified ethnographer in coordination with participating tribes. This information, as well as resource recording forms will be included in reports that meet the FERC and Utah Division of State History (UDSH, which houses the Utah State Historic Preservation Office [SHPO]) guidelines for archaeological and historic architectural studies.

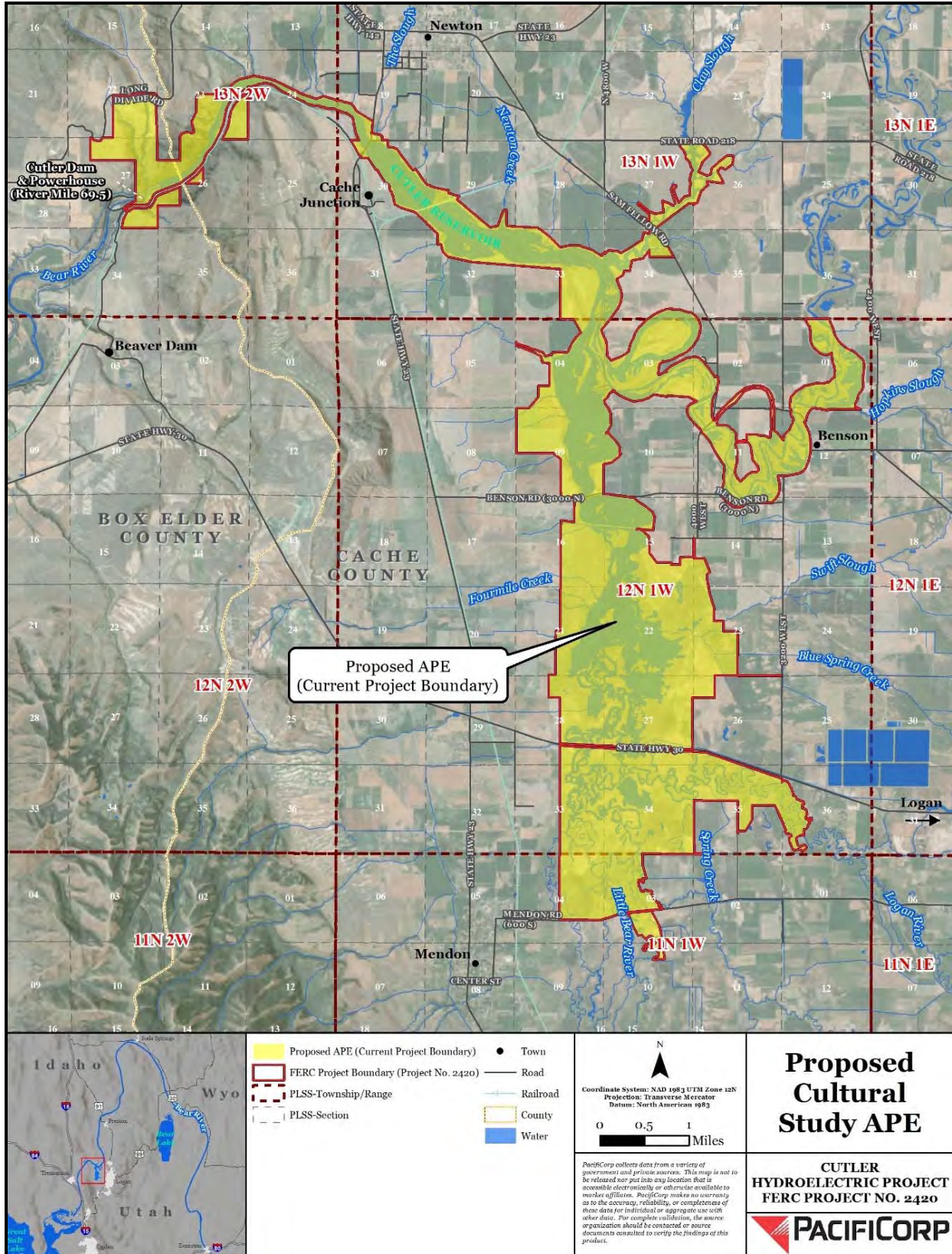
4.2.3 REVIEW OF EXISTING INFORMATION

The FERC must comply with Section 106 of the National Historic Preservation Act (Section 106) in reissuing the license. Section 106 and its implementing regulations require the lead federal agency for an undertaking to take into account the effects of that undertaking on historic properties (i.e., properties that are listed on or eligible for the NRHP); to consult with parties such as SHPOs, Indian Tribes, local governments, and other parties with a demonstrated interest in the undertaking regarding findings and determinations made during the Section 106 process; and to provide the public with information about the undertaking and its effects on historic properties and seek public comment and input. Pursuant to the Section 106 implementing regulations, PacifiCorp requested permission from the FERC to initiate Section 106 consultation for the relicensing. The proposed studies will facilitate the FERC's and PacifiCorp's consultation obligations under Section 106 regarding the identification of historic properties and the assessment and resolution of adverse effects, thereby helping meet key management goals for cultural resources.

The overall FERC relicensing process with its scoping component will facilitate public involvement obligations for the FERC and PacifiCorp under Section 106.

4.2.4 STUDY AREA

PacifiCorp proposes, per the FERC guidance (FERC 2008), that the Project's Area of Potential Effects (APE) for purposes of Section 106 consultation be defined as the Project Boundary, plus any areas upstream or downstream of the Project Boundary that planned hydraulic modeling indicates may be affected by changes in river flow regime (Figure 4-2). The proposed APE is shown as the Project Boundary in Figure 4-2; this figure does not include any upstream or downstream areas that may be added to the APE following hydraulic modeling because any such areas are not yet known.



*Pending results of Hydraulic Modeling.

FIGURE 4-2 PROPOSED CULTURAL AREA OF POTENTIAL EFFECT

PacifiCorp proposes further that the study areas for the proposed archaeological and historic architectural studies consist of those portions of the APE where direct effects on historic properties from proposed Project operations, proposed capital improvements, or other Project-related activity may be anticipated. These proposed study areas are listed in Table 4-1, and a brief rationale for each is provided below. In addition to the studies proposed for these areas, the entire APE will be subject to management actions, such as construction monitoring procedures and discovery protocols, that will be specified in the HPMP.

Proposed Project operations include fluctuating reservoir levels, with a lower low-elevation limit and slightly increased tolerance than under the current license. The proposed study area for potential effects from proposed Project operations is the zone of proposed water-level fluctuation along the shoreline and any such zone along riverbanks downstream and upstream of the reservoir, as well as the Wheelon Dam site, which may be exposed, at least partially, during future low-water periods and may experience increased deterioration as a result.

TABLE 4-1 PROPOSED STUDY AREAS FOR STUDY COMPONENTS

| ACTIVITY TYPE | STUDY AREA | STUDY TYPE |
|--|--|---|
| Project operations (fluctuating reservoir levels) | Shoreline and riverbanks within zone of water-level fluctuation | Archaeological: intensive-level survey during the fall 2019 drawdown of portions of the water-level fluctuation zone along the reservoir shoreline that are not classified as freshwater emergent wetland in the USFS NWI; intensive-level survey in first study season of any areas downstream of the dam or upstream of the reservoir that hydraulic modeling indicates may be affected by changes in river flow regime |
| | Wheelon Dam site | Historic architectural: intensive-level documentation and evaluation of dam during fall 2019 drawdown |
| Capital improvements | Cutler Hydroelectric Power Plant Historic District | Historic architectural: amendment to National Register Registration Form |
| Recreation: concentrated use areas | Marinas, boat launches, and hiking trails listed in Cutler Hydroelectric Project PAD Table 6-22 | Archaeological: intensive-level survey during fall 2019 drawdown of these plus 100-foot buffer, or 100-foot-wide corridor for trails |
| Recreation: boating | Shoreline in North Boater Zone A ¹³ and Bear River Boater Zone C ¹⁴ | Will be covered by intensive-level archaeological shoreline survey described above |
| Irrigation | Known irrigation pumps/canal intakes and undocumented segments of known canals within Project Boundary | Archaeological: intensive-level survey during fall 2019 drawdown and the first study season of these plus 100-foot buffer, or 100-foot-wide corridor for canals |
| Agricultural leasing | Agricultural lease areas | Archaeological and historic architectural: reconnaissance-level survey during the first study season |

Proposed capital improvements consist of like-for-like replacement of the spillway gates and flowline support (as needed) and installation of a new retaining wall between the flowline and the river near the base of the dam to protect the flowline from being undermined in high flow

¹³ The area north of the Benson Railroad bridge and west of the confluence with the Bear River.

¹⁴ The Bear River area, east of the confluence with Cutler Reservoir (including the ‘horseshoe area’).

events. These improvements will occur within the District, and the proposed study area for potential effects from these improvements is therefore the District.

Other Project-related activities with potential to affect historic properties are recreation, irrigation, and agricultural leasing.

Land-based recreation occurs in the Project Boundary at locations such as marinas, boat launches, and hiking trails, and has the potential to significantly affect cultural resources in areas where recreational use of land is concentrated. Such areas—specifically, those recreation facilities listed in the Project PAD Table 6-22—plus an appropriate buffer therefore constitute one study area for recreational effects.

