CUTLER HYDROELECTRIC PROJECT

FERC NO. 2420

~~Proposed~~Revised Technical Study Plans

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PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

~~PROPOSED~~REVISED TECHNICAL STUDY PLANS

CUTLER HYDROELECTRIC PROJECT

FERC NO. 2420

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~~PROPOSED~~REVISED TECHNICAL STUDY PLANS

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1.0 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 FERC on April 29, 1994~~. Because~~; the current license ~~is due to~~will 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 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 FERC 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~~Proposed Study Plan (~~Study Plan~~PSP) annotated outlines.[2] On June 26 and 27, 2019, 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~~PSP annotated

[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)

outlines that 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 the required July 29, 2019~~; these~~ ILP deadline. These comments ~~are~~were summarized in the Response to Comments ~~Table~~table for ~~Proposed Study Plans~~the PAD and SD1 (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~~summarizes stakeholders' comments on the ~~proposed Study Plan~~PSP 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 FERC ILP Study Plan criteria (when applicable), which is outlined in Appendix A and Section 5.0.

PacifiCorp invited federal and state agencies, non-governmental organizations (NGOs), and Native American tribes and tribal organizations to participate in the public meeting, workshops, scoping meeting, and site visit. During these meetings and through FERC eLibrary submission, stakeholders and PacifiCorp identified the need to conduct the studies contained in the PSP. The PSP detailed the study objectives, study area, methods, and schedule for each study.

On October 8, 2019, PacifiCorp hosted the ILP-required Study Plan Meeting in Logan, Utah. Stakeholders, along with FERC, were invited to attend, and discuss study plan requests and comments submitted by July 29, 2019 on SD1, the study plan annotated outlines, and the PAD, as well as PacifiCorp's original responses to these requests/comments.[5]

Additionally, beginning October 28 and 29, 2019, through November 30, 2019, PacifiCorp hosted a number of supplemental stakeholder-specific meetings with the Bear River Canal

[5] Cutler Relicensing Study Plan Meeting – Meeting Summary (October 8, 2019)

Company (BRCC), Utah Department of Agriculture and Food (UDAF), Utah Division of Water Quality (UDWQ), Logan City, Bear Lake Watch, and the Bridgerland Audubon Society (BAS). PacifiCorp and these respective stakeholders discussed concerns and requests, and came to agreement on multiple study requests and revisions to this Revised Study Plan (RSP).

Section 7 of the PAD (Volume I)[6] summarized identified issues and provided an overview of the Technical ~~Study Program~~Studies that PacifiCorp believes will address questions regarding Project impacts. ~~The Response to Comments Table for Proposed Study Plans (~~Appendix ~~A) summarizes how~~B contains the original stakeholder comment or study request, the original PacifiCorp ~~addressed comments raised by stakeholders during the public~~response, and the revised responses edited to describe the consensus reached at the collaborative meetings~~,~~ ~~workshops~~ held in October and ~~scoping meetings.~~ November of 2019.

It is PacifiCorp's belief that ~~the proposed Study Plans~~this RSP, as ~~revised~~amended and detailed from the ~~previous outlines~~earlier annotated outline and the PSP, captures the appropriate range of issues that FERC and stakeholders identified during ~~its~~the 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~~This RSP contains a history of all comments and stakeholder informal consultation received during the process.

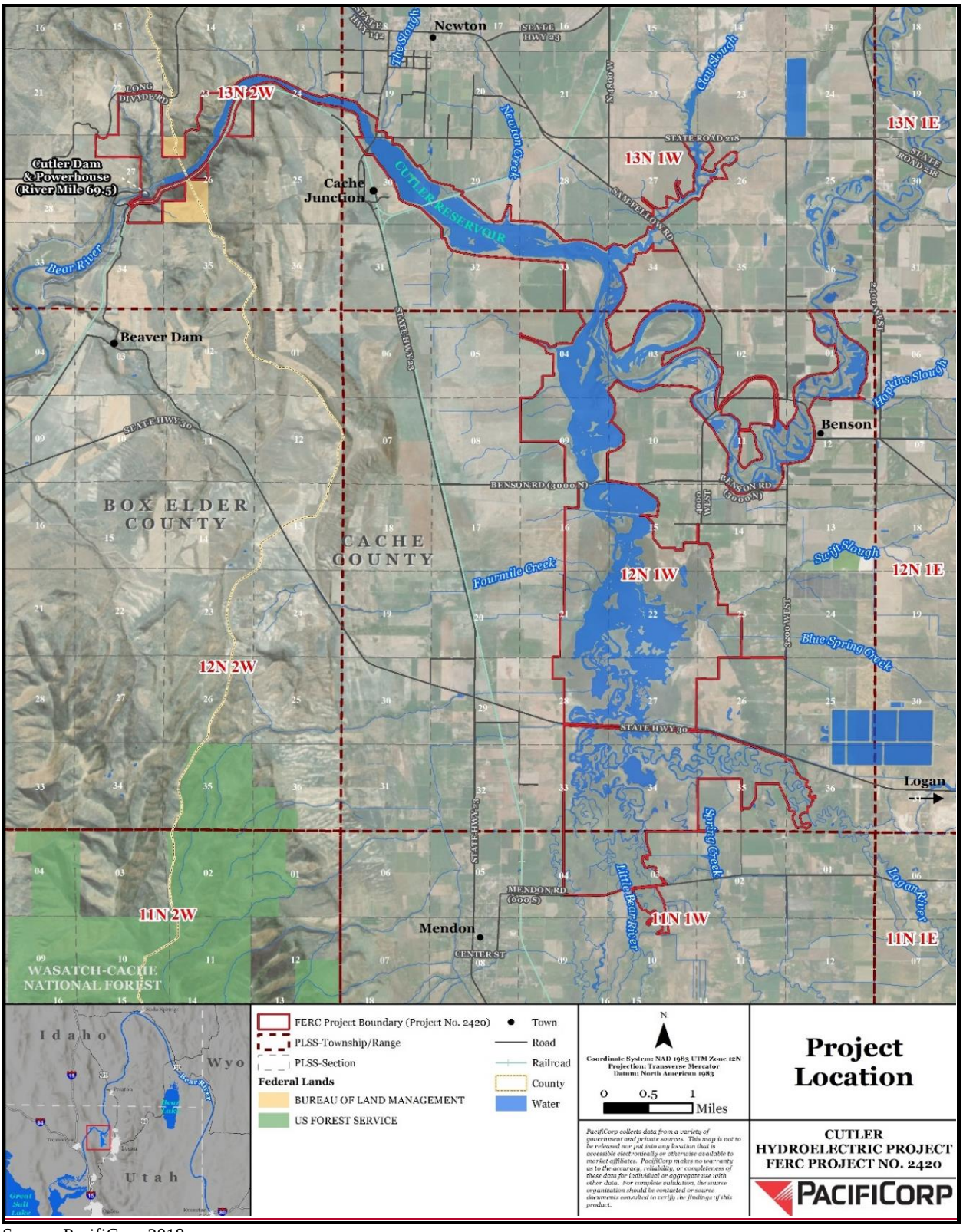
1.2 PROJECT DESCRIPTION

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

The Bear River is a 350-mile-long river that forms a large U-shape around the northern end of the Wasatch Mountain Range, beginning on the north slope of the Uinta Mountains in northern Utah east of the Wasatch Range, spanning across southwestern Wyoming, southeastern Idaho,

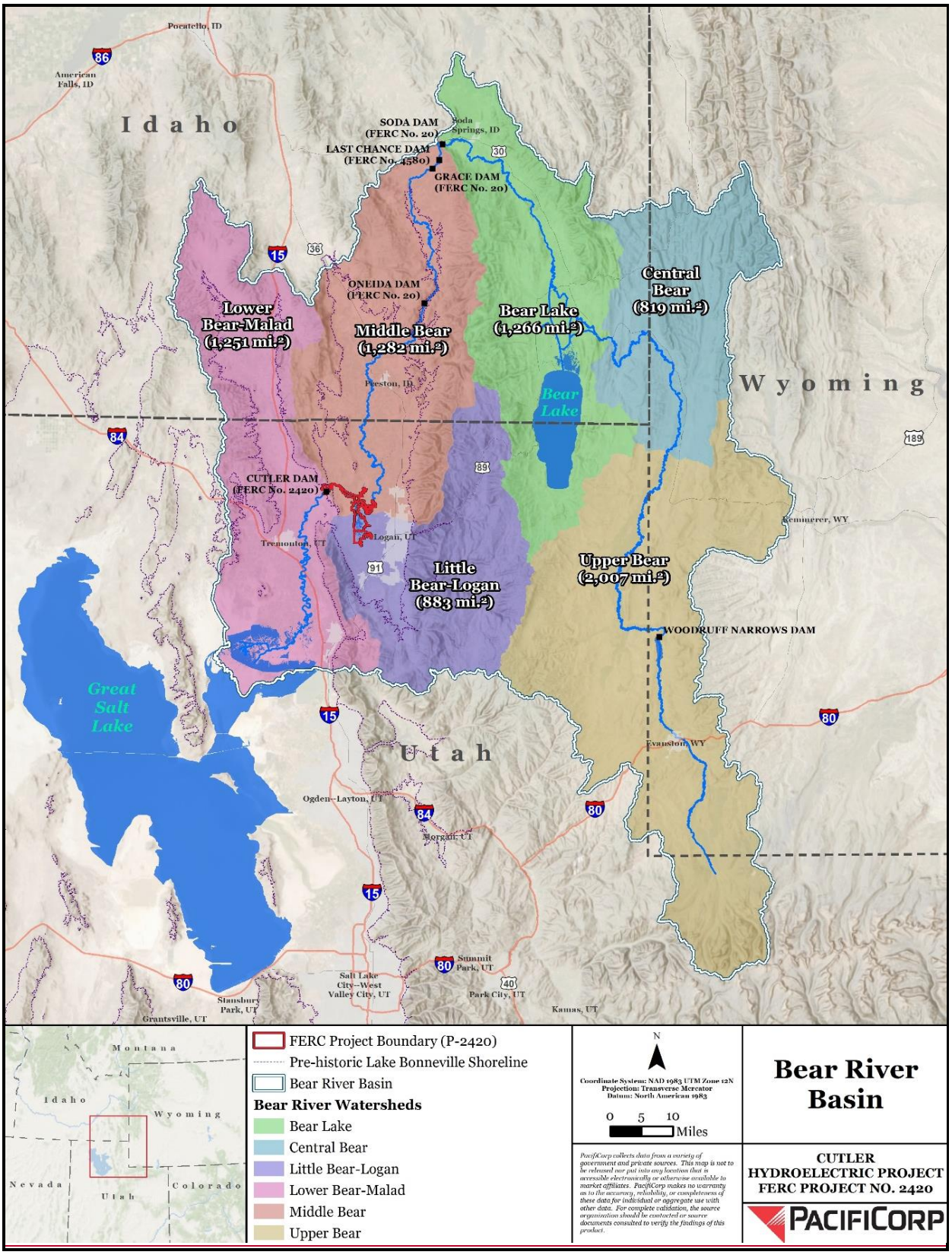
[6] The PAD was submitted as two volumes. Volume I contained the Notice of Intent to File Application for New License~~,~~ and the PAD. Volume II contained all ~~Appendices~~appendices.

and back into northeastern Utah on the west side of the Wasatch Range. 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~~farmlands northeast of the Great Salt Lake and southeast of the Snake River Plains, forming an approximately 7,500-square-mile basin (Figure 1-2).



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

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~~, which 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~~Trenton, 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 the Bear River is heavily influenced by dams and diversions that are used for agricultural and hydroelectric purposes. ~~On~~There are three hydroelectric plants and five dams 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~~in 2003 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.

1.3 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~~ 10,321 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 ~~-~~feet ~~-~~high by 7 ~~-~~feet ~~-~~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.

1.4 OPERATIONS (EXISTING AND PROPOSED)

PacifiCorp is ~~proposing~~evaluating whether to modify ~~operations~~routine operational limitations (i.e., to lower the low elevation limit, keeping the upper elevation limit the same, thus increasing the reservoir elevation operating limit), or to keep them generally the same for the next license term ~~that would~~; both could enable the Project to participate in the ~~western~~Western Energy Imbalance Market (EIM~~).~~) and better match on-going changes to the regional power grid, incorporating increasing power generation from variable renewable resources and other power generation and distribution changes that are occurring throughout the industry.[7]

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~~10,321-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 Section 5.5 of the PAD that will be evaluated during ~~their~~the licensing studies; an operational plan will be proposed in the ~~draft~~Draft and ~~final license applications~~Final License Applications, with ample opportunity provided to stakeholders for comments.

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

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~~407.5 feet to ~~elevation~~ approximately 4,~~395~~396.0 feet (~~down 11 feet~~the mechanical limits from the top of the current elevation range to the sill of the spill gates), 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 potentially increased daily, weekly, and seasonal reservoir elevation fluctuations~~.~~ to better support variable energy generation needs. Note that during the irrigation season, generally April 15 – October 31, no operational changes to the lower reservoir limits are sought due to irrigation pumping from the reservoir. PacifiCorp is not proposing to permanently lower the reservoir an additional 11~~-~~ feet (note that 90 percent of the volume of the reservoir is in the top 3 feet, as measured at Cutler Dam, and that 70 percent of the reservoir volume is in the top 1.5 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~~.~~, and possibly assist with sediment management as well. This will allow the Project to continue to meet daily high electricity demands as well as to optimize for emergency backup reserves holding outflow steadier, except for the occasional (approximately yearly) event when the emergency backup is needed, and the outflow is increased to allow for maximum power generation (30 MW).

~~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.

Throughout this RSP, PacifiCorp uses the terms “future” and “proposed” operations to indicate a range of operations that could be proposed and is therefore the basis for the evaluation approach; however, PacifiCorp has not yet determined the final proposed routine operating range for the next license term. This final proposed routine operating range will be described as part of the Draft and Final License Applications and will be analyzed for environmental effects through the Study Plan process.

1.5 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 a 6-month progress update in the summer of 2020, and an Initial Study Report (ISR), according to the FERC-approved Study Plan Schedule, which ~~would~~will 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 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~~As necessary for specific resources, a second study season and Updated Study Report (USR) will be conducted.

1.6 IMPLEMENTATION SCHEDULE FOR STUDY PROGRAM

Table 1-1 provides 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~~per 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~~C).

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

ILP ACTIVITY	ANTICIPATED FILING DATE*
Scoping Meeting	6/27/19
Comments on PAD, SD1 and Study Requests Due	7/29/19
File Proposed Study Plan/FERC Issues SD2	9/11/19
Study Plan Meeting	10/8/19
Comments on Study Plan Due	12/~~9~~11/19
File Revised Study Plan	1/~~6~~11/20
Comments on Revised Study Plan Due	1/~~21~~27/20
FERC Study Plan Determination	2/5/20
File Study Disputes (if necessary)	*2/25/20*
Select Third Dispute Resolution Panel Member	*3/2/20*
Convene Dispute Resolution Panel	*3/11/20*
File Comments on Study Disputes §5.14(~~i~~I) NLT than 25 days	*3/23/20*

ILP ACTIVITY	ANTICIPATED FILING DATE*
Dispute Resolution Panel Technical Conference	*3/31/20*
Issue Dispute Resolution Panel Findings §5.14(k) NLT than 50 days	*4/15/20*
Issue Director's Study Dispute Determination §5.14 (l) NLT than 70 days	*5/5/20*
Conduct First Year Studies	
File ISR §5.15(c)(1) (1 year, minus 30 days; ISR report filed on day 365)	2/4/21
ISR Agency Meeting §5.15(c)(2)	2/19/21
ISR Meeting Summary Filed	3/8/21
Conduct Second Year Studies	
*File USR** (1 year, minus 30 days; USR report filed on day 365)*	*2/4/22*
USR Agency Meeting	*2/21/22*
USR Meeting Summary Filed	*3/7/22*
File ~~PLP/~~DLA*** (150 days before Final Application due date)	11/2/21

* If date ~~falls~~fell 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~~should be implemented prior to 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~~will be addressed as necessary; 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~~was completed in 2019 (the 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). A drawdown of Cutler Reservoir was conducted in the fall of 2019 for the purpose of obtaining LiDAR and bathymetry data of the reservoir to populate a model that will inform PacifiCorp in determining a range of alternatives for future operations and help inform other studies (e.g. hydraulic modeling and sedimentation). The drawdown was scheduled for the fall of 2019 due to contract and seasonal-based restrictions, and to gather critical information prior to study implementation in 2020. In addition, the

drawdown provided a unique opportunity to observe drawdown effects on the different resources and to relate those effects to future operations. Therefore, for several resources, preliminary studies and/or data collection were initiated during the fall 2019 drawdown period, October 25 to November 16, 2019.