Boating is another type of recreational activity within the Project Boundary, and this may affect cultural resources through wave action along the shoreline. This is likely only a potential effect in Cutler Reservoir boating restriction zones A and C because wakeless speeds are required year-round in zone B. The proposed study area for the potential effects of boating is therefore the shoreline within zones A and C, and it is proposed further that this study area be subsumed by the one described above for operational water-level fluctuations.

Irrigation occurs in and around the Project Boundary associated both with PacifiCorp's Agricultural Lease Program and with fulfillment of non-Project related irrigation water rights. Irrigation pumps and other irrigation infrastructure are located at many locations along the reservoir's edge, and many irrigation canals are present in and around the Project Boundary. The proposed study area for potential effects on historic irrigation-related resources is the locations of known such resources plus an appropriate buffer.

Finally, PacifiCorp's Agricultural Lease Program has some potential to affect historic properties, and the proposed study area for such effects consists of leased areas.

4.2.5 METHODS

PacifiCorp proposes to conduct several types of cultural resources studies, each tailored to one or more of the different study areas and types of potential effects as described.

4.2.5.1 ARCHAEOLOGICAL INTENSIVE-LEVEL SURVEY

Archaeological intensive-level survey (ILS) will be conducted for the zone of proposed water-level fluctuation along the shoreline and any such zone that hydraulic modeling may identify along riverbanks downstream and upstream of the reservoir, as well as for the marinas, boat launches, and hiking trails listed in the Project PAD Table 6-22 and for known irrigation pumps or canal intakes and undocumented segments of known canals within the Project Boundary. To maximize accessibility and visibility, the archaeological ILS will be conducted during the fall 2019 drawdown for the shoreline, recreational areas (marinas, boat launches, and hiking trails), and irrigation infrastructure (pumps, canal intakes, and canals). Survey of any areas along riverbanks upstream or downstream of the reservoir will occur during the first study season, following the completion of hydraulic modeling that will delineate any areas subject to effects from changes in river flow regime; the reservoir drawdown is not relevant to survey of such areas that are not along the reservoir.

The ILS survey area for the shoreline will consist of land along the shoreline between the elevations of 4,392.5 feet and 4,410.0 feet, excluding areas classified in the USFWS National Wetland Inventory (NWI) as freshwater emergent wetland (PAD Figure 6-14). The elevation zone between 4,392.5 feet and 4,410.0 feet equates to the proposed reservoir operating range and tolerance under the relicense (4,394.5 feet to 4,408.0 feet; PAD Table 5-3) plus a buffer of 2-vertical-feet above and below this range. Areas of freshwater emergent wetland will be excluded from survey because they are likely be inaccessible and have limited ground visibility due to dense vegetation cover, even during the reservoir drawdown. It is further noted that the presence of such vegetation within freshwater emergent wetlands may alleviate any impacts to archaeological resources from fluctuating reservoir levels and wave action. GIS tools will be used prior to the survey to define survey area boundaries based on the 4,392.5-foot to 4,410.0-foot elevation zone and NWI freshwater emergent wetland type.

ILS survey areas for recreational areas and irrigation infrastructure will be added to the shoreline survey area just described. Because many of the recreational areas and irrigation infrastructure areas are located along the shoreline, it will be ideal to survey these areas during the fall 2019 drawdown when access and visibility is enhanced. A 100-foot buffer around each recreational

area and known piece of irrigation infrastructure will be surveyed, with the exception of hiking trails and irrigation canals, for which a 100-foot-wide corridor centered on the trail or canal will be surveyed. Some known irrigation-related features were identified in the review of existing information conducted for the PAD (PAD Section 6.12.1). Prior to the survey, aerial imagery, historic topographic maps, and other accessible and applicable data sources will be used to identify additional irrigation pumps, canal intakes, or canals within the Project Boundary that require survey. Any canal segments that have been adequately documented as archaeological sites within the last 10 years will be excluded from the survey. GIS tools will be used to define survey area boundaries for the recreational areas and irrigation infrastructure prior to the survey.

Hydraulic modeling is planned to be completed in the winter of 2019-2020. It is anticipated that this modeling will determine if there are areas along riverbanks downstream of the dam or upstream of the reservoir that will be subject to measurable water level fluctuations under the proposed operations for the relicensing. If the modeling identifies such areas, those areas will be included in the ILS first study season, during a period of low river flow if possible. In addition, the Project APE will be amended to include these areas if they are outside of the Project Boundary. Prior to the survey, GIS tools and hydraulic model results will be used to define any needed survey areas along riverbanks. These areas will consist of the zone of fluctuation in water level, plus a buffer of 2-vertical-feet above and below this range.

The ILS will be a pedestrian archaeological survey that will follow methods outlined in UDSH's *Archaeological Compliance Guidance* (State of Utah 2019). The methods will include: using 15-meter survey transect intervals, re-survey of any areas last surveyed 10 or more years ago, use of Bureau of Land Management (BLM) archaeological site and isolated find definitions, and recordation of linear sites following Utah Professional Archaeological Council guidelines. All archaeological sites identified during the survey will be recorded on UASFs; any site that has standing architecture present will also have a UASF prepared for the architectural features. No shovel probing or other forms of subsurface testing will be conducted. All fieldwork and reporting will be supervised by a professional archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for archaeology and holds a valid Public Lands Policy Coordination Office archaeological Principal Investigator permit.

Any areas that are inundated, even during the drawdown, or that cannot be accessed safely will be excluded from the ILS. However, reasonable efforts will be made to conduct reconnaissance survey of any areas that cannot be accessed; for example, shoreline or riverbank sections may be visually inspected from a safe distance upslope or from adjacent agricultural fields using binoculars. Areas covered by pavement or modern structures, such as marina parking lots or buildings, will be excluded from the ILS.

4.2.5.2 HISTORIC ARCHITECTURAL INTENSIVE-LEVEL SURVEY

An architectural ILS will be conducted for the historic Wheelon Dam, which may experience increased deterioration due to lower water levels under the proposed operations, and which may be altered or removed at some point as a result of future safety and operational requirements. The Wheelon Dam has not previously undergone formal historic architectural documentation. The ILS for the Wheelon Dam will be conducted during the fall 2019 drawdown, on the presumption that the dam, which was inundated by the construction of Cutler Reservoir, will be exposed during the drawdown. The area that will be subject to this ILS will be the location of the dam as it can be determined from historical sources, such as historical maps and photographs. GIS tools will be used prior to the survey to define this survey area based on the historical sources.

The Wheelon Dam historic architectural ILS will consist of a field visit and archival research to collect information following methods outlined in UDSH's *Intensive Level Survey Standard Operating Procedures* for Section 106 undertakings (USHPO 2015a). This will include collecting information necessary for completing a Utah Historic Site Form (UHSF), which will include a location map and sketch map, photographs and drawings of the dam, an architectural description of the dam, the history of the dam's construction and use, with a summary of historical sources consulted to obtain the construction and use information, and an evaluation of the dam's eligibility for the NRHP. High-resolution digital photography will be used for photographic documentation of the dam. Due to the constraints of documenting the historic dam within the current reservoir, a drone may be used for photography, provided that Federal Aviation Administration and PacifiCorp safety requirements can be met. Information and records held by PacifiCorp and any other readily available primary or secondary source documents relating to the history and use of the dam will be consulted to prepare a thorough history and

context. Additionally, online sources will be consulted to locate additional information about the dam that may be available; such sources may include <http://digitalnewspapers.org>, the Library of Congress, and other relevant primary and secondary sources. All fieldwork and reporting will be supervised by a professional architectural historian who meets the Secretary of the Interior's Professional Qualifications Standards for architectural history.

4.2.5.3 HISTORIC ARCHITECTURAL NATIONAL REGISTER REGISTRATION FORM AMENDMENT

Should capital improvements be proposed, an amendment to the District's NRHP nomination form, which dates to 1989, will be prepared. The study area for this study will be the current boundaries of the District. No changes to the District's boundaries are expected to be necessary. This study will occur during the first study season.

This study will consist of a field visit and archival research to collect information following the guidelines of the National Register Bulletin *How to Complete the National Register Registration Form* (rev. 1997) (NPS 1997), and the updated photography and mapping policies for the form (NPS 2013). The entire 1989 nomination form, including the Narrative Description and Statement of Significance, will be updated to reflect present-day standards and requirements for NRHP nomination forms. During the field visit, the current condition and integrity of each component of the District will be documented. The District and its components will be photographed to meet current NRHP digital photo policies. Information will be collected to create two maps for submission with the NRHP nomination form: a location map depicting the District within the context of its surrounding area, and a detail map depicting the components of the District. Archival research will involve the collation and synthesis of existing historical information from available sources, such as those described above under the historic architectural ILS study. In addition, an updated NRHP eligibility evaluation will be prepared for the District, and each component of the District will be evaluated to clarify whether it contributes to the District's NRHP eligibility; these evaluations will follow the guidelines of the National Register Bulletin *How to Apply the National Register Criteria for Evaluation* (rev. 1997) (NPS 1990). Evaluations will take into account previous recommendations as well as observations from the field visit. All changes from the previous nomination form will be noted in the new

nomination form. All fieldwork and reporting will be supervised by a professional architectural historian who meets the Secretary of the Interior’s Professional Qualifications Standards for architectural history.

4.2.5.4 ARCHAEOLOGICAL AND HISTORIC ARCHITECTURAL RECONNAISSANCE-LEVEL SURVEY

An archaeological and historic architectural reconnaissance-level survey (RLS) will be conducted for agricultural lease areas. These areas have likely been substantially disturbed by past agricultural activities, and the potential for intact cultural resources within them is therefore likely low. The level of effort for study of these areas will be scaled to this potential and will consist of an RLS designed to identify any resources that remain intact, which are likely to be large and easily visible, such as building foundations or standing structures. This study will occur during the first study season.

To conduct this study, professional archaeologists and architectural historians will travel through and around the Project Boundary on roads in vehicles and, if feasible, along the reservoir shoreline in boats, to look for cultural resources within agricultural lease areas. The lease areas and suitable means of access will be identified using GIS tools prior to the survey. Any archaeological resources found will be documented and evaluated for NRHP eligibility in the same manner as resources identified in the archaeological ILS (i.e., a UASF will be prepared). Any historic architectural resources found will be documented and evaluated for NRHP eligibility following methods outlined in UDSH’s *Reconnaissance Level Survey Standard Operating Procedures* for Section 106 undertakings (USHPO 2015b). This will include collecting information necessary for completing a Reconnaissance Survey Form and photographic documentation using high-resolution digital photography. NRHP eligibility evaluations for historic architectural resources identified in the RLS will, following UDSH guidance, consist solely of evaluating whether they meet age and integrity requirements; historical research to assess their significance will not be conducted. Measures for further management of any historic architectural resources that are identified as “eligible” in this manner may be specified in the HPMP to be developed for the Project. All fieldwork and reporting will be supervised by a professional archaeologist who meets the Secretary of the Interior’s

Professional Qualifications Standards for archaeology and holds a valid Public Lands Policy Coordination Office archaeological Principal Investigator permit, and by a professional architectural historian who meets the Secretary of the Interior’s Professional Qualifications Standards for architectural history.

4.2.5.5 ETHNOGRAPHIC INVENTORY

Pending tribal participation, an ethnographic inventory will be conducted in coordination with participating tribes to identify historic properties in the proposed APE that have religious and cultural significance to the tribes.

Although there are no tribal lands in or near the Project Boundary, the following tribes are associated with the larger region where the Project is located:

- Northwestern Band of Shoshone Nation
- Shoshone-Bannock Tribes
- Ute Indian Tribe
- Skull Valley Band of Goshute

The tribes listed above will be asked to participate in the ethnographic inventory. If any or all of the tribes agree to participate, a qualified ethnographer will work closely with the participants to identify and appropriately document tribal resources in the proposed APE during the first study season.

4.2.6 SCHEDULE AND PERIODIC REPORTING

Analysis and reporting for the proposed cultural resources studies will follow applicable FERC, UDSH, and National Park Service (NPS) guidelines for archaeological and historic architectural reporting, as outlined in the various guidance documents cited above.

Reporting for the archaeological ILS will follow the requirements of the UDSH *Archaeological Compliance Guidance*. All identified resources will be evaluated for eligibility for the NRHP following UDSH and NPS guidance, and contextual information will be presented as background for such evaluations. UASFs and any UHSFs prepared will be attached to the report. All isolated finds identified during the ILS will be reported in tabular format in an appendix to the report.

Reporting for the Wheelon Dam historic architectural ILS will follow UDSH's *Intensive Level Survey Standard Operating Procedures*. Reporting will include completing a UHSF for the dam, which will be uploaded to UDSH's online database, and submitting an associated letter report. Photographs of the dam, photocopies of historic photographs and historic drawings or plans (if available), and photocopies of any additional research material will be attached to the UHSF.

Reporting for the District study will consist of submission of an NRHP nomination form amendment, including photographs and maps. Images will be provided in digital format only for submittal to the NRHP, although one printed set may be provided for UDSH's records.

Reporting methods for the archaeological component of the RLS will be the same as those described above for the archaeological ILS. Reporting for the historic architectural component will consist of preparing a report that will follow UDSH's *Reconnaissance Level Survey Standard Operating Procedures* and will include a summary of the relevant aspects of the history of the Project Area and a description of survey results.

Reporting methods for the ethnographic inventory will be approved by participating tribes and all confidential information will remain confidential as requested by the participating tribes.

All reporting will occur after the first study season in 2020. All reports and associated deliverables will be submitted first to PacifiCorp and the FERC for review. Following revision based on PacifiCorp's and the FERC's input, reports will be submitted to the Utah SHPO and other consulting parties, as appropriate, for review. Final versions will be prepared following receipt of input from SHPO and any other consulting parties. It is anticipated that UDSH will handle submission of the District NRHP nomination form to NPS according to their procedures for NRHP submissions (which include obtaining approval from the Utah Board of State History). To the extent applicable, all deliverables will be submitted in electronic format and suitable for UDSH's e106 process. Any photographic documentation completed as part of any of the proposed studies may be shared with other parties involved in the FERC relicensing process, subject to the approval of PacifiCorp, the FERC, and UDSH.

Initial study activities will consist of those that will occur during the planned reservoir drawdown in the fall of 2019: the archaeological ILS of shoreline, recreational, and irrigation infrastructure

areas, and the Wheelon Dam historic architectural ILS. First study season activities will consist of the archaeological ILS of upstream and downstream riverbank areas (if needed), the District NRHP nomination form, and the archaeological and historic architectural RLS of agricultural lease areas. It is not anticipated that cultural resources studies will be required during the second study season.

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix B includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress report and for the ISR.

4.2.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Cultural Resources Proposed Study Plan is within the range of \$85,000 to \$140,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts or benefits to the resource, and to determine the need for any specific protection, mitigation or enhancement actions.

4.2.8 PROPOSED STUDY PLAN CONSULTATION RECORD

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the CULT1 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5 provides rationale based on Project specific information and the FERC's Study Plan Criteria (18 CFR § 5.9).

4.2.9 REFERENCES

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5 REQUESTED STUDIES NOT ADOPTED

Multiple stakeholders requested studies that PacifiCorp has not adopted as separate stand-alone studies; however, in some cases, PacifiCorp incorporated elements of the request into a specific Study Plan. The requested studies not adopted are summarized below, and outlined in depth in the Response to Comments Table (Appendix A):

- **Expansion of Sedimentation Study:** PacifiCorp intends to collect LiDAR data on up to 2 miles of the BRCC canals. The LiDAR data will not necessarily provide the quantity of sediment transported into the canals, but a simple load estimate on canal flows and TSS concentrations could be calculated by the BRCC to estimate the annual load of sediment in the canals to assist with its O&M needs.¹⁵
- **Aquatic Weeds and Algae Study Request:** PacifiCorp does not propose to study aquatic weeds or algae during the relicensing process. PacifiCorp believes the requester has not established a Project nexus nor a proposed methodology per the Federal Power Act under 18 CFR §5.9 that would merit PacifiCorp conducting an aquatic or algae study that addresses the transport of weeds in the Project Area or in the BRCC's canals; further PacifiCorp is unaware of any appropriate methodology for such a study. Changing water conditions, especially increased water temperatures, have led to increased aquatic maintenance costs for virtually all canal operators in the region.¹⁶
- **Effects of Cutler Reservoir fluctuations on flows and water levels at Bear River Migratory Bird Refuge facilities downstream of Cutler Dam:** PacifiCorp maintains the Hydraulic Modeling Study plan scope is an appropriate level of effort given the direct and indirect effects identified in the FERC's SD1. PacifiCorp is not proposing to change the overall quantity of water flowing downstream. Other large tributaries, multiple constriction points and an unknown number of irrigation withdrawals (potentially a very large number) downstream of Cutler Reservoir could have flow-related impacts on water in the Bird Refuge. However, operation of the Project would not incrementally contribute to these flow-related impacts because there would not be a change in the overall quantity of water flowing downstream as a result of the Project. The Bird Refuge will be addressed as part of the NEPA cumulative effects analysis to the extent that the Bird Refuge is within the geographic scope of effects from operation of the Project. PacifiCorp has further communicated with USFWS staff to address some of their questions and concerns resulting from SD1 and the PAD.¹⁷
- **Study to determine how greater reservoir fluctuations and/or the removal of Wheelon Dam could lead to changes in sediment and nutrient transport:** PacifiCorp's 2D hydraulic model will be constructed to explore a number of scenarios on operation water elevations

¹⁵ Response to Comments Table, Line 15.

¹⁶ Ibid., line 19.

¹⁷ Ibid., line 21.

and resultant effects on sediment transport. Data collection for the model will include soil classification as well as phosphorous and other potential pollutant data. The model runs will explore transport through the dam and management decisions to control sediment. These issues will be also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the proposed future operations.¹⁸ These issues will be also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the proposed future operations.