1.7 ~~PROPOSAL FOR~~ STUDY PLAN MEETING

As required by 18 CFR § 5.11(e), PacifiCorp ~~proposes to hold~~ held a Study Plan meeting within 30 days after the ~~proposed Study Plan is~~ PSP was filed for purposes of clarifying the ~~proposed Study Plan~~PSP and any initial information gathering or study requests. The Study Plan meeting ~~will be~~was held on Tuesday, October 8, 2019 ~~(location to be determined).~~in Logan, Utah. Similar to past meetings and workshops, there ~~will be a morning and~~ was an afternoon and evening session to best accommodate the public's schedule. Stakeholders and FERC staff were invited to attend and discuss study plan requests and comments submitted by July 29, 2019 on SD1, the study plan annotated outlines, and the PAD, as well as PacifiCorp's original responses to these requests/comments.

1.8 ~~PROPOSED~~ STUDY PLAN MASTER SCHEDULE

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

2.0 TERRESTRIAL AND BOTANICAL ~~B.PROPOSED~~REVISED STUDY PLANS

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

2.1.1 PROJECT NEXUS AND RATIONALE FOR STUDY

~~2.1.1~~1.1.1 ~~PROJECT NEXUS AND RATIONALE FOR STUDY~~

~~The~~ This study plan outlines work related to species listed under the Endangered Species Act (ESA~~)~~). The 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~~NOAA Fisheries). Terrestrial and freshwater species (like those found at the Cutler Project) 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). This study will only address federally listed species under the ESA; several rare or other category of species (such as state-listed) are known to exist within the Project Area—these species and potential effects to them are covered in the Shoreline Habitat Characterization Study Plan (Section 2.2).

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~~ have the ~~Project under a new license could potentially~~potential to affect federally ~~-~~listed species, specifically Ute ladies'-tresses orchid. ~~Proposed changes in~~ Project operations will affect water levels~~, which~~ in Cutler Reservoir. Hydrologic conditions are an essential parameter in this

species' habitat requirements. Hydrologic conditions in Ute ladies'-tresses habitat could be influenced by changes in the management of Cutler reservoir. 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~~ federal agencies are required to analyze the effects of ~~a proposed project~~actions they undertake or ~~action.~~authorize on federally listed species, in consultation with the USFWS. Information regarding the ~~presences~~presence 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. Per USFWS protocol, initial surveys were conducted in August 2019, which identified several individuals in the southern end of the Project Area.

The threatened and endangered species study plan includes initial survey work for Ute ladies'-tresses orchid (*Spiranthes diluvialis*) that was completed during the 2019 field season. Additional survey work may be required in subsequent years, depending on regulatory agency review and requirements. In consultation with FERC, the decision to conduct a survey in 2019 was based on requirements in relevant survey protocols which specify potentially multiple years of surveys, as the species can be quite variable and may not be visible above ground every year. The first-year survey in 2019 confirmed the presence of the species in the Project Area following preliminary surveys conducted in 2018, and also provided information regarding the extent of suitable habitat in the Project Area, data about the occurrence of the species in those habitats, and allowed for additional years of surveys to take place without affecting the project calendar if it is determined necessary.

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 rare or 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 (or with the potential to occur) in or near the Project Area. ~~The~~Prior to the 2019 field survey work, information about the occurrence of ~~the~~this species within the study area ~~is~~was based on limited surveys conducted during a single season. ~~This~~The objective of this study ~~will more~~is to 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

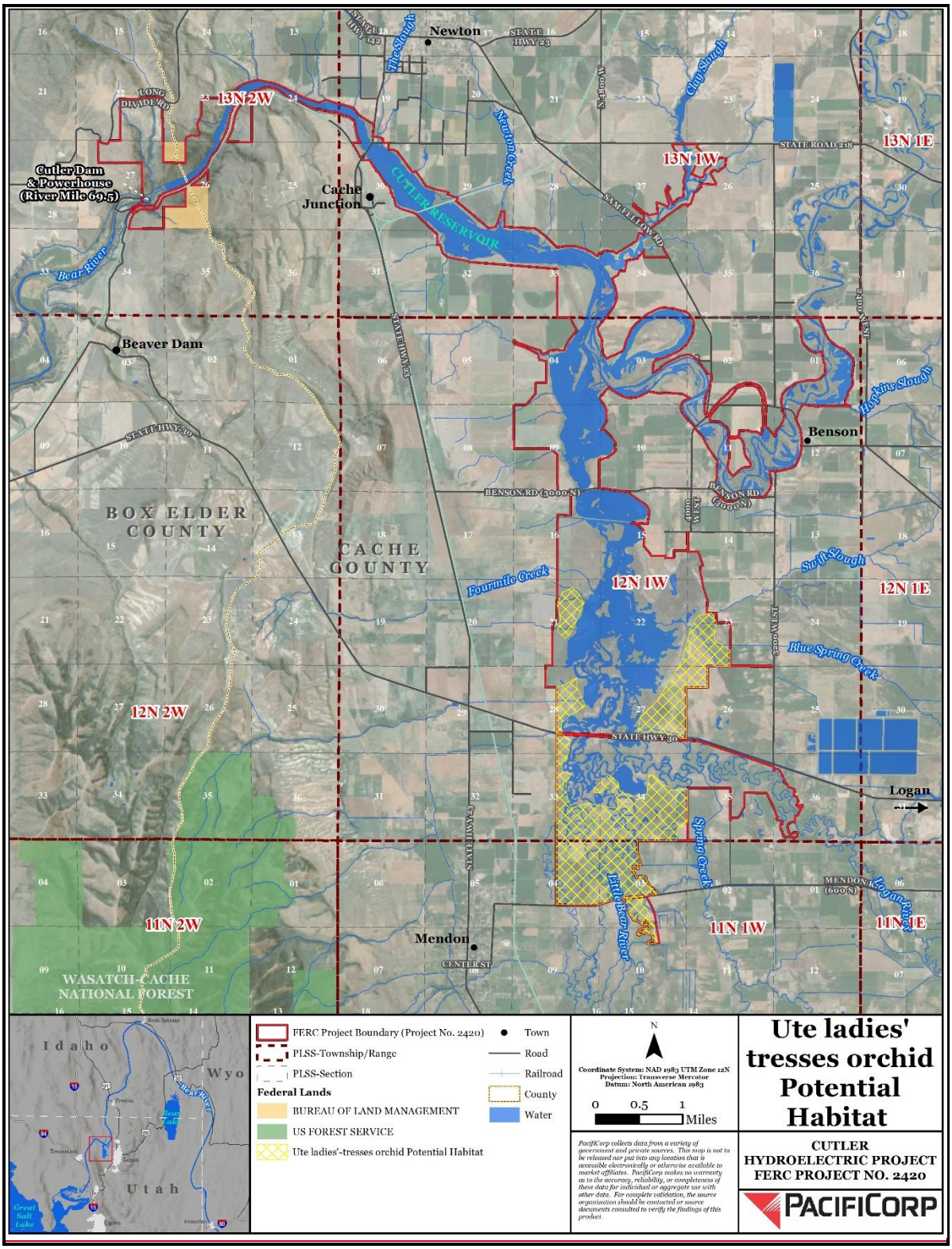
FERC must comply with the ESA in reissuing a Project license. The ESA and its implementing regulations require the lead federal agency of an undertaking to account for the effects of that undertaking on species listed under the ESA. In addition, certain segments of the public are also interested in rare species, particularly those that are listed under the ESA~~.~~ (information regarding other rare but non-ESA listed species can be found in Section 2.2, Shoreline Habitat Characterization Study Plan). 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~~U.S. 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~~The 2019 survey focused on suitable habitat for this species, which ~~include~~includes wet meadow and shoreline habitat. All surveyed areas ~~will be~~were located

inside the Project Boundary, represented by the red outline in Figure 2-1. Figure 2-1~~below~~ also shows areas within the Project Boundary within which suitable habitat occurs. Suitable habitat for Ute ladies'-tresses is located in the North and South Marsh units.



Source: PacifiCorp 2018

FIGURE 2-1 STUDY AREA ~~FOR~~AND POTENTIAL HABITAT OF 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~~was 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~~ The 2019 ~~and including the flowering window~~surveys for Ute ladies'-tresses orchid were completed in August ~~2020),~~2019 to correspond with flowering. Based on the results of the 2019 surveys and consultation with regulatory agencies and stakeholders, 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~~. The timing of any additional surveys will be ~~adjusted~~ based on flowering ~~morphology~~ of ~~nearby~~ known populations.

For the 2019 survey work, the entire Project Area was evaluated to identify areas of potentially suitable habitat, using a combination of aerial imagery and on-the-ground reconnaissance. Areas that were determined to contain potentially suitable habitat were surveyed via pedestrian surveys to provide complete survey coverage of those habitats. Figure 2-1~~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.~~

shows areas inside the Project Boundary where potentially suitable habitat occurs. Potentially suitable habitat occurs in a very fine mosaic pattern with adjacent unsuitable habitat within these polygons. Topographic changes of less than a foot can make an area either too wet or too dry to be potentially suitable habitat, in combination with the occurrence of localized areas of groundwater discharge. Horizontally, these changes can occur in less than 10 feet. The complex

interaction of habitat variables at very fine scales requires determinations of suitable habitat to be made in the field. Based on the in-field habitat determination, suitable habitat was surveyed with 100 percent pedestrian survey coverage and data were collected on occurrences of Ute ladies'-tresses orchids.

2.1.6 SCHEDULE AND PERIODIC REPORTING

~~Surveys will focus on the late-July through~~The 2019 surveys were executed in early August ~~timeframe,~~ when ~~the~~ known local populations of Ute-ladies' tresses orchids ~~are~~were blooming and ~~easier to locate.~~easily locatable. Existing data ~~will be collected, organized~~, aerial imagery, and on-the-ground reconnaissance were used to identify potentially suitable habitat and prioritize detailed field survey locations. ~~Work can be~~The survey work was conducted outside of the reservoir drawdown window in ~~October 2019~~fall 2019, and prior to the issuance of FERC's Study Plan Determination.

The ~~Proposed~~ Study Plan Master Schedule (Appendix ~~B~~C) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, and the estimated filing ~~date of~~dates for the 6-month progress ~~report~~update 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~~The Proposed Study Plan was developed in collaboration with the stakeholders, including members of the public, agency representatives, NGOs and Native American ~~Tribes~~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~~on the Threatened and Endangered Species Proposed Study Plan TERR 1 (TERR1 Study Plan).

2.1.9 REFERENCES

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2.2 SHORELINE HABITAT CHARACTERIZATION ~~PROPOSED~~REVISED STUDY PLAN (TERR 2)

2.2.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The proposed changes ~~for~~to Project operations may affect the type and amount of shoreline habitat available at Cutler Reservoir, including spreading invasive species. ~~Changed~~Changes in project operations may impact nesting birds by increasing water elevations post-nesting, exposing isolated areas to terrestrial predators if water levels drop, or by changing the nature of the habitats.

This study is necessary to comply with, or respond to, federal regulations that protect shorebirds and other terrestrial wildlife (including rare or state-listed conservation priority species) 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~~ Quantify changes in littoral habitat ~~types~~.
- ~~Characterization of~~Characterize emergent and adjacent wetland and upland vegetation.
- ~~Mapping of~~Map invasive species.
- ~~Assessment~~Assess of the ~~impact~~effect of proposed operational changes on ~~these parameters~~littoral habitats and invasive species distribution and associated effects on terrestrial and amphibian wildlife~~.~~ (Section 2.18).[8]
- ~~Effects of the proposed changes in Project operations to be addressed in this Study Plan include:~~Assess the effects of water surface elevation (WSEL) changes, including:
  - 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.

[8] 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).

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 guidelines to "protect, enhance, and develop wildlife habitat~~.~~."

Input from stakeholders at public meetings relevant to this Study Plan focused on the potential impacts to migratory birds in the Project Area, and on the potential for the spread of weeds. Therefore, a significant portion of this study will be dedicated to identifying impacts in these two areas. Specifically, examining existing data regarding bird species that could be or are known to be present in the area and their local and national population trends, as well as reviewing existing sources of weed ~~infestations and analyzing~~infestation data to facilitate analysis of how infested areas may change or spread as a result of ~~changed~~proposed changes in 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 (Section 3.3~~Report (to be completed))~~ will ~~provide~~identify locations where land bridges could form across a range of WSELs corresponding to Project operations. The Hydraulic Modeling Study will ~~form at various water levels in areas usually isolated by~~also document lateral movement of the ~~current operation's water levels~~reservoir wetted perimeter, if any, including changes in distance from the vegetated shoreline.
2. Sedimentation Study Plan (Section 0~~Report (to be completed))~~ will identify areas where sediment movement may ~~impact~~affect shoreline habitat areas.
3. Land Use Study Plan (Section 2.3~~Report (to be completed))~~ will identify areas where shoreline erosion occurs ~~and may expand~~, including potential changes resulting from any change in Project operations.
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, and surrounding, 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.

Data generated through the Hydraulic Modeling Study Plan will quantify changes, if any, in wetted perimeter and provide information on how far the water is from the vegetated shoreline under any future operating scenario. The Hydraulic Modeling Study will also identify when and where land-bridges form for a range of reservoir WSELs. The proposed operating scenarios to be evaluated using this tool will be constrained by existing commitments PacifiCorp has for water delivery at different times of the year (e.g., irrigation water delivery during summer months that may preclude lower reservoir levels).

Information about predator use of islands will be gathered from ~~data~~literature review and discussion with managers at the USFWS Bear River Bird Refuge, located approximately 45 river-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 drone imagery and LiDAR data collected in the fall of 2019, with ground-truthing as indicated below. 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~~emergent marsh, wet meadow, upland, cropland, mud flats, woody/shrubby vegetation, and bare ground. Identification of ~~some~~areas dominated by 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.~~ . The number of random points will be determined using established statistical methods, specifically the sample size equation based on the multinomial distribution developed by Tortora (1978):

$$N = \frac{B\Pi_i(1 - \Pi_i)}{{b_i}^2}$$

In this equation Π_i is the proportion of the i^{th} class out of k classes that is closest to 50 percent of the total area of the classification, b_i is the desired precision for this class (5 percent is standard and held constant for all classes), and B is determined from the chi squared table with one degree of freedom based on the value of:

$$1 - \frac{\alpha}{k}$$

In this equation α is the 100^{th} percentile of the desired confidence interval (85 percent is standard for landcover mapping products) and k is the number of classes. At this time, Π_i and k are unknown, and it is therefore not possible to determine the number of points needed for a statistically valid sample. However, it is likely that the number of points will be on the order of 500 ± 200.

Once the number of points needed is determined, the points will be stratified by landcover class. Points will be assigned to each class based on the proportion of the classification they represent, with a minimum of 30 points per class. For example, if 500 points are needed and there are four classes with proportions of the total measuring 60, 20, 15, and 5 percent, the allocated points would be 300, 100, 75, and 30, respectively. Once the number of points per class is determined, points will be randomly distributed within each class.