- Effects on water quality from fluctuating reservoir levels and Wheelon Dam removal: PacifiCorp's Water Quality Study proposes to monitor TP, dissolved phosphorus, orthophosphate, and DO during the drawdown to evaluate the potential for mobilization of nutrients. That data will be used to predict the effect of proposed operations on potentially mobilizing nutrients and levels of DO in the reservoir and downstream of the dam; heavy metals and other contaminants will be assessed as part of the Sedimentation Study. These issues will also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the proposed future operations.¹⁹
- Fish Entrainment Study: PacifiCorp is interested in furthering the discussion with USFWS on impediments to or opportunities for fish passage to be evaluated as part of this relicensing. The need for this study is not clear; as the comment letter noted, there is currently no native or sport fishery downstream of the Project, nor are there threatened or endangered species or anadromous fish issues in or downstream of Cutler Reservoir. The agency resource goals and objectives (and for which species) that would be addressed by studying entrainment mortality or providing fish passage opportunities is not clear. PacifiCorp has further communicated with USFWS staff to address some of their questions and concerns resulting from SD1 and the PAD.²⁰
- Study to consider how reductions in the Bear River flows as a function of climate change and warmer air temperatures would impact hydropower generation: PacifiCorp is not proposing a Hydrological Study during this relicensing that would address climate change or snowpack levels. Whereas PacifiCorp agrees with the FERC's 2009 determination that climate change is occurring, PacifiCorp also agrees with the FERC that it is not aware of any climate change models that are known to have the accuracy needed to predict the degree of specific resource impacts and serve as the basis for informing license conditions (FERC February 23, 2009 Study Plan Determination for the Yuba-Bear, Drum-Spaulding, and Rollins Projects). Climate change will be addressed as part of the Cumulative Effects analysis.²¹
- Study of methane emission from Cutler and make it clear that the Project is not considered an "emission free" power source: PacifiCorp will review existing information concerning methane emissions from western reservoirs as part of the analysis process. A Project nexus nor proven methodology that is consistent with generally accepted practice

¹⁸ Ibid., line 22.

¹⁹ Ibid., line 24.

²⁰ Ibid., line 23.

²¹ Ibid., line 27.

in the scientific community per the Federal Power Act under 18 CFR §5.9 has been identified.²²

- Analysis of the socioeconomic impacts of the Project: PacifiCorp is not proposing to conduct a Socioeconomic Study as part of this relicensing, as any proposed Project operational changes would not change the socioeconomic framework from the current analysis provided in the PAD. The study elements being requested are part of the FERC's Developmental Analysis and would not normally be a part of a socioeconomic study.²³
- Model the Bear River system to include Bear Lake and the hydro plants downstream: PacifiCorp is not proposing to change the withdrawals from Bear Lake nor the operations from projects upstream of Cutler Reservoir. Additionally, PacifiCorp maintains the upstream projects are not hydraulically connected or dependent on the operations of the Cutler Reservoir; nor will the reservoir have impacts to the tailwater of the nearest upstream dam. Additionally upstream projects are not dependent on the operations of the Cutler Reservoir; nor will the reservoir have impacts to the tailwater of the nearest upstream dam. Additionally, a Public Interest Consideration per the Federal Power Act under 18 CFR §5.9 is needed to for PacifiCorp to consider merits of this study.²⁴
- Temporal and Spatial Characteristics of the Avian Community: PacifiCorp is not proposing a Temporal and Spatial Characteristics Study of the Avian Community as part of this relicensing. PacifiCorp would be interested in furthering this discussion with the requester after potential effects on various populations have been established in the Shoreline Characterization Study and Land Use Study.²⁵
- Study of cross-sectional diurnal dissolved oxygen: PacifiCorp is conducting a Water Quality Study whose analysis will use existing DO monitoring data collected during 2008 and 2009. These measurements were collected at 15-minute frequencies for a 7-day periods during most months. This data set will be used to characterize anoxic conditions and seasonal patterns at each monitoring site.²⁶
- Study the potential for dredging to improve fish and wildlife habitat and control *Phragmites*: PacifiCorp is not proposing to include the reach down to the Great Salt Lake as part of its Hydraulic Study as part of this relicensing. A Project nexus nor a Public Interest Consideration per the Federal Power Act under 18 CFR § 5.9 has been establish that would help PacifiCorp consider if study is merited.²⁷
- Study looking at erosion below the Cutler Dam as a result of water level fluctuations and subsequently winter time ice fluctuations: Land Use Study will collect data during the drawdown and in the following year to identify potential impacts of proposed operational changes on Bear River bank stability and erosion. UDAF is welcome to provide PacifiCorp with Bear River channel locations where they are concerned about bank

²² Ibid., line 28.

²³ Ibid., line 29.

²⁴ Ibid., line 34.

²⁵ Ibid., line 36.

²⁶ Ibid., line 37.

²⁷ Ibid., line 38.

erosion or sloughing. These locations will be taken into consideration when choosing monitoring sites.²⁸

- Study that looks at dredging for the positive impact on the fishery, water quality and potentially reduce the *Phragmites* problem: The Hydraulic Modeling Study will analyze the impacts to the hydraulics, sediment transport, and water quality within the reservoir that would result from dredging.²⁹
- Study of the effects associated with winter ramping and the effects on bank erosion and water quality: PacifiCorp would like to understand the Project nexus, methodology proposed and agency-specific resource management goals per 18 CFR § 5.9(b)(2) and how the requested modification to studies would inform a quantitative measure that could inform future license conditions.³⁰

²⁸ Ibid., line 41.

²⁹ Ibid., line 43.

³⁰ Ibid., line 45.