Visiting each random point in the field will be necessary to determine the correct class. The class values collected in the field, relative to the class values based on imagery classification, will be compiled in an error matrix from which the standard accuracy statistic $\hat{K}$ can be calculated using the following equation:

$$\hat{K} = \frac{N \sum_{i=1}^{k} x_{ii} - \sum_{i=1}^{k} (x_{i+} * x_{+i})}{N^2 - \sum_{i=1}^{k} (x_{i+} * x_{+i})}$$

where k is the number of landcover classes in the matrix, x_{ii} is the number of observations in row i and column i, and are the totals for row i and column i, and N is the total number of accuracy assessment points. This equation yields values between 0 and 1 with values closer to 1 representing higher agreement between the classification and ground reference information. For landcover classifications of this type, values above 0.8 are considered to have strong agreement and a value above 0.8 will be the goal (Congalton et al. 1983). If this goal cannot initially be met, the classification will be adjusted until the level of agreement between the classification and the ground reference information meets the goal.

Existing weed information, including that from Cache County, PacifiCorp, state and sovereign lands, 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. Specific weeds that will be documented during these efforts include: thistles (*Cirsium* spp.), goatsrue (*Galega officinalis*), dyer's woad (*Isatis*

tinctoria), tamarisk (*Tamarix ramosissima*), field bindweed (*Convolvulus arvensis*), punctureveine (*Tribulus terrestris*), and Russian olive (*Elaeagnus angustifolia*).

2.2.5.3 CUTLER 2019 DRAWDOWN FIELD WORK

~~1.1.1.1~~ FIELDWORK

~~Beyond~~ associated with 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~~ Cutler Reservoir drawdown ~~of the reservoir. This work will be~~ focused on ~~collecting data related to the~~ the interaction between WSELs, wetted perimeters, and proximity to habitat types. Land bridge formation ~~and use of land bridges~~ connecting islands in the reservoir to the shore~~. This would entail the placement and maintenance of approximately~~ was documented for respective reservoir WSELs. Approximately 10 cameras ~~at and around~~were installed in areas adjacent to important bird nesting sites. The cameras will validate the wetted perimeter footprint predicted for that location using the hydraulic model developed in the Hydraulic Modeling Study Plan (Section 3.3).

2.2.5.4 ANALYSIS AND COLLECTION OF ADDITIONAL DATA

This study will be conducted in two phases. The first phase will be a preliminary analysis of existing data, information developed as part of this RSP, and proposed operational details provided by PacifiCorp will determine if additional field work is necessary to evaluate the potential effects of future operations.

The preliminary analysis phase will examine how future Project operations may affect respective bird and other rare or sensitive species assumed to be present. The list of species assumed to be present will be based on records for northern Utah and southeast Idaho. The arrival and departure date ranges for each migratory bird species will be defined based on eBird records. Start and end dates for proposed project operations and the associated WSELs and wetted perimeter boundaries will be compared to habitat types used by each bird (and other rare or sensitive) species during the period these species are present. The result of this phase will be a list of species that have the potential to be impacted by Project operations. This list will be organized by those species with potential impacts during the breeding season, non-breeding season, or both,

and will highlight birds with a specific conservation status. Effects on non-avian, state-listed species will be similarly analyzed in this phase.

Effects during the breeding season are expected to be somewhat limited by irrigation water delivery obligations, which could occur as early as April of some years. Due to these obligations, Project operations during some of the breeding season are not likely to change appreciably relative to current operations. Should this not prove to be the case (based on results of the hydraulic modelling), as part of the second phase, PacifiCorp would evaluate potential PME measures to minimize Project effects on birds and other rare or sensitive species.

Once the hydraulic study yields information on what habitats, if any, would be affected by future Project operations, the second phase of this analysis would be an assessment of the effects of Project operations on birds/other rare/sensitive species in affected habitats. In order to determine the magnitude of these potential effects, bird surveys during the breeding season would be conducted using the Standardized North American Marsh Bird Monitoring Protocol and standard aerial pair counts for waterfowl (Conway 2011). For the North American Marsh Bird Monitoring, survey routes in the affected habitats would be established and one season of surveys would be conducted to establish a baseline. Other species not targeted by these breeding season protocols would be documented anecdotally. For impacts related to the non-breeding season, the Integrated Waterbird Management & Monitoring (IWMM) program protocols would be used. This program, administered by the U.S. Fish and Wildlife Service, has been developed to monitor non-breeding waterbirds across the country using standardized methods (https://iwmmprogram.org).

Phase 2 surveys would only be conducted if the Phase 1 analysis determines there are effects of Project operations that differ from existing conditions. Surveys would only be conducted in those areas where effects would occur, based on the results of the hydraulic modelling. Should surveys be necessary, PacifiCorp will coordinate with local ecologists and stakeholders to identify exact survey locations or routes within the potentially affected areas.

2.2.6 SCHEDULE AND PERIODIC REPORTING

~~The data generated by the efforts described in Section 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~~ potential changes in shoreline habitat ~~types~~composition and area.
- Current status of invasive plant infestations and potential for spread.
- Potential ~~impacts~~effects of changes in these parameters ~~on habitat of~~(shoreline area and composition, and invasive plants) on terrestrial wildlife (primarily migratory birds) and ~~amphibians~~other rare/sensitive species.

- ~~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~~C) provides the outline for study implementation for individual studies for 2019 and 2020~~.~~, as well as the phased study work, as necessary. Appendix ~~B~~C also includes the estimated start and completion dates for each study, and estimated filing ~~date of~~dates for the 6-month progress ~~report,~~update 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~~90,000 to $~~80~~250,000. The proposed study effort is adequate to provide the level of information needed to understand project effects~~, impacts or~~ and 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 5.0 provides rationale based on Project-specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

2.2.9 REFERENCES

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2.3 LAND USE PROPOSEDREVISED STUDY PLAN (TERR 3)

2.3.1 PROJECT NEXUS AND RATIONALE FOR STUDY

The proposedfuture Project operations willmay allow greater fluctuations in reservoir surface elevation than currently occur, resulting in several potential land-use impactseffects. Irrigation water withdrawal at existing diversions and pump sites could be hampered, interfering with use of existing water rights if proposed operationsoperation 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 and water quality. Scenic quality could be degraded by exposed reservoir bed., if that occurred. Several of these potential effects willwould 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 proposedfuture 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 lands as the destination for the irrigation, domestic, and industrial water rights. Canal that are withdrawn on Project lands. Individual pumpers and canal companies that divert from the reservoir willwould likely not be affected based on the range of elevations and seasons that are being considered. PumpedAlthough it is technically possible that pumped withdrawals could be impacted depending on the location and elevation of each structure, and the actual variability of the reservoir elevations., because meeting all water rights as specified by contract or other controlling document has a higher priority than hydroelectric generation at the Project, it is unlikely that irrigation or other water withdrawals would be affected by future Project operations. Surface elevations at the southern end of the reservoir willwould be relatively slow to respond to a change in pool elevation compared to the north end, and are unlikely to be affected by normal future Project operations given the inability to lower the reservoir below 4404.5 feet, as measured at Benson Marina, even when the elevation at the dam is below 4390.0 feet. 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. that could be affected by future reservoir operations (such as those areas north of the reservoir confluence with the Bear River but south of Cutler Canyon).

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. Where possible, 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 proposedpotential future 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 PlansPlan 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 removalremoving hundreds of car bodies from the banks, (resulting from a previous government [predecessor to the current Natural Resources Conservation Service] initiative to stabilize eroding banks using discarded automobiles), establishing a vegetated shoreline buffer, bank stabilizationstabilizing banks, 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 periodically expose previously submerged areas of the reservoir bed where shallow, low-gradient conditions exist. Depending on the range of reservoir elevation changes in the proposedfuture 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 could 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 ofeffects of potentially increased fluctuating water levels on land use and aesthetic resources. The Study PlanLand Use portion of the RSP 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 impactseffects of existing and proposedfuture 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~~viewpoints on and near Cutler Reservoir

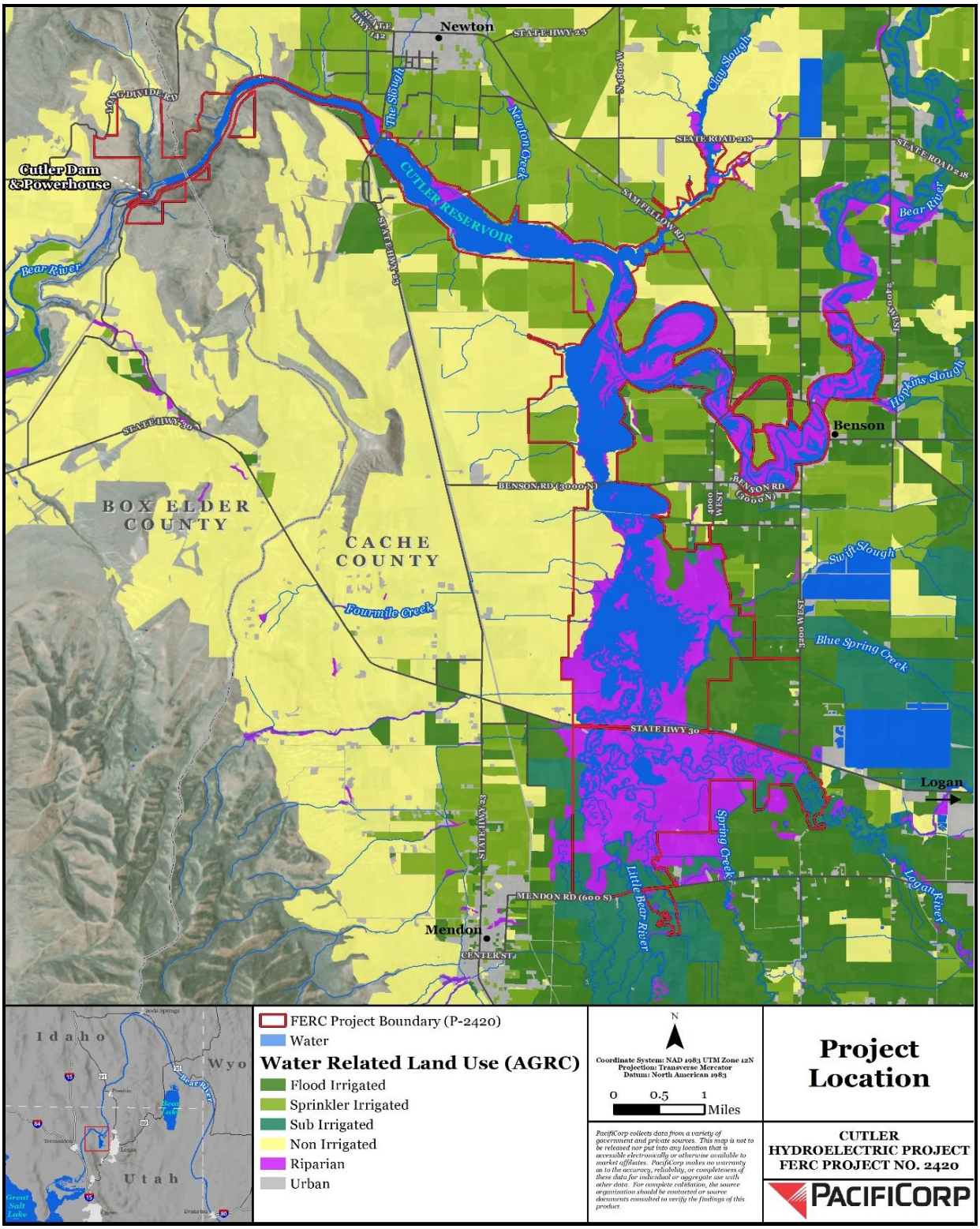
2.3.4 STUDY AREA

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 a reach of 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~~))~~,[9] ~~,~~ 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

[9] 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).WSEL. 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 EROSIVE 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 Land Use Study will identify areas of potential bank erosion by examining aerial photos, LiDAR survey data, and existing GIS mapping information. Existing soil information (SSURGO2)[10] will be used to characterize soil and hydraulic properties of banks for reservoirs and streams. Areas where past bank stabilization efforts have occurred will also be identified. Results from the hydraulic model scenarios will be used to determine the potential maximum change and rate of change in WSEL in areas where bank stability is a concern. These results will be used in combination with existing bank information to identify areas where sloughing may be a concern under the proposed change in reservoir operations.

The Bear River downstream of Cutler Dam will be studied at five to six representative locations to identify potential impacts from fluctuating water levels. These areas The extent of flow

[10] The SSURGO database contains information about soil as collected by the National Cooperative Soil Survey over the course of a century. The information can be displayed in tables or as maps and is available for most areas in the United States and the Territories, Commonwealths, and Island Nations served by the U.S. Department of Agriculture, Natural Resources Conservation Service.

attenuation downstream of Cutler Dam will be estimated based on information from the hydraulic model. Potential areas of bank erosion in the area of attenuation will be monitored during experimental releases from Cutler Dam in 2020 tofrom Cutler Dam that 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. Several commenters expressed an interest in assisting with identifying potential bank sloughing areas of concern downstream of Cutler Dam that may be included in the noted monitoring.

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 existing control measures will be madeassessed 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 located 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 vehicle access 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 alldata 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 impactseffects 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 impactseffects on water-withdrawal infrastructure, results of hydraulic modeling will be used to determine a WSLWSEL at the Cutler Dam where each withdrawal site willcould be impactedaffected. 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 (mechanical limit) drawdown levels. Discussion will introduce other factors such as drawdown timing and duration. The current FERC license requirementsoperating scenarios for managing Cutler Reservoir require that water rights are met under any reservoir management scenario.; that will not change as a result of relicensing the Project. Results from the impacteffects analysis on water-withdrawal infrastructure will identify critical minimum surface elevations and help ensure this requirement is metseasonal needs for all infrastructure.

Planned hydraulicHydraulic modeling will be used to determine the elevation for each fence survey site when the terminal end of the fence willwould 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 drawdownsdrawdown limits (as measured at Cutler Dam). Discussion will introduceconsider 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 impactseffects from ice movement, and potential for undercutting or otherwise destabilizing erosion control measures.

ImpactsEffects 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 Octoberfall 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 the fall 2019 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 studyStudy results will be shared with the recreation and shoreline habitat studies, as well asand others as appropriate, to determine the full impacteffect of proposed changes on each resource.

The Proposed Study Plan Master Schedule (Appendix B) provides the outline for studyC) outlines implementation for individual studies for 2019 and 2020. Appendix BC includes the estimated start and completion dates for each study, and the estimated filing date ofdates for the 6-month progress reportupdate 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 $125144,000. The proposed study effort is adequate to provide the level of information needed to understand Project effects, impacts direct, indirect and/or benefits to the resource, cumulative effects, and to determine the need for any specific protection, mitigation or enhancementPME actions.

2.3.8 PROPOSED STUDY PLAN CONSULTATION RECORD

AppendixAppendices A outlinesand B outline comments received from stakeholders for all study plans, and how comments were addressed in the TERR3 Study Plan.this RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on Project-specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

2.3.9 REFERENCES

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3.0 FISH AND AQUATIC ~~PROCESSES PROPOSED~~RESOURCES REVISED STUDY PLANS

3.1 FISH AND AQUATIC ~~PROPOSED~~REVISED 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~~potential changes in operations, of the Project for 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~~the fall 2019 reservoir drawdown on the aquatic community; and to relate ~~the drawdown effects to the proposed~~ potential 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~~future 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~~consistency with ~~these~~the relevant 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~~, and a mollusk survey of the reservoir during the 2019 fall drawdown. The fisheries work completed on the Bear River will serve to establish the current fishery community ~~in the Bear River~~ downstream of the Project and will be included in the ~~summary document~~ISR.