APPENDIX A
RESPONSE TO COMMENTS TABLE

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|----|------------------------|--|---|
| 1. | City of Logan | Increase water quality monitoring frequency to better understand water quality, independent of hydrologic variation. This should be completed annually and reported with all inflows from gauging stations occurring at the same time. mg/L is not adequate to truly understand the issues. Using the proposed reservoir volume mapping at various water levels and inflows, a representative mass balance can be prepared to quantify the individual impacts. | PacifiCorp believes this comment to be a request for a future PME measure, which will be established after the impacts analysis is completed. PacifiCorp intends to complete a Water Quality Study during the upcoming study season that will compile previously collected data and reports and combine it with hydrologic data collected as part of this relicensing effort. |
| 2. | City of Logan | PacifiCorp, FERC, and the UDWQ need to publish water quality monitoring reports and data from their studies from 2014 to present, early in the process rather than as a result of the process. PacifiCorp recognizes that the 2013 phosphorous data was erroneous. As a result, the ongoing monitoring has not been published since 2008. This must be published for review as soon as possible to ensure that good science is used in the review. | Comment noted. The assertion regarding monitoring result publication is incorrect. PacifiCorp published water quality monitoring data from 2013 in the Cutler RMP Five-Year Monitoring Report filed in March 2018; the 2008 water quality data was published in the previous monitoring report in 2013. The RMP reports are based on 5-year monitoring periods, therefore, the next report that contains data from 2013 to 2018 will be published in 2020, rather than 2023 as scheduled, due to the relicensing timeline and proposed data synthesis. All previous Cutler RMP Five-Year Monitoring reports are available for review on the PacifiCorp website. |
| 3. | City of Logan | Map areas that became stagnant due to sedimentation or other types of isolation within the reservoir which have higher temperatures and hold the water for long periods of time, thus it becomes toxic. These areas will mobilize stored TP from the sediments as the oxidation states of iron change. | PacifiCorp intends to complete pre- and post-drawdown LiDAR and bathymetry surveys in late 2019 that will inform areas that will potentially "pond" under a range of proposed elevation changes. A range of conditions may occur as a result of the proposed elevation changes including, but not limited to, pH, DO, and temperature changes, along with other chemical processes. PacifiCorp intends to conduct analyses on phosphorus in the bed sediments as well as other ions that may absorb or bind with cation exchange (these may include CaCo ₃ , Al, and Fe). |
| 4. | City of Logan | Evaluate the impacts of common carp on the water quality of the Bear River Cutler Reservoir. Studies in Utah Lake should be used to establish a correlation or comparison since both are shallow eutrophic reservoirs. The reservoir and the Bear River are impacted by the feeding habits of the large population of carp. This is reflected when the carp change their feeding habits during the winter months. | PacifiCorp intends to conduct a Water Quality Study that will summarize the results of studies regarding this issue from the Bear River Refuge and other systems similar to the Cutler Reservoir. The Project nexus per the Federal Power Act under 18 CFR §5.9 for this study request is not clear. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
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| 5. | City of Logan | Evaluate the sediment profiles throughout the reservoir to ensure that any sediment movement or removal will not mobilize other contaminants. | Comment noted. PacificCorp intends to collect samples to be analyzed for specific constituents. These will include metals (RCRA), pesticides, PCBs, AL, FE, P, and CaCo3. |
| 6. | City of Logan | Develop a 2D water reservoir model based on the LiDAR mapping data being collected. This will help to better evaluate the impacts of a broader range of reservoir operations that are beyond the ability to physically measure given the limited time to complete the study. This will also allow the evaluation of the impacts from an area where measurements will not be easily gathered. | Comment noted. As stated in the PAD and the scoping meetings, a 2D model is proposed. PacificCorp intends to build a Hydraulic Model as a result of the Hydraulic Modeling Study plan. The 2D model will provide a detailed inundation boundary and flow pattern results. |
| 7. | City of Logan | It is not adequate for PacificCorp to evaluate the impacts of varying operations by simply measuring discrete points of drawdown under controlled inflow conditions. PacificCorp should be required to create the 2D model to allow the evaluation of the boundary conditions to determine overall impacts. | Comment noted. PacificCorp intends on building a Hydraulic Model as a result of the Hydraulic Modeling Study plan. The 2D model will provide a detailed inundation boundary and flow pattern results that will help evaluate boundary conditions and determine overall impacts. |
| 8. | City of Logan | Use the 2D model to evaluate mitigation options to evaluate drawdown impacts, the potential benefits of limited and large portion dredging, the breaching of the Wheelon Dam, and other proposed options. Breaching Wheelon Dam before verifying that the sediments in the reservoir are not contaminated could be devastating to Cutler Reservoir and the downstream Bear River. | Comment noted. PacificCorp intends on building a Hydraulic Model as a result of the Hydraulic Modeling Study plan. The 2D model will allow PacificCorp to evaluate future PME measures. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
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| 9. | City of Logan | The soils around Cutler Reservoir are highly erosive. Rapid lowering of the water surface, particularly in a repeated nature will create unbalance hydrostatic forces. This will likely cause increased sloughing of the banks. This is a water quality, wetland, and habitat concern that must be addressed. The soils around the reservoir are highly erosive as demonstrated by the concerns in the RMP and the extensive erosion control efforts employed by PacificCorp as part of the existing license. Any proposed modifications must be evaluated for impacts and mitigation efforts employed to protect the banks and the wetlands from erosion as well as to prevent erosion from further harming water quality in the reservoir and downstream. The rapid fluctuations would create unbalanced hydrostatic pressures in the soils and can cause bank failures and sloughing. This would impact water quality, the ecology of the banks, including wetlands and surrounding property owners. | Comment noted. PacificCorp's proposed 2D model will quantify the volume of sediment activated by the reservoir based on the changes in hydraulics caused by the drawdown. However, the hydraulic model will not model/predict bank sloughing quantities and locations. PacificCorp does plan on collecting data before, during and after the drawdown that might provide insight into the impacts that repeated drawdowns could have on bank stability. This includes time-lapse photography of various sites that could be more susceptible to bank erosion during the drawdown. The City of Logan is welcome to provide PacificCorp any locations of particular concern with regard to bank erosion or sloughing taking place. These locations will be taken into consideration when choosing final observation sites (see also Land Use Study Plan, section 2.3). |
| 10. | City of Logan | Organize a technical advisory committee to help provide technical oversight of the studies on the proposed operations. | PacificCorp is conducting the Cutler relicensing using the FERC's ILP. The FERC ILP process provides for regular stakeholder and technical review of Study Plans, including the proposed implementation, data analysis, and reporting through prescribed steps as outlined in the Federal Power Act under 18 CFR § 5.15. There are provisions and steps outlined in this process to adjust studies as necessary based on review of preliminary data. In addition, PacificCorp intends to continue on-going PacificCorp-sponsored collaboration efforts, which will include workshops to address technical issues on an as-needed basis. |
| 11. | City of Logan | Consider the effects on the bank stabilization efforts implemented with nearly stable WSL restrictions that would potentially no longer be effective. | Comment noted. PacificCorp's intends to conduct a Land Use Study that will address existing concerns with regard to shoreline erosions and impacts of the proposed elevation changes in reservoir operations on the efficacy of past bank stabilization efforts at Cutler Reservoir. |
| 12. | City of Logan | The data presented in the TDML included oxygen, TP, TSS, ammonia, turbidity, a biologic and fisheries study, and water temperature. All of these will be affected, either positively or negatively, by level fluctuation. These modifications require extensive evaluation in order to protect the ecologic value of the reservoir, water quality both in the reservoir and downstream, and the surrounding properties. | Comment noted. PacificCorp intends to conduct a Water Quality Study, Fish and Aquatic Resources Study, and Hydraulic Modeling Study that will provide the effects of proposed reservoir elevation changes on the prominent environmental issues that exist in the reservoir. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|------------------------|---|--|
| 13. | City of Logan | Evaluate the water quality impacts on the reservoir associated with upstream BMPs. These will include the construction of the Logan WWTF, JB Swift Wastewater Treatment Plant, Hyrum Wastewater Treatment Plant, water quality projects on the Logan River and the Little Bear River, efforts to eliminate feed lot discharges, conversion of flood irrigation to sprinkler irrigation from the Idaho border all the way to Cutler Reservoir, and the implementation of extensive storm water management programs by each of the cities, as well as Cache County, upstream of Cutler Reservoir, on all of the tributaries. The water quality of the reservoir is affected by all of the region. Address how those efforts have modified the water quality and how any operation modifications will either support or negate those benefits. Any modifications to the reservoir operations, particularly increase in WSLs may jeopardize the discharge, and possibly the operations of the new Logan city WWTF. This \$160 million-dollar regional facility must be protected. | Comment noted. PacifiCorp believes this comment is consistent with the cumulative effects analysis that the FERC has specified in SD1. PacifiCorp's Water Quality Study will inform this analysis. |
| 14. | BRCC | The expansion of the LiDAR study could establish the elevations of the channel in relation to the gates and other fixed items in the system. Through modeling, a third party can: <ol style="list-style-type: none"> 1) model the performance of their current gate system in a variable operation system to ensure that steady delivery will occur 2) determine locations appropriate for weirs 3) model the quality of delivery of a weir based on the integrated system 4) compare the two resulting qualities of delivery. BRCC requests this variable operation modeling occur and be taken into account by FERC when deciding whether to grant PacifiCorp a more flexible operation elevation. | PacifiCorp has agreed to collect LiDAR data and provide the data on up to 2 miles of BRCC canals as requested by BRCC, however, a clear Project nexus between the proposed Project operations and Project maintenance of the canals has not been established. PacifiCorp believes that the reservoir and dam may be reducing the sediment in the canals since the dam acts as a trap to avoid sediment entering the canals. In the spirit of collaboration, LiDAR data should help confirm quantities of water deliveries under the proposed operations. |
| 15. | BRCC | Expand the Sedimentation Study to include the two main BRCC canals found just below Cutler Dam. The goal of an expanded sedimentation study is to: <ol style="list-style-type: none"> 1) understand the amount of sediment that is passed from Cutler Dam to the BRCC canals each season 2) determine operational practices that could reduce sediment transfer to the canal system. | PacifiCorp intends to collect LiDAR data on up to 2 miles of the BRCC canals. The LiDAR data will not necessarily provide the quantity of sediment transported into the canals, but a simple load estimate on canal flows and TSS concentrations could be calculated by the BRCC to estimate the annual load of sediment in the canals to assist with its O&M needs. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
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| 16. | BRCC | Expand the LiDAR readings to include the two main BRCC canals to the same 2-mile-distance. PacificCorp's contractual obligations to BRCC are directly related to the condition of the BRCC canals and an expanding LiDAR study and data will be used to: <ol style="list-style-type: none"> 1) establish the ability of current gate automation systems to provide a steady flow of irrigation and stock water during the newly proposed variable operation 2) determine viable locations for better measurement devices 3) help determine an appropriate maintenance program for the upper canal system as it relates to silt deposits 4) determine the true channel capacity of the respective canals. | PacificCorp intends to collect LiDAR data on up to 2 miles of BRCC canals as requested by BRCC. PacificCorp believes that the reservoir and dam may be reducing the sediment in the canals since the dam acts as a trap to avoid sediment entering the canals. The canal measuring system is calibrated annually or more frequently as needed; in 2019 the accuracy was assessed in conjunction with BRCC and found to be adequate. |
| 17. | BRCC | Expansion of the LiDAR study would measure the current canal elevations to determine the extent of sedimentation since the last cleaning. This data could then be used to determine an appropriate cycle for cleaning of this section of the canal. The data would assist in a study determining how much sediment is transported to the canals from Cutler Reservoir. Sedimentation will be an issue of increasing concern to BRCC as it affects BRCC's ability to effectively deliver water to shareholders and remediation is expensive. Moreover, the cost to PacificCorp to expand the LiDAR study would be limited since the river channel along the same length is already being surveyed as part of the current LiDAR study. | PacificCorp intends to collect LiDAR data on up to 2 miles of the BRCC canals. The LiDAR data will not necessarily provide the quantity of sediment transported into the canals, but a simple load estimate on canal flows and TSS concentrations could be calculated by the BRCC to estimate the annual load of sediment in the canals to assist with its O&M needs. |
| 18. | BRCC | The suspended solids cause economic loss to the shareholders of BRCC and in turn removes capital from Box Elder County. The data gathered from an expanded sedimentation and LiDAR study could be used to determine the current amount of sediment passed to the canal system. BRCC recommends FERC use the sediment studies to inform whether PacificCorp's operations can be adjusted to minimize future sediment loading. For example, BRCC recommends FERC review whether the 7-foot low-level passage described on page 7 of the FERC Scoping document can and should be utilized to clear material from the face of the dam. If operated in times of high water (when the spill gates would normally operate), the associated high-water flows would allow additional sedimentation to be carried downstream without adverse effects. | PacificCorp believes the Hydraulic Modeling Study and the Sedimentation Study will help inform future Cutler operations. These results might help the BRCC plan for O&M needs of their canals, which are likely to receive less sediment than if they were withdrawing from a free-flowing river rather than a reservoir. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|-------------------------------------|---|---|
| 19. | BRCC | <p>Requests an additional Study of Aquatic Weeds and Algae. Aquatic weeds and algae impede BRCC’s ability to effectively deliver shareholder water and can represent public safety concerns. Aquatic weeds and algae can clog irrigation infrastructure and canals. Clogged infrastructure can result in costly time delays and damage to personal and real property. Accordingly, aquatic vegetative control efforts constitute the single largest annual expenditure for BRCC. Over the past 4 years, BRCC has seen its control costs double. As a potential conduit for aquatic weeds and algae, BRCC recommends FERC study whether Cutler Reservoir is a contributing source for increased aquatic weeds and algae in BRCC canals. The study will review:</p> <ol style="list-style-type: none"> 1) the corresponding populations levels of aquatic weeds and algae in Cutler Reservoir and BRCC canals 2) the migration of aquatic weed and algae populations into the BRCC canal system through Cutler Reservoir by reproduction or direct relocation 3) preventative and mitigation measure to minimize upstream aquatic plant material or algae from flowing into the BRCC canal system. <p>This study will supplement existing BRCC efforts to determine the cause of an increasingly vibrant aquatic weed and algae population. The aquatic weeds and algae which BRCC is most concerned about are: Filamentous Algae, Sago Pondweed, and Horned Pondweed. BRCC also recommends FERC study appropriate aquatic weed and algae prevention and mitigation measures reflecting the results of the initial study. BRCC recommends studying inserting a sample catch screen in the canals below the dam a set number of days each month. A professional biologist should be consulted to develop an appropriate protocol to adequately accomplish the goals of the study.</p> | <p>PacifiCorp does not propose to study aquatic weeds or algae during the relicensing process. PacifiCorp believes the requester has not established a Project nexus nor a proposed methodology per the Federal Power Act under 18 CFR §5.9 that would merit PacifiCorp conducting an aquatic or algae study that addresses the transport of weeds in the Project Area or in the BRCC's canals; further PacifiCorp is unaware of any appropriate methodology for such a study. Changing water conditions, especially increased water temperatures, have led to increased aquatic maintenance costs for virtually all canal operators in the region.</p> |
| 20. | Mitchell Moncur; Private Citizen | <p>Mitchell Moncur suggests that the concrete boat ramp needs to be extended located at Cutler Canyon Marina. Suggested the boat ramp be extended 6 to 8 linear feet to prevent scraping and damage to boat trailers to launch boats.</p> | <p>PacifiCorp's Recreation Resources Study Plan will inform the effects the proposed operations will have on the usability of boat ramps and in-water recreation. The results of this study will be used to determine whether additional PME measures related to recreation resources are merited. Mr. Moncur spoke with PacifiCorp staff and was chiefly interested in measures that could address a boat ramp use concern immediately rather than as a future PME measure; the situation will be assessed during the proposed 2019 Cutler drawdown.</p> |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|------------------------|---|---|
| 21. | USFWS | <p>Study Request: Effects of Cutler Reservoir fluctuations on flows and water levels at Bear River Migratory Bird Refuge facilities downstream of Cutler Dam</p> <p>USFWS is concerned that large swings in the discharge of the Bear River will inhibit water diversions to the refuge, damage refuge infrastructure, or lead to flooding of privately owned property along the Bear River.</p> <p>USFWS recommends that a study be conducted to better characterize the proposed changes in reservoir elevations, Bear River discharge, and what effect it has on downstream facilities (pg. 3 has full details of study request).</p> | <p>PacifiCorp maintains the Hydraulic Modeling Study plan scope is an appropriate level of effort given the direct and indirect effects identified in the FERC's SD1. PacifiCorp is not proposing to change the overall quantity of water flowing downstream. Other large tributaries, multiple constriction points and an unknown number of irrigation withdrawals (potentially a very large number) downstream of Cutler Reservoir could have flow-related impacts on water in the Bird Refuge. However, operation of the Project would not incrementally contribute to these flow-related impacts because there would not be a change in the overall quantity of water flowing downstream as a result of the Project. The Bird Refuge will be addressed as part of the NEPA cumulative effects analysis to the extent that the Bird Refuge is within the geographic scope of effects from operation of the Project. PacifiCorp has further communicated with USFWS staff to address some of their questions and concerns resulting from SD1 and the PAD.</p> |
| 22. | USFWS | <p>Study Request: The refuge occupies portions of the historical Bear River Delta and is the natural location where sediment carried in the Bear River is deposited. Information contained in the PAD notes the potential for two management actions that may release large volumes of sediment (and associated nutrients and contaminants) into the river that may eventually settle onto the refuge: reservoir fluctuations and removal of Wheelon Dam.</p> <p>USFWS recommends a study be conducted to determine how greater reservoir fluctuations and/or the removal of Wheelon Dam could lead to changes in sediment and nutrient transport (details on pg. 4 of comments).</p> | <p>PacifiCorp's 2D hydraulic model will be constructed to explore a number of scenarios on operation water elevations and resultant effects on sediment transport. Data collection for the model will include soil classification as well as phosphorous and other potential pollutant data. The model runs will explore transport through the dam and management decisions to control sediment. These issues will be also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the proposed future operations.</p> |
| 23. | USFWS | <p>USFWS is concerned that fish and other aquatic resources are not able to survive in this portion of the Bear River due to the inability to maintain flows and the inability to pass through the dam.</p> <p>USFWS requests that information on impediments to or opportunities for fish passage be provided and evaluated subject to Section 18 of the Federal Power Act. USFWS also recommends that the Project design consider the installation of fish screens at intake structures for the Project turbines and pumps in order to avoid fish entrainment.</p> | <p>PacifiCorp is interested in furthering the discussion with USFWS on impediments to or opportunities for fish passage to be evaluated as part of this relicensing. The need for this study is not clear; as the comment letter noted, there is currently no native or sport fishery downstream of the Project, nor are there threatened or endangered species or anadromous fish issues in or downstream of Cutler Reservoir. The agency resource goals and objectives (and for which species) that would be addressed by studying entrainment mortality or providing fish passage opportunities is not clear. PacifiCorp has further communicated with USFWS staff to address some of their questions and concerns resulting from SD1 and the PAD.</p> |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|------------------------|--|---|
| 24. | USFWS | <p>Study Request: Effects on water quality from fluctuating reservoir levels and Wheelon Dam removal</p> <p>Destabilization of the stream bed or the bed of Cutler Reservoir may entrain and release nutrients and contaminants which would likely be harmful to aquatic wildlife and migratory bird habitat downstream of Cutler Dam. Specific concerns are that excess nutrients could lead to unwanted vegetation and harmful algal blooms, that heavy metals could concentrate in refuge impoundments, that low DO levels could lead to reduced food supply, and that any of these factors may lead to the spread of avian disease.</p> <p>USFWS recommends that a study be conducted to evaluate various water quality parameters that change as a result of greater reservoir level fluctuations and the removal of Wheelon Dam.</p> | <p>PacificCorp's Water Quality Study proposes to monitor TP, dissolved phosphorus, orthophosphate, and DO during the drawdown to evaluate the potential for mobilization of nutrients. That data will be used to predict the effect of proposed operations on potentially mobilizing nutrients and levels of DO in the reservoir and downstream of the dam; heavy metals and other contaminants will be assessed as part of the Sedimentation Study. These issues will also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the proposed future operations.</p> |
| 25. | Utah Rivers Council | <p>Suggests that FERC consider several connected and cumulative actions to comply with NEPA. FERC should consider impacts to the full reach of the river down to the refuge and the entire Great Salt Lake, rather than just 2 miles downstream. The scope of the environmental analysis should include not only the entire reach of the Bear River below Cutler Dam, but the Great Salt Lake as well. FERC should conduct sediment sampling in Cutler Reservoir for depth and composition as sediment has major implications to the potential hydropower generation. URC also suggests a rigorous analysis of the sediment composition to understand what type of pollutants might be washed downstream.</p> | <p>The FERC's SD1 identified the Bear River Basin, and the mainstem of the Bear River as the geographic scope for cumulative effects for specific resource areas. Cumulative effects will be determined once more is known about Project impacts on the specific resources. By law, PacificCorp is bound by contractual agreements with irrigators to meet their water needs before using water for Project purposes. PacificCorp is also proposing a Sedimentation Study to address the effects Project operations has on sediment transport, and includes sampling for heavy metals and other contaminants.</p> |
| 26. | Utah Rivers Council | <p>Suggest FERC conduct an investigation into the stated purpose and need for the Project. An appropriate question for FERC to ask is whether or not the facility generates enough power when it is truly needed. During mid-May to the end of September the facility creates very little power even though the peak power demand months comes during that period. FERC should also ask whether RMP has other power generation options available, either through oncoming solar generation or modernization of electrical grids that could substitute the need for hydropower generation at Cutler Reservoir.</p> | <p>Comment noted. The subject of power generation of Cutler, and how that relates to other power generation alternatives, will be addressed in the FERC's Developmental analysis under the category of "Need for Power," which will also address the economic viability of Cutler operating in the future.</p> |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|------------------------|--|--|
| 27. | Utah Rivers Council | Suggests that FERC consider how reductions in the Bear River flows as a function of climate change and warmer air temperatures would impact hydropower generation. Increasing air temperatures will result in more rain and less snow in the Bear River watershed. This, in turn, threatens Bear River snowpack, which will have significant impacts on Bear River water users, including RMP. Climate models indicate there may be a 5-15% increase in precipitation levels in Northern Utah, but rising temperatures mean this will occur more frequently as rain-leading to less snow accumulation and an earlier snowmelt. | PacifiCorp is not proposing a Hydrological Study during this relicensing that would address climate change or snowpack levels. Whereas PacifiCorp agrees with the FERC's 2009 determination that climate change is occurring, PacifiCorp also agrees with the FERC that it is not aware of any climate change models that are known to have the accuracy needed to predict the degree of specific resource impacts and serve as the basis for informing license conditions (FERC February 23, 2009 Study Plan Determination for the Yuba-Bear, Drum-Spaulding, and Rollins Projects). Climate change will be addressed as part of the Cumulative Effects analysis. |
| 28. | Utah Rivers Council | Suggests that FERC require an independent study of methane emission from Cutler and make it clear that Cutler Project is not considered an "emission free" power source. The large amounts of sediment and organic matter behind the dam in the reservoir produce methane. | PacifiCorp will review existing information concerning methane emissions from western reservoirs as part of the analysis process. A Project nexus nor proven methodology that is consistent with generally accepted practice in the scientific community per the Federal Power Act under 18 CFR §5.9 has been identified. |
| 29. | Utah Rivers Council | Suggests FERC should conduct a thorough, independent analysis of the socioeconomic impacts of the Project. These include, but are not limited to, the cost of the power generated by the Cutler Project to the consumers and the financial feasibility of the Project over the next 30 years. | Comment noted. PacifiCorp is not proposing to conduct a Socioeconomic Study as part of this relicensing, as any proposed Project operational changes would not change the socioeconomic framework from the current analysis provided in the PAD. The study elements being requested are part of the FERC's Developmental Analysis and would not normally be a part of a socioeconomic study |
| 30. | Utah Rivers Council | Suggests that FERC should consider alternatives to issuing a new 30-year license for the Project. URC is suggesting that the Cutler hydropower generation is not needed and could be decommissioned so that the dam use could be changed, with solar power a likely alternative for power generation in Utah. | Comment noted. The FERC will consider alternatives in its NEPA analysis. |
| 31. | Utah Rivers Council | Suggests a full EIS to be conducted instead of an EA. | Comment noted. Ultimately, the FERC will decide whether an EA is sufficient or an EIS is required based on its NEPA implementing regulations and other factors. |
| 32. | Bear Lake Watch | Geographic scope of cumulative efforts should be the entire Bear River Basin. | Comment noted. The FERC's SD1 identified the Bear River Basin, and the mainstem of the Bear River as the geographic scope for cumulative effects for specific resource areas. |
| 33. | Bear Lake Watch | The allocations of irrigation water are spelled out in the Amended Bear Lake Settlement Agreement (2004) and should be part of the FERC record for Cutler relicensing. | Comment noted. The Bear Lake Settlement Agreement and all the major water uses are addressed in the PAD in Section 4.3 and thus are part of the FERC record for Cutler relicensing. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|-----------------------------|---|--|
| 34. | Bear Lake Watch | Requests an additional study that would model the Bear River system to include Bear Lake and the hydro plants downstream. The model should include enough to show what-ifs, impacts of different flow regimes, impacts and reservoir refill times when spinning reserve is needed, impacts and refill times when Cutler is operated at the proposed new levels, and any impacts to Bear Lake. | PacifiCorp is not proposing to change the withdrawals from Bear Lake nor the operations from projects upstream of Cutler Reservoir. Additionally, PacifiCorp maintains the upstream projects are not hydraulically connected or dependent on the operations of the Cutler Reservoir; nor will the reservoir have impacts to the tailwater of the nearest upstream dam. Additionally upstream projects are not dependent on the operations of the Cutler Reservoir; nor will the reservoir have impacts to the tailwater of the nearest upstream dam. Additionally, a Public Interest Consideration per the Federal Power Act under 18 CFR §5.9 is needed to for PacifiCorp to consider merits of this study. |
| 35. | Bridgerland Audubon Society | It is crucial to include the 1,900 acres of PacifiCorp-owned riparian lands scattered along 35 miles of the Bear River downstream of Idaho state line into the geographical extent for analysis and management of the Cutler Hydroelectric near Benson | PacifiCorp is not proposing to include the 1,900 acres of PacifiCorp-owned riparian lands along 35 miles of the Bear River downstream of the Idaho state line as part of this relicensing. The upstream projects are not dependent on the operations of the Cutler Reservoir; nor will the reservoir have impacts to the tailwater of the nearest upstream parcel. |
| 36. | Bridgerland Audubon Society | Suggests surveys of the Temporal and Spatial Characteristics of the Avian Community. The goal would be to quantify the temporal and spatial populations of avian species, both on the water and in the uplands around the perimeter, by conducting multiyear population surveys and correlating that data with habitat conditions. (Page 3) | PacifiCorp is not proposing a Temporal and Spatial Characteristics Study of the Avian Community as part of this relicensing. PacifiCorp would be interested in furthering this discussion with the requester after potential effects on various populations have been established in the Shoreline Characterization Study and Land Use Study. |
| 37. | Bridgerland Audubon Society | Suggests a cross-sectional diurnal DO study. The goal of the study would be to better understand the extent of anoxic conditions during the most lethal conditions, typically early mornings in the heat of August, along cross-sections of the reservoir's shallow environments. (Page 4) | Comment noted. PacifiCorp is conducting a Water Quality Study whose analysis will use existing DO monitoring data collected during 2008 and 2009. These measurements were collected at 15-minute frequencies for a 7-day periods during most months. This data set will be used to characterize anoxic conditions and seasonal patterns at each monitoring site. |
| 38. | Gabriel Murray, UDAF | For the purposes of studying potential impacts to downstream landowners and the environment, studies should include area along the river corridor all the way to the Great Salt Lake. | PacifiCorp is not proposing to include the reach down to the Great Salt Lake as part of its Hydraulic Study as part of this relicensing. A Project nexus nor a Public Interest Consideration per the Federal Power Act under 18 CFR § 5.9 has been established that would help PacifiCorp consider if study is merited. |
| 39. | Gabriel Murray, UDAF | Any studies of Cutler Reservoir should consider the potential for dredging to improve fish and wildlife habitat and control Phragmites. | Comment noted. PacifiCorp's hydraulic model to be developed as part of the study will have the ability to analyze actions such as dredging, if needed. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|-----------------------------|---|---|
| 40. | Gabriel Murray, UDAF | Due to rapid changes in climate and advances in data collection/analysis, the permit should only be allowed a 30-year time frame before reevaluating operations. | Comment noted. The FERC will consider alternatives in its NEPA analysis. |
| 41. | Gabriel Murray, UDAF | Suggests a study looking at erosion below the Cutler Dam as a result of water level fluctuations and subsequently winter time ice fluctuations. This study can be explored through modeling effort and real time data collection. | The hydraulic model will quantify WSL and the volume of sediment transported up to 2-miles downstream of Cutler Dam based on the change in hydraulics during the drawdown. The hydraulic model is not able to model/predict bank sloughing quantities and locations. However, the Land Use Study will collect data during the drawdown and in the following year to identify potential impacts of proposed operational changes on Bear River bank stability and erosion. UDAF is welcome to provide PacifiCorp with Bear River channel locations where they are concerned about bank erosion or sloughing. These locations will be taken into consideration when choosing monitoring sites. |
| 42. | Michael Allred: Utah DEQ | Suggests that studies include all the area impacted by dam operations which can be observed all the way down to the Bird Refuge. | Cumulative effects downstream at the Bear River Migratory Bird Refuge will be determined once more is known about Projects impacts on the resource. PacifiCorp would like to understand the agency-specific resource management goals per 18 CFR § 5.9(b)(2) and how the requested modification to studies would inform a quantitative measure that could inform future license conditions. |
| 43. | Michael Allred: Utah DEQ | Suggests looking into dredging for the positive impact on the fishery, water quality and potentially reduce the <i>Phragmites</i> problem. | Comment noted. The Hydraulic Modeling Study will analyze the impacts to the hydraulics, sediment transport, and water quality within the reservoir that would result from dredging. Additionally, PacifiCorp would like to understand the agency-specific resource management goals per 18 CFR § 5.9(b)(2) and how the requested modification to studies would inform a quantitative measures that could inform future license conditions. Per the FERC, the agency should thoroughly explain how the study request relates to that management goal. |
| 44. | Michael Allred: Utah DEQ | Suggests that a 30-year license is more reasonable than 40-50 years. No justification for a longer license. | Comment noted. At a later point during this relicensing process, The FERC will consider cost of new license measures and determine new license period accordingly. |
| 45. | Michael Allred: Utah DEQ | Suggests a study of the effects associated with winter ramping and the effects on bank erosion and water quality could be determined. | PacifiCorp would like to understand the Project nexus, methodology proposed and agency-specific resource management goals per 18 CFR § 5.9(b)(2) and how the requested modification to studies would inform a quantitative measure that could inform future license conditions. Per the FERC, the agency should thoroughly explain how the study request relates to that resource management goal. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|-----------------------------------|---|--|
| 46. | Bret Holman: Private Citizen | Dropping the water level by 1 to 2 feet would make the current boat ramp unusable for most boats and will also increase the risk of boaters encountering dangerous obstacles that are usually submerged by water. Does not want to see the area made more restrictive as the public originally agreed to the reservoir with the caveat that it would remain a multi-use recreational area. | PacifiCorp's Recreation Resources Study Plan will inform the effects the proposed operations will have on the usability of boat ramps and in-water recreation. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |
| 47. | Nathan Holman: Private Citizen | The majority of the area used for recreation is only 4 to 5 feet deep and a reduction in operating levels would leave the area unusable for motorized boaters. Suggests to limit the time period PacifiCorp is allowed to lower the water level to 1 week or less, or during a period of the year when the impact would be minimized. | PacifiCorp's Recreation Resources Study Plan will inform the effects the proposed operations will have on the usability of boat ramps and in-water recreation. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |
| 48. | National Park Service | Cutler Canyon Marina: 1) install additional concrete to the existing pad where the accessible picnic table is located to provide access to the barbeque grill. Expansion should be 5-feet by 13-feet and be on the east side of the existing pad to provide the minimum maneuvering area to and around grill. 2) designated a handicap parking space next to the accessible picnic table 3) designate a handicap parking space near the toilet facility 4) lower the height of the informal sign on the west side of parking lot 5) enlarge the font of printed materials on the sign so it is readable by someone sitting in a car since the sign does to have an accessible route to it. | PacifiCorp appreciates the accessibility survey conducted by the NPS in June of 2019. The information provided will be used to improve some items in the short term (prior to license submittal), and will inform the Recreation Resources Study Plan which will assess the adequacy of recreation sites, including any needed improvements required by the ADA. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |
| 49. | National Park Service | Benson Marina: 1) enlarge handicap parking spaces so that it meets the standard dimensions of a van-accessible spot of 11 feet for parking plus 5 feet for the access aisle 2) install at least one accessible picnic table bench under the covered pavilion 3) provide paved access to the other accessible picnic tables and provide access from the tables to the barbeque grills 4) reduce vertical gap in front of the bathroom 5) improve the route from the parking area to the launch site by creating a firm and stable surface at a grade not exceeding 8 percent | PacifiCorp appreciates the accessibility survey conducted by the NPS in June of 2019. The information provided will be used to improve some items in the short term (prior to license submittal), and will inform the Recreation Resources Study Plan which will assess the adequacy of recreation sites, including any needed improvements required by the ADA. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |

| No | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|------------------------|---|--|
| 50. | National Park Service | Upper Bear River Access: 1) replace handicap parking sign 2) provide improved access to fishing dock 3) add toe-rail to the perimeter of the fishing dock 4) reduce the vertical gap between the walkway to the bathroom and the bathroom's concrete pad. | PacifiCorp appreciates the accessibility survey conducted by the NPS in June of 2019. The information provided will be used to improve some items in the short term (prior to license submittal), and will inform the Recreation Resources Study Plan which will assess the adequacy of recreation sites, including any needed improvements required by the ADA. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |
| 51. | National Park Service | Logan River Recreation Site: 1) improve access to the floating dock by reducing vertical gaps between the pathway and the concrete pad, the pad and the ramp to the dock, and from the ramp to the dock itself 2) increase the width of the dock to a minimum of 60 inches 3) add toe-rails to the dock perimeter. | PacifiCorp appreciates the accessibility survey conducted by the NPS in June of 2019. The information provided will be used to improve some items in the short term (prior to license submittal), and will inform the Recreation Resources Study Plan which will assess the adequacy of recreation sites, including any needed improvements required by the ADA. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |
| 52. | National Park Service | Cutler Marsh Marina: the space within the pavilion should be modified to provide enhanced access. This could be done by increasing the size of the pavilion or by rearranging the tables 1) provide additional concrete around at least one of the grills to provide a minimum maneuvering area of 60-inches by 60-inches 2) reduce vertical lip between the sidewalk and the accessible picnic table 3) add toe-rails to the existing dock 4) the area to the left of the existing boat ramp could be improved to create a self-service, accessible boat launching site | PacifiCorp appreciates the accessibility survey conducted by the NPS in June of 2019. The information provided will be used to improve some items in the short term (prior to license submittal), and will inform the Recreation Resources Study Plan which will assess the adequacy of recreation sites, including any needed improvements required by the ADA. The results of this study will be used to determine whether PME measures related to recreation resources are merited. |