3.1.5.2 EFFECTS OF THE FALL 2019 RESERVOIR DRAWDOWN ON THE AQUATIC COMMUNITIES

A drawdown of Cutler Reservoir ~~is planned for October~~was conducted in fall 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~~provided 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~~were recorded in ~~various locations throughout~~ each of the reservoir units except for the Bear River Unit which, because of its riverine nature, was not likely to have any stranding areas during the drawdown and at the lowest reservoir elevation. Location of stranding areas and isolated pools ~~will be~~were identified and georeferenced. ~~Because the~~The exposed reservoir bottom sediments, which are composed of very fine silt and clay, are virtually impossible to access by foot. During the fall 2019 drawdown, a Marsh Master® (semi-floating tracked vehicle) and an aerial drone were used to survey 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~~ along the ~~main~~perimeter of each reservoir~~. If~~ unit. An ArcGIS Collector tracked the Marsh Master and georeferenced each pool that contained live or dead fish. The size of each stranding pool was estimated, and number of fish ~~is too great, then~~estimated along with species and size when possible. In addition, all isolated pools that did not contain fish were counted. Locations not accessible by a Marsh Master® were documented using an aerial drone. The drone photographed those pools to verify presence or absence of fish, and georeferenced 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.~~ pool location.

UDWR ~~proposes~~surveyed the exposed shorelines and reservoir bed where possible to locate and sample mollusks species in the reservoir drawdown zone and note elevations such that potential effects of ~~proposed~~future operations can be determined. UDWR focused on locating the California floater (*Anodonta californiensis*), which is a native species. 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

A bioassessment of benthic macroinvertebrates (described below) will allow for an effect's determination of future project operations on this community.

PacifiCorp will employ the Rapid Bioassessment technique (David et al. 1998) to determine the health of the benthic macroinvertebrate community. ~~Survey sites~~Fieldwork was conducted prior to and during the fall 2019 drawdown. Lab work will be conducted in 2020. Survey sites were established in each of the ~~four~~ reservoir units, as identified in the 2018 Cutler Hydroelectric Project ~~Resource Management Plan~~RMP Five-year Monitoring Report (PacifiCorp 2018). These units are delineated as: ~~the~~ South Marsh Unit, North Marsh Unit, Reservoir Unit, Bear River Unit (upstream of the reservoir confluence), 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). However, the Rapid Bioassessment methodology is not applicable to large rivers so the Bear River Unit was not sampled. In addition, at drawdown the Bear River Unit transformed from a reservoir environment to a riverine one, eliminating the ability to directly compare the two conditions of pre-drawdown and during drawdown. Each unit ~~will have~~sampled was assigned between one and seven transects depending on the ~~zone~~unit length. ~~Transect locations will be identified for each unit.~~ Potential study transects ~~will be~~were selected in the field, depending on accessibility~~.~~, prior to the sampling effort. While locating the transects, investigators ~~will take~~took care to select sites that ~~will~~did not become dewatered during the drawdown. The protocol for this technique ~~requires~~required investigators to choose several representative transects in each unit and then randomly select ~~which~~a transect to sample in each unit. Each transect ~~will have~~had a minimum of four sampling sites along the transect line.

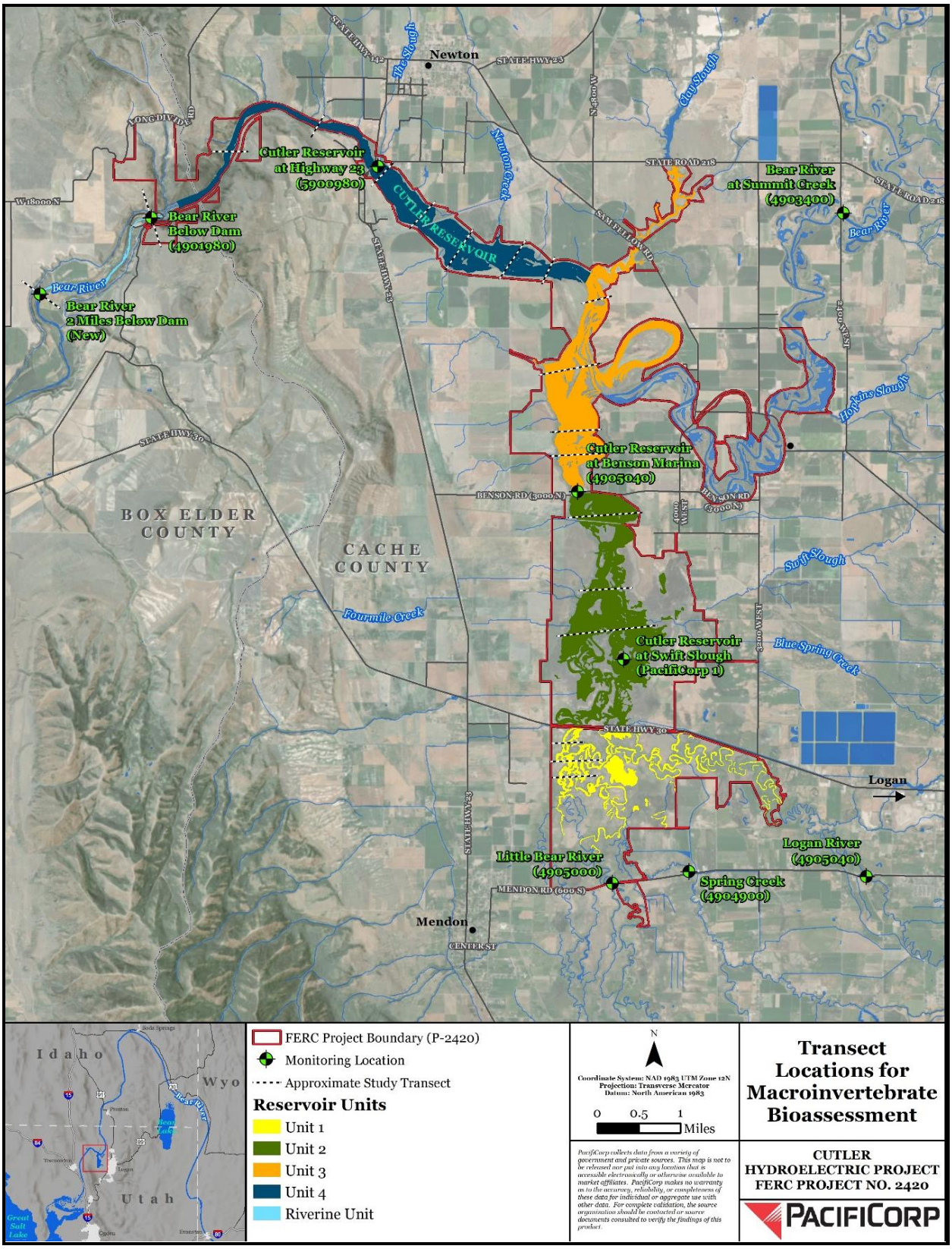

FIGURE 3-1 TRANSECT LOCATIONS FOR MACROINVERTEBRATE BIOASSESSMENT

Samples ~~will be~~were collected using either a kick-~~sampling method~~net to scoop along the bottom or ~~a Ponar~~an Eckman dredge depending on the depth. Two kick-net scoops or Eckman grabs were collected at each sample site on every transect. Each sample ~~will~~was be rinsed clean and most of the detritus removed (with the exception of filamentous green algae) to assure samplers that they have enough organisms. Any detritus, rocks, wood, or other media ~~are to be~~were thoroughly cleaned and rinsed to remove any organisms that are clinging to those pieces. In addition, the samples ~~will be~~were washed through ~~graduated sieves~~a 250-micron sieve to remove silt and mud such that the sample is as clean as possible 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~~were preserved in 95 percent ~~ethanol~~isopropanol and taken to a laboratory setting to sort and identify organisms. Organisms will be sorted to ~~family~~genus for this exercise.

There ~~will be~~was a baseline benthic macroinvertebrate survey at each randomly selected transect prior to the drawdown. ~~The~~This baseline Rapid Bioassessment ~~will occur in early~~occurred the week of October 14, 2019, prior to the drawdown period. Transects ~~will be~~were 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~~were georeferenced~~, and two~~. Two people ~~are anticipated to conduct~~plus a boat operator conducted this work over ~~3~~several 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~~Eckman 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~~was repeated 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~~0.5 foot).

3.1.5.4 FRESHWATER MOLLUSK SURVEY

During the drawdown ~~planned for October~~conducted in fall 2019, a crew from UDWR ~~plans~~surveyed shorelines and accessible reservoir bed to collect mollusk specimens. The crew ~~will~~ specifically ~~plan~~looked to assess ~~what~~whether the native ~~bivalves are~~California floater was present in the reservoir. The crew ~~will look~~also looked for non-native bivalves~~. PacifiCorp will assist~~ such as the paper pondshell (*Utterbeckia imbeccilis*). UDWR ~~with the effort and will note~~noted where native and non-native species are located within the potential operational zone and ~~record~~will provide dates and times of observation to PacifiCorp to determine reservoir elevations that are critical for bivalve survival.

3.1.5.5 DETERMINE POTENTIAL EFFECTS OF ~~PROPOSED~~FUTURE 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~~future Project 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 assessment; 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~~fish and aquatic organisms in Cutler Reservoir
- ~~Information~~New and existing information on the benthic macroinvertebrate and the mollusk communities including species presence and the extent of exposure ~~to proposed~~under future Project ~~operation~~operations
- A description and analysis of how ~~proposed~~future operations may affect the aquatic reservoir communities using elevation data from the reservoir drawdown and results from the reservoir modeling

The ~~Proposed~~ Study Plan Master Schedule (Appendix ~~B~~C) provides the outline for ~~individual studies~~study implementation for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, and the estimated filing ~~date of~~dates for the 6-month progress ~~report~~update 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 direct, indirect and/or cumulative effects, ~~impacts or benefits to the resource,~~ and to determine the need for any specific ~~protection, mitigation or enhancement~~PME actions.

3.1.8 ~~PROPOSED~~ STUDY PLAN CONSULTATION RECORD

Appendix A and B outlines comments received from stakeholders for all Study Plans, and how comments were addressed in the ~~AQ1 Study Plan.~~RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides the rationale why based on Project specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

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3.2 WATER QUALITY ~~PROPOSED~~REVISED 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~~ future Project operations ~~, of the Project~~ for FERC relicensing. Continued operation of the Project ~~as proposed~~ may have direct, indirect, and/or cumulative effects on water quality resources. Comments from FERC staff and stakeholders on the PSP requested that PacifiCorp introduce a two-phased approach to the water quality study plan.

In order to address comments by stakeholders on the Proposed Water Quality Study Plan, PacifiCorp is modifying the PSP to include a two-phased study plan approach.

Phase 1 will be a synthesis of all existing water quality data for Cutler reservoir, with the addition of new water quality data gathered during the fall 2019 drawdown. Data sources will include PacifiCorp, UDWQ, USU, the 2010 TMDL study, and other sources where available. PacifiCorp will issue an interim report at the conclusion of the first year of studies summarizing water quality conditions in the reservoir, identifying data gaps, and detailing any proposed data collection in 2021 (Phase 2) if data gaps are found.

Phase 2 will be implemented during 2021 depending on Phase 1 gap analysis recommendations and conclusions.

The rationale for this study includes:

- There is uncertainty ~~as to~~regarding how ~~the proposed~~future Project operations may affect water quality within the FERC Project Boundary and downstream of Cutler Dam; increased levels of reservoir ~~fluctuations may~~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 to relate this information to potential effects of future operations; and,
- Water quality information from past monitoring efforts by PacifiCorp, USU, and ~~Utah Division of Water Quality (~~UDWQ~~)~~ is readily available. In addition, there are numerous entities managing the five major TMDL designations in the Bear River basin that have been implementing monitoring requirements. However, because several entities have collected and stored data separately, PacifiCorp proposes to synthesize all existing data

and ~~collect~~including additional data collected during the ~~proposed~~ 2019 drawdown to provide a more complete understanding of water quality conditions in Cutler Reservoir and the surrounding aquatic environment, including the 2-mile ~~stretch~~reach of the Bear River downstream of Cutler Dam~~.~~ (note that if the hydraulic study demonstrates evidence for an altered reach of river [i.e., a reach length affected differently by future dam operations], the downstream reach length may be adjusted).

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~~reach up to 2 ~~-~~miles downstream of Cutler Dam, or as adjusted given additional information from the hydraulics study. As stated in Section 3.2.1~~.~~, Phase 1 objectives will:

~~Objectives will include:~~

- Determine potential effects of continued and ~~proposed~~future 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~~future 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~~Provide recommendations to address water quality problems identified; and,
- Provide information for NEPA analysis of the affected environment.

3.2.3 REVIEW OF EXISTING INFORMATION – PHASE 1

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~~process that was completed by ~~SWCA for the~~ UDWQ in 2010 (SWCA 2010). That ~~study~~TMDL identified excessive TP and low DO as pollutants of concern and developed target levels for the TMDL study area~~.~~, which included Cutler Reservoir. 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 ~~to12~~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.[11]

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

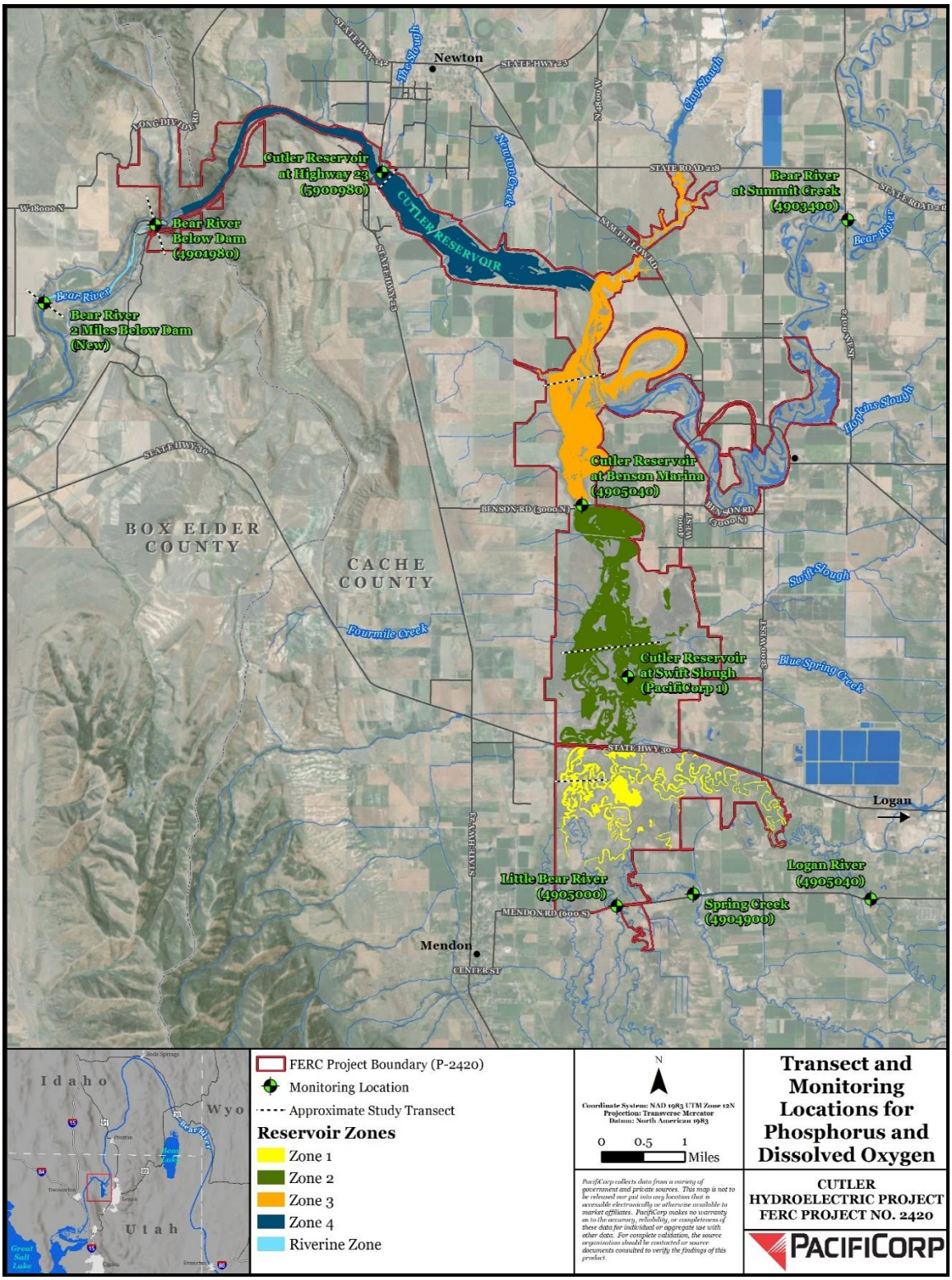
Total Phosphorus

- 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~~and 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~~.~~ (or as dictated by the results of the hydraulics modelling, as noted in Section 3.13).

[11] In the TMDL, the Northern Reservoir and the Southern Reservoir are separated by Benson Road at Benson Marina.



* 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

~~**1.1.1.2 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.~~

3.2.5.1 PHASE 1 – COLLECTION OF PHOSPHORUS AND DISSOLVED OXYGEN SAMPLES ~~DURING~~DURING THE FALL 2019 DRAWDOWN

For the purpose of making direct comparisons to water quality data previously collected by PacifiCorp and other entities over the past ~~23~~24 years, sampling transects for the drawdown ~~will be~~were established at ~~the same~~or in close proximity to the reservoir water quality sampling stations used for PacifiCorp's monitoring reports. One exception is that a sampling station ~~will be~~was established ~~2~~ approximately two miles downstream of the Cutler Dam. Table 3-1 lists the proposed transect or sampling locations and number of samples per transect.

TABLE 3-1 SAMPLING TRANSECT LOCATIONS ~~QUANTITIES~~AND SAMPLE NUMBERS

TRANSECT	NUMBER OF SAMPLES ALONG TRANSECT
Cutler Reservoir ~~at Swift Slough~~in the South Marsh Unit	~~5~~4
Cutler Reservoir in the North Marsh Unit	4
Cutler Reservoir ~~at Benson Marina~~in the Reservoir Unit	~~3~~4
Cutler Reservoir ~~at Highway 23~~in the Cutler Canyon Unit	~~3~~4
Bear River immediately downstream of Cutler Dam	~~3~~1
Bear River 2 miles ~~below~~downstream of Cutler Dam	~~3~~1

Water samples ~~will be~~were collected to analyze TP, total dissolved phosphorus, orthophosphate, and DO at each sampling point along a transect near the surface ~~and near the bottom. Total~~. TP, dissolved phosphorus, and orthophosphate will be analyzed in ~~an analytical~~a laboratory while

DO ~~will be~~was 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~~occurred one week prior to the fall 2019 reservoir drawdown and was repeated within ~~2~~two days ~~following~~during the drawdown ~~to~~at the reservoir's lowest elevation.

3.2.5.2 PHASE 1 – 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~~were summarized in the ~~2019 report.~~Cutler Reservoir 2018 Five-year Monitoring Report (PacifiCorp 2018). 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.~~ or provided in a regular reporting cycle. In addition, the TMDL study (SWCA 2010) provides a rich source of information regarding point and non-point sources and documents the annual nutrient loading into Cutler Reservoir. Some of the main findings from the TMDL study are outlined in the introduction for this RSP.

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~~Ecosystems Research, Inc. also collected a DO data series from 2005 to 2007 for Swift Foods through each year at a number of locations that will be correlated with PacifiCorp sampling locations in the ISR. Ecosystems Research, Inc. DO data are recorded in 15-minute intervals. PacifiCorp will condense this data down to June through September when temperatures are highest to evaluate worst-case scenarios for temperature and DO.

If there is sufficient congruency between the various reports and studies, 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. Existing reports that will be reviewed as part of this study have been annotated below.

PacifiCorp 5-year Monitoring Report. 2018.

Per the Cutler FERC license, PacifiCorp began collecting water quality data in 1996. Chemical parameters included nutrient concentrations of phosphorus (total and orthophosphate) and nitrogen as NO3, NO2, NH3, and total Kjeldahl nitrogen (TKN). Physical parameters included temperature, TSS, specific conductivity, pH, and DO values. The samples were collected during five hydroperiods (1996–1998, 2000–2003, 2008, 2013, and 2018). The 2018 report includes all the previous water quality data collected where comparisons are made at each of eight monitoring sites per year.

Budy, P., M. Baker and S.K. Dahle. 2011.

Dr. Budy and two other researchers collected water quality information and fish, plankton, and benthic macroinvertebrate data and used this information to assess fish performance in the highly eutrophic Cutler Reservoir environment. Water quality data collected during this study include temperature, conductivity, total dissolved solids, pH, salinity, turbidity, and DO. In addition, they collected data on secchi depth, TKN, nitrate-nitrite, ammonia, TP, dissolved phosphorus, and soluble reactive phosphorus.

Wurtsbaugh, W.A. and R. Lockwood [eds]. 2007.

The two editors and a group of USU students worked together to gather information related to the Logan City wastewater treatment plant (WWTP) discharge and compared the fisheries, planktonic, and benthic macroinvertebrate communities with that of the Logan River where it enters Cutler Reservoir. Water quality information collected included TP, DO, temperature, pH, chlorophyll *a*, and turbidity.

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

In addition, the BRCC has requested PacifiCorp to evaluate existing literature regarding phosphorus concentrations in waterbodies and how that relates to aquatic vegetation production. This analysis will be included in the ISR and the final Water Quality Technical Report.

3.2.5.3 PHASE 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 potential future Project operations.

This work will be conducted by the sediment modeling crew and shared with other resource area analyses (refer to Sediment Analysis Study Plan methods). Any TP, dissolved TP and orthophosphate data from the core analysis will be incorporated into the ISR and final Water Quality Technical Report.

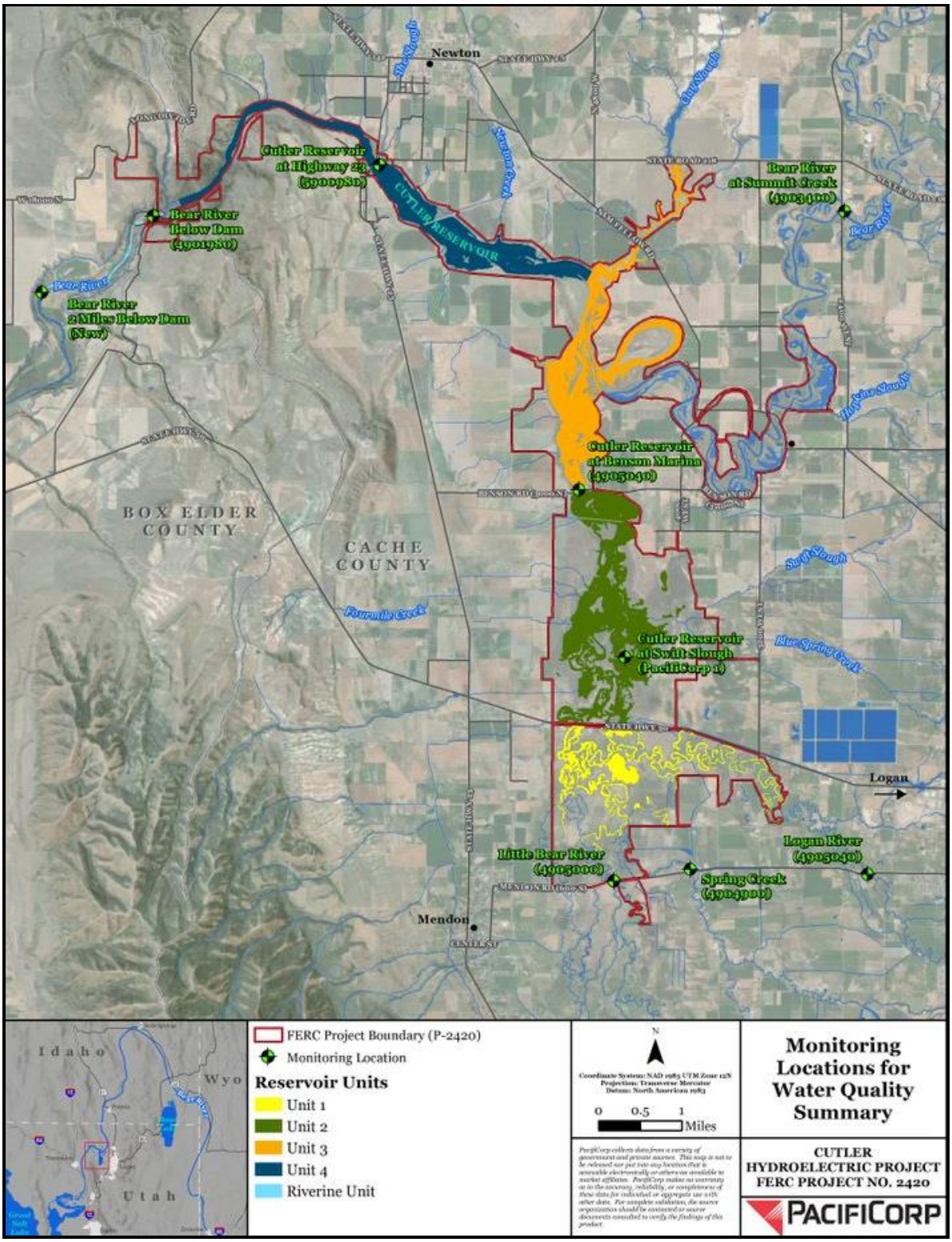


FIGURE 3-3 MONITORING LOCATIONS FOR WATER QUALITY SUMMARY ANALYSIS

A ~~Study Plan report~~Phase 1 report that will be included as part of the ISR 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~~under future Project operations
- A description and analysis of how ~~proposed~~future Project operations may affect water quality within the study area.
- Findings from searching literature for the relationship between phosphorus concentrations in water and aquatic vegetation production.

3.2.6 SCHEDULE AND PERIODIC REPORTING

The ~~Proposed~~ Study Plan Master Schedule (Appendix ~~B~~C) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, and the estimated filing ~~date of~~dates for the 6-month progress ~~report~~update 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~~75,000 to $~~65~~95,000. 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~~PME actions.

3.2.8 STUDY PLAN CONSULTATION RECORD

~~1.1.2 PROPOSED STUDY PLAN CONSULTATION RECORD~~

Appendix A outlines comments received from stakeholders for all study plans, and how comments were addressed in the revised AQ2 Study Plan. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on additional Project-specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

~~3.2.8~~3.2.9 REFERENCES

Budy, P., M. Baker and S.K. Dahle. 2011. "Predicting fish growth potential and identifying water quality constraints: A spatially-explicit bioenergetics approach." Environmental

Management 2011: 48: 691. https://doi.org/10.1007/s00267-011-9717-1. Accessed November 29, 2018.

Dees, T. 2007. "Effects of wastewater treatment plant discharge on benthic invertebrate communities in Cutler Reservoir." In Comparison of chemical and biological characteristics in Cutler Reservoir (Utah) near the inflows of the Logan River and the Logan Wastewater Treatment Plant, edited by W.A. Wurtsbaugh and R. Lockwood. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. https://www.bearriverinfo.org/files-ou/digital-resources/pub__4974621.pdf. Accessed December 19, 2018.

PacifiCorp. ~~2019. Water quality analysis and summary report for Cutler Reservoir, Utah: SWCA Environmental Consultants.~~

~~PacifiCorp.~~ 2018. *Cutler Hydroelectric Project Resource Management Plan 5-year Monitoring Report 2013-2017.* PacifiCorp, Salt Lake City, Utah. http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Cutler/03282018_Cutler_RMP-5yr_Monitor.pdf. Accessed December 19, 2018.

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PacifiCorp. 2002. Cutler Hydro Project No. 2420 Resource Management Plan Five-Year Implementation and Monitoring Report: 1995-2002. Volume 1: Report. Prepared for Federal Energy Regulatory Commission, Portland Regional Office, Portland, Oregon.

SWCA Environmental Consultants (SWCA). 2010. *Middle Bear River and Cutler Reservoir Total Maximum Daily Load (TMDL).* Prepared for Utah Division of Water Quality. http://www.deq.utah.gov/ProgramsServices/programs/water/watersheds/approvedtmdls.htm. Accessed November 21, 2018.

Wurtsbaugh, W.A. and R. Lockwood [eds]. 2007. *Comparison of limnological characteristics in Cutler Reservoir (Utah) near the inflows of the Logan River and the Logan Wastewater Treatment Plant.* Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. https://www.bearriverinfo.org/files-ou/digital-resources/pub__4974621.pdf. Accessed December 19, 2018.

3.3 HYDRAULIC MODELING ~~PROPOSED~~REVISED 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 to assess the feasibility and potential impacts that may result from the potential change in future operations as described in the PAD (PacifiCorp 2019).

A detailed hydraulic model of the Project has not yet been created~~. Proposed~~ but is underway following the preliminary LiDAR data collection that occurred during the fall 2019 drawdown, and is expected in 2020. Potential 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 to a ~~short~~relevant distance downstream of Cutler Dam~~.~~ (the precise distance will be set based on model outcomes, as stated in Section 3.13 and detailed below).

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~~will include all facilities within the current PacifiCorp Project Boundary, as well as ~~portions~~(preliminarily) 2 miles of the Bear River downstream of the PacifiCorp Project Boundary near the Cutler powerhouse. The preliminary 2-mile extension of the study area was based on engineering judgment and aims to capture the change in sediment transport within the Bear River downstream of Cutler Dam ~~and upstream of the confluence~~; if hydraulic modeling demonstrates that downstream effects are likely to change as a result of potential future Project operations, then the downstream analysis reach length may be changed to correlate with the ~~Cutler Reservoir. The~~model findings. That is, 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~~ the Data Collection section below, and in the Drawdown Elevation and Model Calibration Data Acquisition Plan (DEMCDAP~~)~~), which was prepared for the

~~proposed~~fall 2019 drawdown.[12] Details on the methodology, timing, and execution of the sediment data collection are provided in the ~~Cutler~~Revised Sedimentation Study Plan. Once compiled, the various 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~~from potential future Project ~~operation~~operations on the hydraulic conditions, sediment transport capacity, and water surface elevations, as well as answer questions posed by other ~~proposed~~related studies.

3.3.5.1 DATA COLLECTION

Updated LiDAR and aerial imagery ~~will be~~were collected during ~~a~~the fall 2019 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~~were still inundated at the maximum drawdown and ~~are~~were therefore not able to be surveyed using LiDAR. ~~Pressure~~Fifteen pressure transducers ~~will be~~were placed ~~at multiple locations~~ within the reservoir to collect stage (elevation) data ~~within the reservoir~~ before and during the drawdown event. ~~This~~These data, along with ~~the~~ inundation extents developed from the aerial images collected ~~from~~during the LiDAR survey, will be used to calibrate the hydraulic model. Sediment core samples, suspended sediment concentrations, and depth to bedrock (where feasible) ~~will be~~were collected before, during, and ~~before~~after (depending on the component) the fall 2019 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 Study Plan and the DEMCDAP. ~~Detailed~~Flow data were collected at seven locations within the Project Area. These flow data were combined with detailed evaluation of the hydrologic data gathered from surrounding existing USGS stream gages~~,~~ and PacifiCorp stream gages~~, and computed inflows~~ to quantify groundwater contributions ~~will be used to~~and develop inflow hydrographs to the hydraulic model.