| NO | COMMENTS/ REQUESTER | COMMENT | PACIFICORP RESPONSE |
|-----|-------------------------------------|---|--|
| 53. | Jason Watterson: Private Citizen | <p>Allowing PacifiCorp to open up the operational window of Cutler Reservoir would have dramatic effects on the environment and many users of the reservoir including:</p> <p>Irrigation: pumps along the reservoir could be have their ability to pump irrigation water impacted.</p> <p>Recreation: small variations of the reservoir due to its small size can flood areas or create vast mud flats. Boats and even canoes and kayaks will not be able to operate. If reservoir elevations are significantly varied, recreational use will be limited. The Watterson's host many recreational users each year and this will limit their business.</p> <p>Agriculture: high water levels impact soils and agriculture by pushing salts into the surrounding soils and impact agricultural production.</p> <p>Invasive Species: phragmites, gaotsrue, dyers woad and another species have dramatically spread through the Project and adjacent areas, increasing water consumption and damaging habitat and agriculture.</p> | <p>PacifiCorp will address these impacts as part of the Land Use, Recreation, and the Shoreline Characterization Study plans. The Land Use Study plan will address impacts of the proposed operational changes on irrigation pumps that withdraw from Cutler Reservoir. Each known pump that withdraws from the Reservoir will be assessed. The proposed operational changes will not cause water levels to rise above the OHWL. However, changing reservoir elevations may have potential to create a wet/dry cycle in some areas and subsequently impact soil salinity. The potential for this impact to occur will be addressed in the Land Use Study plan. The Shoreline Characterization Study will address invasive species, including collecting information on where they are, and will analyze the impact of proposed operations on their distribution in the future. The effects of drawdown on recreation will be assessed during the 2019 and 2020 study season, including impacts to the usability of boat ramps and in-water recreation. The results of this study will be used to determine whether PME measures related to recreation are merited.</p> |

Key for Comment Response Table3

| | |
|-------|---------------------------------------|
| 2D | 2-Dimensional |
| ADA | Americans with Disabilities Act |
| Al | Aluminum |
| BMP | Best Management Practice |
| BRCC | Bear River Canal Company |
| CaCo3 | Calcium Carbonate |
| CFR | Code of Federal Regulations |
| DO | Dissolved Oxygen |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EPA | U.S. Environmental Protection Agency |
| Fe | Iron |
| FERC | Federal Energy Regulation Commission |
| ILP | Integrated Licensing Process |
| O&M | Operation and Maintenance |
| OHWL | Ordinary High Water Level |
| NEPA | National Environmental Protection Act |

| | |
|---------|---|
| NPS | National Park Service |
| PAD | Pre-Application Document |
| PME | Protection, Mitigation, and Enhancement |
| Project | Cutler Hydroelectric Project |
| Refuge | Bear River Bird Refuge |
| RMP | Resource Management Plan |
| SD1 | Scoping Document 1 |
| TMDL | Total Maximum Daily Load |
| TP | Total Phosphorus |
| TSS | Total Suspended Solids |
| UDAF | Utah Department of Agriculture and Food |
| UDWQ | Utah Division of Water Quality |
| URC | Utah Rivers Council |
| USFWS | U.S. Fish and Wildlife Service |
| WWTF | Wastewater Treatment Facility |

APPENDIX B
PROPOSED STUDY PLAN MASTER SCHEDULE

| Proposed Study Activity 2019-2020 | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Cultural | | | | | | | | | | | | | | | | | | | | |
| Drawdown Fieldwork | | X | X | X | X | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | | | | | | X | X | X | | | | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Fish & Aquatic | | | | | | | | | | | | | | | | | | | | |
| Drawdown Fieldwork | | | | X | X | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Hydraulic Modeling | | | | | | | | | | | | | | | | | | | | |
| Drawdown Fieldwork: LiDAR, Bathymetry, Sampling | | | | X | X | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | X | X | X | X | | | | | | | | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Land Use | | | | | | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Recreation | | | | | | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | | X | X | X | X | X | X | X | X | X | | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Sedimentation | | | | | | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Shoreline Characterization | | | | | | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | X | X | X | X | X | X | X | X | X | X | X | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |

| Proposed Study Activity 2019-2020 | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Threatened and Endangered Species Survey | | | | | | | | | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | X | X | X | | | | | | | | | | X | X | | | | | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |
| Water Quality | | | | | | | | | | | | | | | | | | | | |
| Drawdown Fieldwork | | | | X | X | X | | | | | | | | | | | | | | |
| Drawdown-Specific Reporting | | | | | | | X | X | | | | | | | | | | | | |
| First Study Season: Field Studies & Analysis | | | | | | | | | | | | | | | | X | X | X | | |
| 6-Month Progress Report | | | | | | | | | | | | | X | | | | | | | |
| Initial Study Report | | | | | | | | | | | | | | | | | | | | X |

- X Estimated proposed study season
- X Second study season (if necessary)
- Date** Dates in Blue text represent 2019
- Date** Dates in Green text represent 2020
- Date** Dates in Orange text represent 2021