[12] Available ~~once completed,~~ upon request.

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. Both the 1D and 2D models will include boundary conditions at the Bear River, Logan River, Little Bear River, Spring Creek, Clay Slough, Cutler Dam, and Downstream end of the model. If it is determined that there are any significant sources of groundwater inflow within the reservoir those will be added as internal boundary conditions. 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 fall 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~~WSEL 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. Once the model is constructed, a timestep interval will be determined based on grid cell size, model run time, and model stability. Model stability is often analyzed by examining the Courant numbers within the computational domain. The Courant

number[13] can help guide both the necessary cell size and the timestep interval required for a stable and accurate model.

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 and potential future operating procedures. The calibrated model will be used to estimate the impacts of potential changes ~~to dam~~resulting from Project operation on channel hydraulics, sediment transport capacity, inundation boundary, and water quality.

Specifically, the calibrated model will provide water surface elevations, depths, velocities, and shear stresses anywhere within the model boundary. The model ~~could~~will also produce an inundation boundary of the reservoir based on the operations at Cutler Dam. The hydraulic/sediment transport model will also be able to estimate the total bed sediment mobilized within the reservoir due to changes in the operation of Cutler Dam

The model will be useful in answering questions posed by other ~~proposed~~related 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 will include a summary of all collected information and discussion of the analyses. The report will address the topics below:

3.3.6.1 DATA COLLECTION

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

[13] The Courant number is the residence time of water within a model cell.

3.3.6.2 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)~~ [14]
- Digital terrain data set
- Structural data used in the model

3.3.6.3 MODEL CALIBRATION

- What data ~~was~~were used for calibration
- Calibration results
- Finalized timestep model component and resulting Courant numbers within the computational domain.

3.3.6.4 MODEL IMPLEMENTATION

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

The ~~Proposed~~Revised Study Plan Master Schedule (Appendix ~~B~~C) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, and the estimated filing ~~date of~~dates for the 6-month progress ~~report~~update 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~~ direct, indirect and/or ~~benefits to the~~

[14] A representation of the conveyance areas resistance to flow–an increased Manning's roughness will decrease velocities across that section.

~~resource,~~ cumulative effects, and to determine the need for any specific ~~protection, mitigation or enhancement~~PME actions.

~~3.3.81.1.1 PROPOSED STUDY PLAN CONSULTATION RECORD~~

3.3.8 ~~APPENDIX~~STUDY PLAN CONSULTATION RECORD

Appendices A ~~outlines~~and B outline comments received from stakeholders for all study plans, and how comments were addressed in the ~~AQ3 Study Plan.~~RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on additional Project-specific information and 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~~REVISED 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~~outlined 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, resulting from in-reservoir hydraulics or from mechanical actions such as dredging (a frequently discussed potential PME action) 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 previously 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~~However, 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~~potential future changes in Project operation that could have the potential to ~~resuspend~~re-suspend and mobilize bed sediments in key areas of and throughout 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 potential future operational

changes. The study will also address the practicability of dredging as a sediment management measure and assess its potential 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 potential 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~~.~~ (SWCA 2010). This Study Plan aims to understand the interaction of phosphorus bound in bed sediments and the water column. Understanding the movement and release of the internal phosphorus recycling from bed sediments may provide valuable insight into management of Cutler.

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 Ambient Water Quality Data Management System database (AWQMS). 2019.
- United States Geological Survey National Water Information System 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~~Critical 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. Sediment cores collected are primarily used in developing the sediment transport component of the hydraulics model. Sediment structure inputs provide the model the necessary information to predict scour, deposition, re-suspension, and transport load from the system under a defined model condition. The number of core samples necessary to characterize the sediment structure is dependent upon the sediment variability throughout the reservoir. If the sediment structure is uniform throughout, then as few as 20 samples may be needed to provide the sediment model with enough data to run accurately. Because of the vast area of Cutler, the number of inflows, and the variety of habitats (canyon, open water, and marsh habitats), it is not possible to predict a sufficient number, but rather the study will have the sediment transport model define the necessary number needed for accurate modelling, per standard accepted practice for this discipline.

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 upstream base of Cutler Dam.
- **Canyon Reach** from Wheelon Dam to the Highway 23 bridge, to assess the effects of the historic ~~dam~~Wheelon 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** upstream 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.

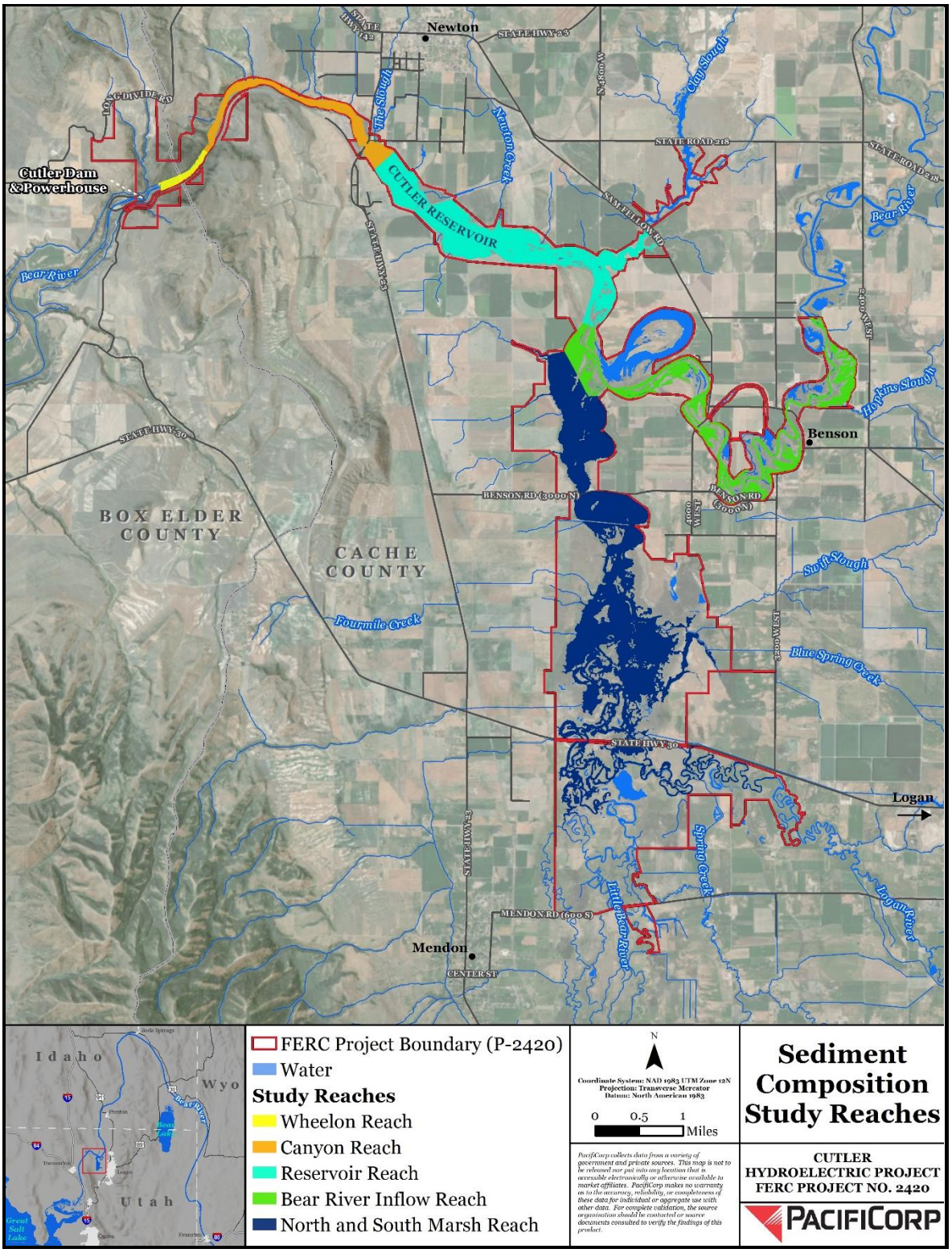

FIGURE 3-4 SEDIMENT COMPOSITION STUDY REACHES

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

- **North and South Marsh Unit -** 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 (including Logan City's effluent discharge) 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).
- **Bear River Unit -** 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~~are occurring throughout the marsh and reservoir.
- **Canyon and Reservoir Unit -** 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.

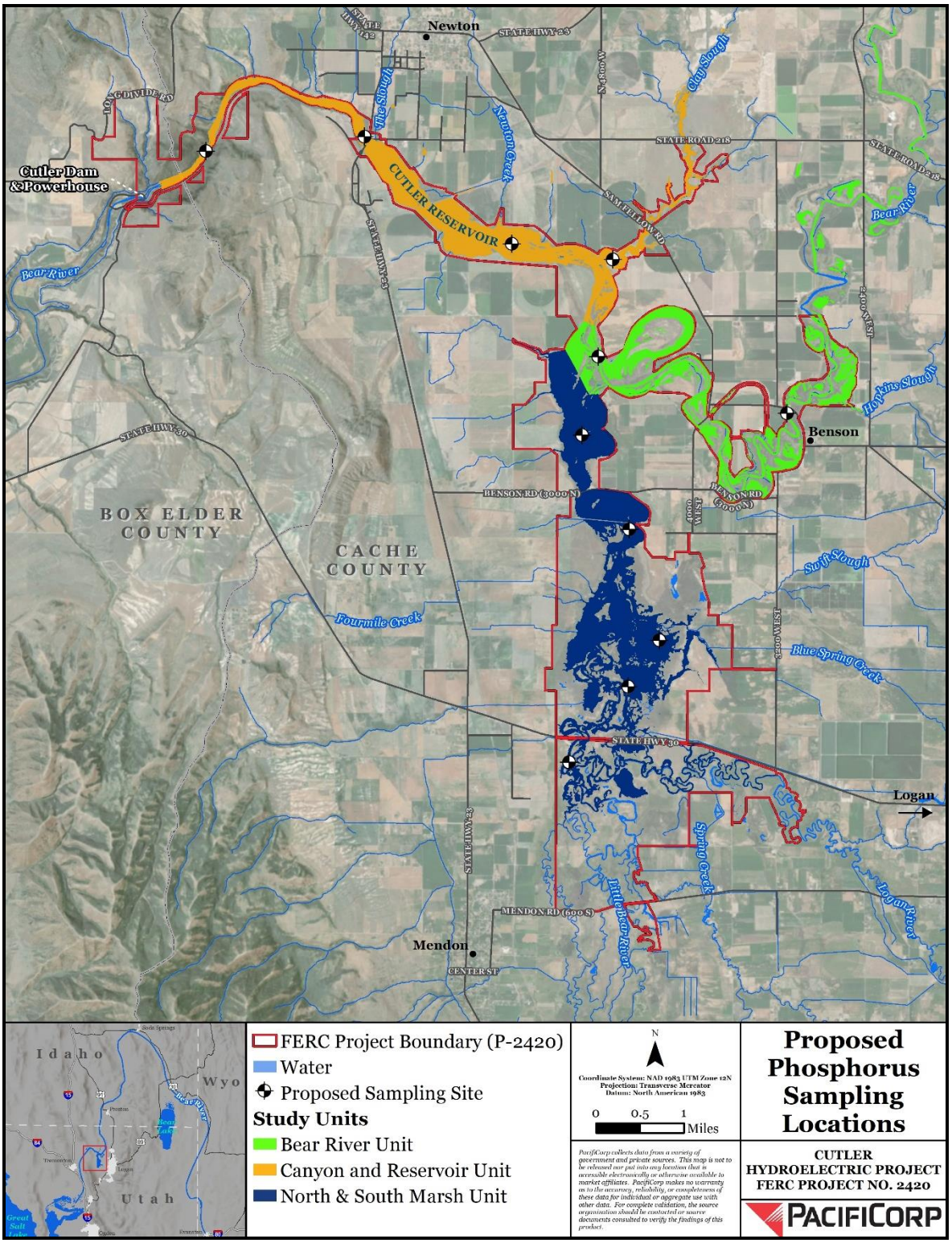

FIGURE 3-5 PROPOSED PHOSPHORUS SAMPLING LOCATIONS

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 for sample collection 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~~WSEL 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 ~~63µ~~63µm 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~~minimum of 10 percent of the cores will 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 ~~dichlorodiphenyldicholoethylene~~dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyl (PCBs), and Resource Conservation and Recovery Act (RCRA)[15] 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~~recycling 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~~

TP samples collected by USU over the past decade suggest the North and South Marsh units of Cutler contain the highest concentrations of TP (Wurtsbaugh and Lockwood 2007, Wurtsbaugh et al. 2008, and Mears and Wurtsbaugh 2009). While concentrations are variable from site to site and year to year. TP concentrations are consistently up to five times higher than other locations as a result of continued internal recycling and external loading. Variability in TP concentration

[15] ~~Resource Conservation and Recovery Act~~

may be driven by wastewater discharge timing, load (flow multiplied by concentration), and a range of natural variables.

Potential changes in Project operations could affect velocity and ~~resuspend~~re-suspend sediments which could exacerbate the existing high concentrations found in the water column, and in turn ~~affecting~~affect 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 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~~WSEL and water velocity.

General sample locations proposed in Figure 3-5 are loosely predicated on past sampling locations from USU research for TP in Cutler and are generally located near TP loading sources. Precise sampling locations will be selected based upon sediment structure when the first sampling event occurs.

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 spacing[16] 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 site will include: date, time of sampling, location ID, weather conditions, and samplers name. Additional measurements of field conditions ~~may~~will include air temperature, water temperature, ~~DO,~~ and ~~pH~~DO to ~~log~~document 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~~Two hundred 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

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

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 kinematic 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 WSLWSEL benchmarks such as the dam WSLCutler Dam WSEL or Benson Marina stilling basin WSLWSEL 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 be placed in an open sky area to 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. and included in the ISR. 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 to explore the exchange of phosphorus between bed sediments and the water column and the potential for ~~resuspension~~re-suspension 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~~could occur if the decision were made to dredge in some areas of the reservoir.

3.4.7 SCHEDULE AND PERIODIC REPORTING

The ~~Proposed~~Revised Study Plan Master Schedule (Appendix ~~B~~C) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, and the estimated filing ~~date of~~dates for the 6-month progress ~~report~~update 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 ~~the~~additional 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 all components 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,~~direct, indirect and cumulative effects, and to determine the need for any specific ~~protection, mitigation or enhancement~~PME actions.

3.4.9 ~~PROPOSED~~REVISED STUDY PLAN CONSULTATION RECORD

~~Appendix~~Appendices A ~~outlines~~and B outline comments received from stakeholders for all Study Plans, and how comments were addressed in the ~~AQ4 Study Plan.~~RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on additional Project-specific information and 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.

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Wurtsbaugh, W.A., B.J. Abbott., and D. Epstein (editors) 2008. Comparative Limnological Analysis of Cutler Reservoir and Dingle Marsh with Respect to Eutrophication. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. 71 p.

4.0 HUMAN ENVIRONMENT ~~PROPOSED~~REVISED STUDY PLANS

4.1 RECREATION RESOURCES ~~PROPOSED~~REVISED 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~~implemented 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~~re-issuance of a new license for the Project, 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 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 (i.e., 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~~PacifiCorp's Five-Year Monitoring Report series 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.

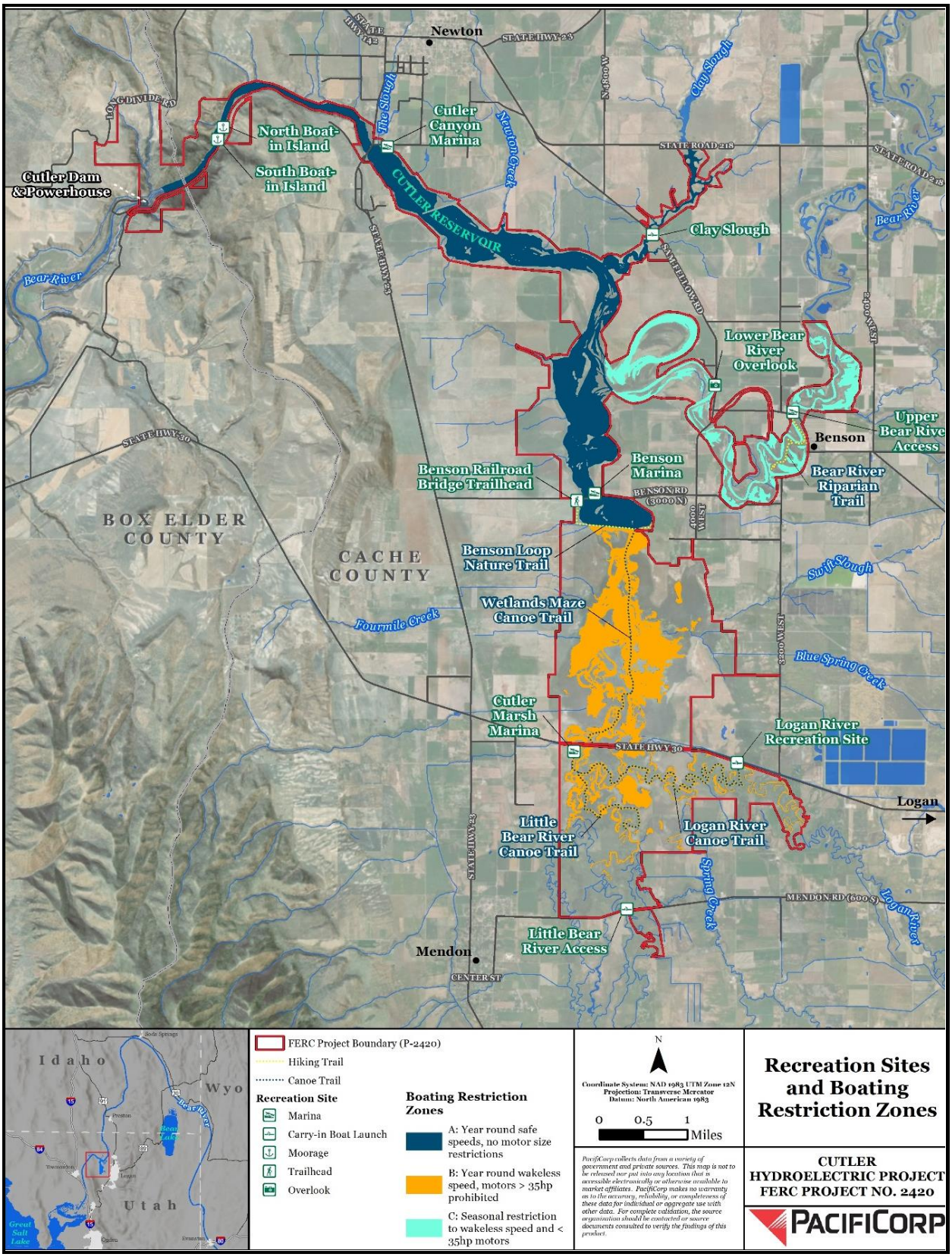

FIGURE 4-1 RECREATION STUDY PLAN AREA

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 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~~.~~ for the next license. 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~~accessibility
- Photographs
- Safety/security concerns

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~~,~~ (based on use counts below, where available), 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~~,~~ and 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 Management Plan Monitoring Report (PacifiCorp 2018).

4.1.5.4 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 used to help develop the questions for the visitor survey. Where opportunities arise, structured interviews with individuals pursuing recreation opportunities in the Project Boundary will be conducted.

~~4.1.5.4~~4.1.5.5 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 survey questions will be developed based on information gathered during the structured interviews. Prior to survey implementation, the survey instrument will be pre-tested, and refined for clarity, if necessary. The pre-test will include a total of 10 to 15 completed surveys, with the intent to receive feedback on readability, length, and general understanding of survey content. If necessary, minor changes to the survey may be made to make the survey easier to complete and/or understand.

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 the purpose of the survey and link to the 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~~1.1.1.1 ~~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~~Potential future 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. In addition, drones were used during the fall 2019 drawdown to document changes in wetted perimeter corresponding to distinct reservoir elevations at Cutler recreation sites (Table 4-1~~The topographic data will be used~~). Field crews marked the wetted perimeter daily with non-permanent survey paint when there was a change in reservoir elevation during the drawdown. Drones captured still photos along a pre-programmed flight path to document lateral changes in wetted perimeter distance across a range of reservoir elevations. Survey markers with established grids were used to measure changes in lateral distance. Recreation planners will also use the drone photos as well as the LiDAR and bathymetry data 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.

TABLE 4-1 DRONE DOCUMENTATION OF CUTLER RECREATION SITES DURING DRAWDOWN

Cutler Recreation Sites	Reservoir Sites	Cutler Marsh Marina
		Benson Marina
		Cutler Canyon Marina
		Clay Slough
	Tributary Sites	Little Bear River Access
		Logan River Recreation Site
		Upper Bear River Access

4.1.6 SCHEDULE AND PERIODIC REPORTING

The ~~Recreation Resources~~recreation portion of the ISR will document the analysis and results in compliance with 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
- Project safety and security needs relative to recreation access

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. while at the same time maintaining Project safety and security. 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 will be submitted as part of the license applicationLicense 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 FERC.

The recreation studies will be competed in one study year. Based on the results provided in the ISR, relicensing participants may request modifications to the recreation study and/or new studiesadditional information; 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 BC) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix BC includes the estimated start and completion dates for each study, and the estimated filing date ofdates for the 6-month progress reportupdate and for the ISR.

4.1.7 LEVEL OF EFFORT AND COST

The estimated cost of conducting the Recreation Resources Proposed Study PlanRSP 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~~PME actions.

4.1.8 ~~PROPOSED~~REVISED STUDY PLAN CONSULTATION RECORD

Appendix A ~~outlines~~and B outline comments received from stakeholders for all study plans, and how comments were addressed in the ~~REC1 Study Plan.~~RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on additional Project-specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

4.1.9 REFERENCES

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4.2 CULTURAL RESOURCES ~~PROPOSED~~REVISED 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~~Project's existing and ~~proposed~~potential future 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~~potential future 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 FERC and Utah Division of State History (UDSH, which houses the Utah State Historic Preservation Office [SHPO]) guidelines for archaeological and historic architectural studies.

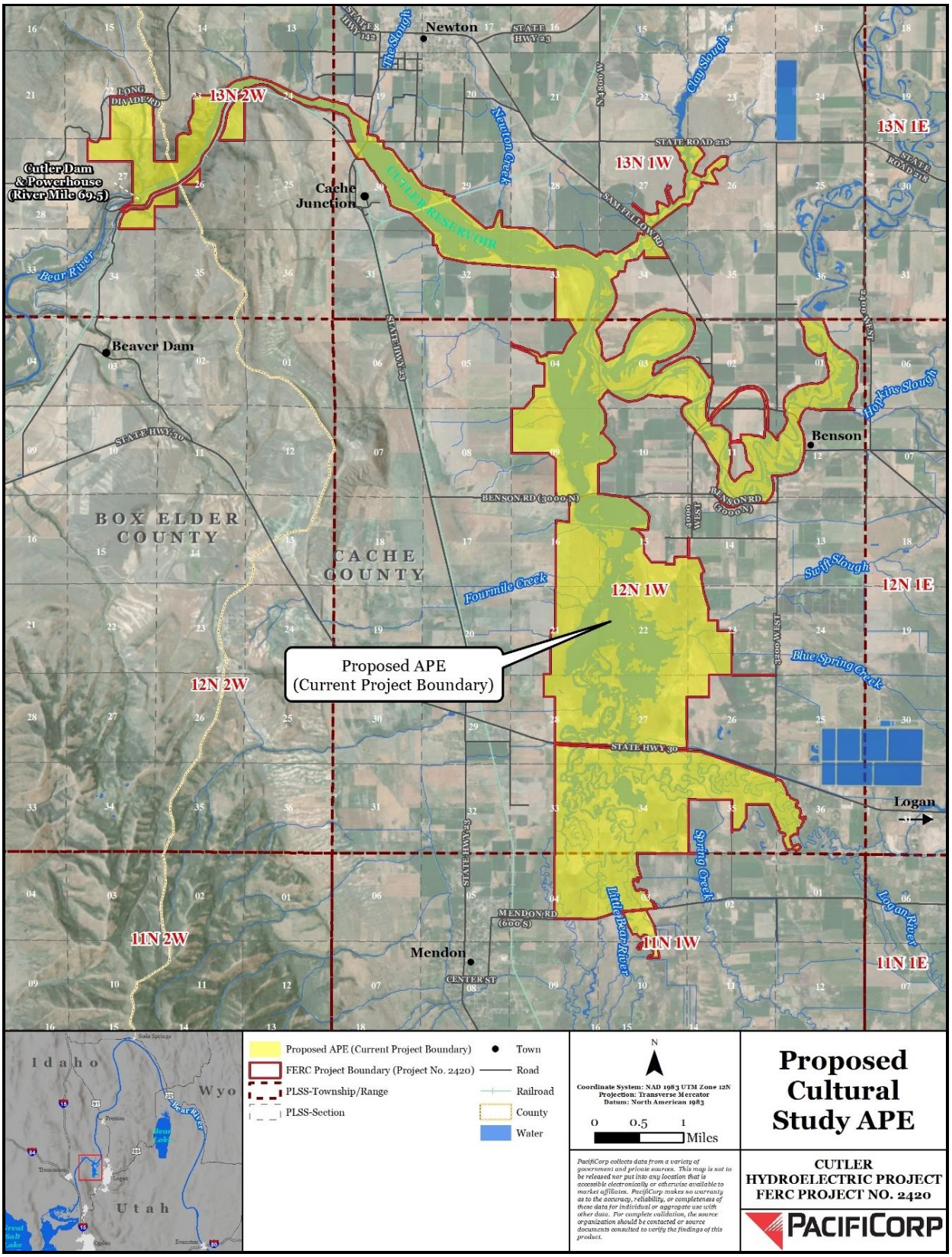
4.2.3 REVIEW OF EXISTING INFORMATION

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~~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 FERC to initiate Section 106 consultation for the relicensing. The proposed studies will facilitate 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 FERC and PacifiCorp under Section 106.

4.2.4 STUDY AREA

PacifiCorp proposes, per 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). In October 2019 the Utah SHPO concurred with this definition of the APE. 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 4-2, 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. Wheelon Dam may also be altered or removed at some point as a result of future safety and operational requirements.

TABLE 4-2 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~~USFWS 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[17] and Bear River Boater Zone C[18]	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~~supports (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

[17] The area north of the Benson Railroad bridge and west of the confluence with the Bear River.
[18] The Bear River area, east of the confluence with Cutler Reservoir (including the ~~'~~"horseshoe ~~area').~~area").

high flow 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~~an archaeological ILS ~~will be~~was conducted during the fall 2019 drawdown for areas that were exposed and reasonably accessible, including portions of the shoreline, recreational areas (marinas, boat launches, and hiking trails), and irrigation infrastructure (pumps, canal intakes, and canals~~).~~) that are normally inundated by the reservoir . The shoreline, recreational areas, and irrigation infrastructure that were not surveyed during the drawdown will be surveyed during the first study season. Survey of any areas along riverbanks upstream or downstream of the reservoir will also 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)~~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~~ mechanical limits of the reservoir operating range (and is the evaluation range for the future Project operation proposal) 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 (see Land Use Study Section 2.3~~.~~). 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 and different from the current operations regime 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. The Utah SHPO will be consulted on any amendments to the APE. 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 or a drone. 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~~consists 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~~includes collecting information necessary for completing a Utah Historic Site Form (UHSF), which ~~will include~~includes 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~~Preliminary documentation ~~of~~for the Wheelon Dam was conducted during the fall 2019 drawdown, as the dam~~.~~, which was inundated by the Cutler Reservoir, was exposed during the drawdown. Due to ~~the~~safety and access constraints of documenting the historic dam ~~within~~during the ~~current reservoir~~drawdown, a drone ~~may be used for photography, provided that Federal Aviation Administration and PacifiCorp safety requirements can be met~~was used to capture high-resolution images and video footage not otherwise available. 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~~component 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~~The amendment to the District's NRHP nomination form 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 FERC for review. Following revision based on PacifiCorp's and 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, FERC, and UDSH.

Initial study activities will consist of those that ~~will occur~~occurred during the ~~planned~~ reservoir drawdown in the fall of 2019: the archaeological ILS of inundated shoreline, recreational, and irrigation infrastructure areas, and the Wheelon Dam historic architectural ILS field visit. First study season activities will consist of the archaeological ILS of non-inundated shoreline, recreational areas, irrigation infrastructure, upstream and downstream riverbank areas (if needed), the Wheelon Dam historic architectural ILS archival research, 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~~C) provides the outline for study implementation for individual studies for 2019 and 2020. Appendix ~~B~~C includes the estimated start and completion dates for each study, the estimated filing date of the 6-month progress ~~report~~update 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~~110,000 to $~~140~~200,000. The proposed study effort is adequate to provide the level of information needed to understand Project direct, indirect, and cumulative effects, ~~impacts or benefits to the resource, and~~ and to determine the need for any specific ~~protection, mitigation or enhancement~~PME actions.

4.2.8 ~~PROPOSED~~REVISED STUDY PLAN CONSULTATION RECORD

Appendix A ~~outlines~~and B outline comments received from stakeholders for all study plans, and how comments were addressed in the ~~CULT1 Study Plan~~RSP. If stakeholder comments were not incorporated or studies were not considered, Section 5.0 provides rationale based on additional Project-specific information and FERC's Study Plan Criteria (18 CFR § 5.9).

4.2.9 REFERENCES

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5.0 REQUESTED STUDIES NOT ADOPTED

~~Multiple~~Several 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 already-proposed Study Plan. The requested studies not adopted are summarized below, and outlined in depth in the PAD/SD1 Response to Comments Table (Appendix A~~):~~), PSP Response to Comments Table (Appendix B), and the Consultation Record (Appendix D).

- Expansion of Sedimentation Study: As stated in the PSP filed September 11, 2019, and stated in both meetings with BRCC, PacifiCorp ~~intends to collect~~has collected LiDAR data on up to 2 miles of the BRCC canals~~. The~~ that originate from Cutler Dam. As previously stated, 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.[19] BRCC's December 11, 2019 comments on the PSP retract the previous request to study sediment transport in the BRCC canals. PacifiCorp did adjust sampling efforts during the drawdown to address, in part, BRCC's study request. See PacifiCorp revised response (November 2019) to BRCC Comment 15 in Appendix A, and BRCC Comments 2 and 3 in Appendix B (January 2020).

- Aquatic Weeds and Algae Study Request: PacifiCorp does not propose to study aquatic weeds or algae during the relicensing process~~.~~, but instead has agreed (as detailed below) to include as part of the Water Quality Study an additional component that addresses BRCC's concern. 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~~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.[20] BRCC's December 11, 2019 comments on the PSP retract the previous request to study aquatic weeds in Cutler Reservoir. PacifiCorp and BRCC have reached agreement to expand, describe, and analyze the relationship between phosphorus and aquatic weed growth as part of the Water Quality Study using existing literature. See PacifiCorp revised responses (November 2019) to BRCC Comments 19 in Appendix A, and BRCC Comment 4 in Appendix B (January 2020).

- 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 FERC's ~~SD1~~SD2. PacifiCorp is not proposing to change the overall ~~quantity~~volume of water flowing downstream. Other large tributaries, multiple

[19] PAD/SD1 Response to Comments Table, Line 15.
[20] ~~Ibid., line 19.~~ PAD/SD1 Response to Comments Table, Line 19.

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.[21] On August 22, 2019, the USFWS and PacifiCorp staff held a conference call to discuss the USFWS Scoping comment letter on the Cutler Hydroelectric Relicensing project. Subsequently, PacifiCorp staff met with USFWS Bear River Bird Refuge (BRBR) personnel on October 7, 2019 to better understand the agency's concerns regarding general Cutler operations, as well as to discuss current and potential future operational scenarios. In that meeting, PacifiCorp explained that the purpose of the drawdown was to conduct preliminary required relicensing studies and clarified it was not a proposal for future operations. The SD2 table labeling the analysis range as the proposed operations range was clarified and addressed in additional detail. PacifiCorp's hydrologist gave a presentation with additional detail regarding current Cutler operations, as several USFWS staff are relatively new to BRBR. Potential future changes in operations can be simulated using the hydraulic model that will be developed as part of the Hydraulic Modeling Study. The discharge from Cutler Dam as a result of these potential future operations can be extracted and quantified for evaluation to the downstream terminus of the hydraulic model boundary (Section 3.3.4 in the RSP detailing the hydraulic model study area). Effects further downstream can then be extrapolated as needed. Potential changes from current operations in discharge from Cutler Dam including frequency of discharge fluctuations associated with shifts in Project operations will be documented in the hydraulic model outputs (Section 3.3.5.4 in the RSP).

- 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~~PacifiCorp's 2D hydraulic model will be ~~constructed to explore a number~~capable of analyzing a range of operations scenarios ~~on operation water elevations~~ and ~~resultant~~associated 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.[22] These issues will be~~These issues will also be assessed through the proposed test fluctuation flows in 2020, which will mimic some of the ~~proposed future operations~~potential future operations.[23] Although not included as a stand-alone study, the intent of this requested study will be met in the aggregate with the Hydraulic Modeling and Sediment study plans.

[21] ~~Ibid., line 21.~~ PAD/SD1 Response to Comments Table, Line 21.
[22] ~~Ibid., line 22.~~
[23] PAD/SD1 Response to Comments Table, Line 22.

- Effects on water quality from fluctuating reservoir levels and Wheelon Dam removal: This specific study request is included as part of PacifiCorp's Water Quality Study which 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.[24]

- ~~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.[25]~~

- Fish Entrainment Study: PacifiCorp and the USFWS consulted on two occasions (August 22 and October 1, 2019) to better understand the USFWS's concerns and to address the concern about fish entrainment. The October meeting also included representatives from the Utah Division of Wildlife Resources (UWDR). Following additional discussions and clarifications regarding the current fishery, habitat, and Bear River instream flow conditions below Cutler Dam, PacifiCorp and the USFWS agreed that the issues cited in the USFWS July 2019 comment regarding fish passage and fish screens are not issues requiring an additional study as part of the Cutler Relicensing process. USFWS would like PacifiCorp to include a summary in the Aquatic Resources Technical Report of sampling efforts for bluehead sucker and other native species in the lower Bear River since 1994. For further information see the response to USFWS Comment 21 in Appendix A.

- 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~~to incorporate various climate ~~change or snowpack levels. Whereas PacifiCorp agrees with FERC's 2009 determination that~~scenarios in the resource studies. As the commenter notes, there are numerous climate ~~change is occurring, PacifiCorp also agrees with FERC that it is not aware~~scenarios available to select but none of ~~any~~the climate change models ~~that~~ are known to have the accuracy needed to predict the degree of specific resource impacts ~~and~~or 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

[24] ~~Ibid., line 24.~~ PAD/SD1 Response to Comments Table, Line 24.
[25] ~~Ibid., line 23.~~

change will be addressed as part of ~~the~~FERC's Cumulative Effects analysis.[26] For further information see the response to National Audubon Society Comment 7 in Appendix B.

- 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~~, however, PacifiCorp does not intend on drafting a stand-alone study to address potential methane emissions. Neither 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 not been identified by the commenter.[27]
- 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 FERC's Developmental Analysis, and would not normally be a part of a ~~socioeconomic study~~Socioeconomic Study.[28]

[26] ~~Ibid., line 27.~~
[27] ~~Ibid., line 28.~~ PAD/SD1 Response to Comments Table, Line 28.
[28] ~~Ibid., line 29.~~ PAD/SD1 Response to Comments Table, Line 29.

- 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~~PacifiCorp responded to this December 2019 comment in Appendix A, Comment 35. As noted in that response, PacifiCorp does not intend to include the upriver Bear River Bottoms (BRB) lands in the Cutler study plan area for analysis of direct effects. As discussed at the October 8, 2019 Study Plan Meeting, FERC stated that no mechanism has been identified linking effects at Cutler Reservoir with effects upstream in these specified riparian lands. Subsequently, on October 29, 2019, PacifiCorp held a collaborative meeting with BAS to discuss study requests and comments. PacifiCorp affirmed their original response that operation of Cutler Reservoir does not impact the 1,900 acres of PacifiCorp-owned riparian lands upstream of the Cutler Hydroelectric Project. As noted in 18 CFR 5.9(b)(5), PacifiCorp believes there is a lack of nexus to project operations , and therefore, does not plan to include these lands in the proposed studies. 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.[29]

- 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.[30]~~, however, PacifiCorp did agree to host further discussions with the Bridgerland Audubon Society and the National Audubon Society with regard to updates to the Shoreline Characterization Study and potentially the Land Use Study.[31] As a result of comments from the Bridgerland Audubon Society as well as the National Audubon Society, PacifiCorp has agreed to amend the Shoreline Habitat Characterization Study (SHCS) in Section 2.2 of this RSP to include a second study phase, that, if necessary, would include surveys of bird use in the Project Boundary during the breeding and non-breeding season. The adjustments in the study plan are reflected in Section 2.2 of this RSP. Beyond substantially changing habitat relationships, climate change may also substantially alter species distributions. No analysis we conduct today can avoid this issue, and a habitat-based approach does not seem any more vulnerable to climate change related drawbacks than any other approach. As part of the accuracy assessment, a substantial amount of anecdotal weed data will be collected. It is PacifiCorp's opinion that this new data, in conjunction with existing data, will be adequate for the analysis of future changes in weed distribution as they pertain to operational changes at Cutler. The SHCS will incorporate eBird and Breeding Bird Survey (BBS) data since both of these datasets, while they do not fully capture the information that is needed, will provide useful information. Additionally, Section 2.2.4

[29] ~~Ibid., line 34.~~ PAD/SD1 Response to Comments Table, Line 34.
[30] ~~Ibid., line 36.~~
[31] PAD/SD1 Response to Comments Table, Line 36.

has been amended to include the areas surrounding the OHWL. As a result of these revisions to the SHCS, this study request has been resolved. For further information see the response to Bridgerland Audubon Society Comment 3, and National Audubon Society Comment 2 in Appendix B.

- 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-minutes 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.[32] As noted in Logan City Comment (Appendix A, Comment 2), PacifiCorp will file a progress update with FERC in 2020 and the ISR in early 2021 which will summarize water quality conditions in Cutler Reservoir, identify water quality data gaps and recommendations for a Phase 2 of this study, as needed in 2022. As provided for in the ILP regulations (18 Code 18 CFR § 5.15), Logan City and other stakeholders will have an opportunity to review and comment on both reports as well as provide comments on the need for a second field season.

- 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.[33]~~established that would help PacifiCorp consider if the study is merited.[34] PacifiCorp agrees that the effects of dredging could be informed through various aspects of the Hydraulic Modeling, Sedimentation, and Water Quality Study Plans. However, dredging is a future management action that could be considered as a potential PME measure in the new Cutler FERC license. Dredging is not necessarily a study plan request or comment but could be identified as a PME measure following the completion of the studies proposed in this RSP that are designed to collect information on water quality, fisheries and other aquatic resources. This information, combined with the LIDAR and bathymetry data, would be analyzed upon completion of the field work. Suggestions for future management actions would be one of the outcomes in the data analysis. The potential benefits and impacts of dredging would be considered in the alternatives analysis as part of the NEPA environmental analysis. For further information, review UDWQ Comment 43 in Appendix A.

- 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 erosion or sloughing. These locations will be taken into consideration when choosing monitoring sites.[35]~~wintertime ice fluctuations: In response to this UDWQ/UDAF

[32] ~~Ibid., line 37.~~ PAD/SD1 Response to Comments Table, Line 37.
[33] ~~Ibid., line 38.~~
[34] PAD/SD1 Response to Comments Table, Line 38.
[35] ~~Ibid., line 41.~~

comment, PacifiCorp has modified the Land Use Study to include monitoring of bank erosion at downstream locations during the winter period. The study plan has been modified in section 2.3.5.3 to include monitoring the Bear River below Cutler Dam at 5-6 representative locations to identify potential impacts from fluctuating water levels. Monitoring will take place below Cutler Dam in the area of flow attenuation as defined by the hydraulic model.[36] For further information please review UDAF Comment 41 in Appendix A.

- ~~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.[37]~~
- 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.[38]~~

[36] PAD/SD1 Response to Comments Table, Line 41.
[37] ~~Ibid., line 43.~~
[38] ~~Ibid., line 45.~~

~~APPENDIX A~~

- In response to this UDWQ/UDAF comment, PacifiCorp has modified the Land Use Study to include monitoring of bank erosion at downstream locations during the winter period. The study plan has been modified in section 2.3.5.3 to include monitoring the Bear River below Cutler Dam at 5-6 representative locations to identify potential impacts from fluctuating water levels. Monitoring will take place below Cutler Dam in the area of flow attenuation as defined by the hydraulic model.[39] For further information please review UDWQ Comment 45 in Appendix A.[40]

[39] PAD/SD1 Response to Comments Table, Line 41.
[40] PAD/SD1 Response to Comments Table, Line 45.

APPENDIX A

PAD/SD1 RESPONSE TO COMMENTS TABLE

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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.	**PacifiCorp ~~believes~~understands this comment to be focused on future project mitigation measures, rather than a study plan request.** On October 29, 2019, PacifiCorp held a collaborative meeting with Logan City to discuss study requests and comments. As discussed at the meeting, this comment was intended to focus on potential PME measures for ~~a future~~ the new FERC license rather than a comment on the PSP filed September 11, 2019. Accordingly, comments on future PME measures are premature at this time. Logan City will have multiple opportunities during the FERC relicensing process to provide recommendations on future license requirements. The need for increased frequency of water quality monitoring in a new FERC license will be determined by FERC as part of their independent environmental analysis. The existing information on water quality, in combination with data collected through the proposed field studies, will help inform FERC on the need for this type of PME measure~~, which will be established after the impacts analysis~~ in the next license. As part of the relicensing process, PacifiCorp is ~~completed. PacifiCorp intends~~proposing 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.~~ hydrology information. PacifiCorp intends to build both 1D and 2D hydraulic models as a result of the Hydraulic Modeling Study as described in the PSP filed September 11, 2019. The models will provide detailed water surface elevations and flow pattern results at any number of reservoir operation levels.	Resolved
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.	**PacifiCorp will amend the WQ Study Plan to include a phased approach, and include 2018 data in the 2020 Interim Report.** On October 29, 2019, PacifiCorp held a collaborative meeting with Logan City to discuss study requests and comments. PacifiCorp elaborated on the available data and current monitoring schedule at the Cutler Project. The available data and timing of publication is described in the September 11, 2019 response to Logan City. UDWQ in a separate stakeholder meeting with PacifiCorp confirmed that their data is available to the public including Logan City. An outcome of recent discussions with Logan City was an amended Water Quality Study Plan as proposed by FERC and agreed by participants at the Logan City study plan meeting. Per this verbal agreement, PacifiCorp will amend the Water Quality Study Plan adding a two-phased study plan approach. Phase 1 would be a synthesis of existing water quality data for Cutler reservoir. Data sources would include PacifiCorp, UDWQ, Utah State University, the Middle Bear and Cutler Reservoir TMDL study, and other sources where available. PacifiCorp would request Logan City provide their TMDL monitoring data to be included in the synthesis report. PacifiCorp will file an ISR with FERC in 2020 and the Initial Study Report in early 2021 which will summarize water quality conditions in Cutler Reservoir, identify water quality data gaps and recommendations for the Phase 2 study in 2022. As provided for in the ILP regulations (18 Code of Federal Regulation [CFR] § 5.15), Logan City and other stakeholders will have an opportunity to review and comment on the water quality interim report as well as provide comments on the need for a second field season.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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 CaCo3, Al, and Fe).	**PacifiCorp clarified that detailed mapping of all reservoir areas and elevations is included in the Proposed Study Plan (PSP).** On October 29, 2019, PacifiCorp held a collaborative meeting with Logan City to discuss study requests and comments. As presented to meeting participants, the LiDAR mapping of Cutler Reservoir in combination with the reservoir bathymetry work will provide detailed bed elevations to delineate areas in the reservoir that have the potential to become isolated. This analysis of the reservoir will be provided in reports in planar and profile illustrations correlated with reservoir elevations. As part of the fall 2019 drawdown, PacifiCorp surveyed areas that could become isolated in Cutler Reservoir. Such pools have been georeferenced and will be incorporated into the geographic information survey (GIS) mapping of Cutler Reservoir. The hydraulic modeling of the reservoir in combination with field observations georeferenced during the fall 2019 drawdown, will reveal areas of the reservoir that potentially have low velocities and may be more isolated from the general recycling of the reservoir volume. The Water Quality Study Plan as filed September 11, 2019 and the proposed amendment as described previously in this comment table, will include an analysis of nutrients in Cutler Reservoir including phosphorus in its various forms.	Resolved
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.	**PacifiCorp clarified that a review of the effects of carp in similar reservoir ecosystems is included in the WQ Study Plan.** On October 29, 2019, PacifiCorp held a collaborative meeting with Logan City to discuss study requests and comments. An outcome of our discussions was an amended Water Quality Study Plan as proposed by FERC and agreed to by participants at the meeting. The amended water quality study plan (described previously in the revised comment response table) will include a summary of studies regarding carp as described in the Water Quality Study Plan as filed September 11, 2019. Carp are listed as a non-game fish by UDWR but are still managed by the state. This fish species is prolific and found throughout the entire Bear River drainage from near its headwaters to the Great Salt Lake. Based on recent conversations with UDWR, it is unclear that carp can be linked directly as a causal agent to water quality degradation within Cutler Reservoir because removal of carp would not be expected to improve water quality in Cutler Reservoir. The Bear River is subject to anthropogenic impacts such as municipal effluent, irrigation diversion and return flows, seepage of agricultural waste, and industrial discharge all of which impact reservoir water quality.	Resolved
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. PacifiCorp intends to collect samples to be analyzed for specific constituents. These will include metals (RCRA), pesticides, PCBs, AL, FE, P, and CaCo3.	**PacifiCorp clarified that sediment mapping and coring, and assessment of Resource Conservation and Recovery Act (RCRA) and other contaminants is included within the Water Quality and Sediment Study Plan.** PacifiCorp is collecting sediment core samples as described in the Water Quality Study Plan as filed September 11, 2019. Randomly selected sediment cores will be sampled and analyzed for specific constituents that may have been deposited over decades in the reservoir. These will include the eight metals listed in the RCRA, pesticides, and, polychlorinated biphenyls (PCBs).	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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. PacifiCorp 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.	**PacifiCorp clarified that the Hydraulic Study Plan includes both 1D and 2D reservoir modeling.** PacifiCorp intends to build both 1D and 2D hydraulic models as a result of the Hydraulic Modeling Study as described in the PSP filed September 11, 2019. To accomplish the goals and objectives of this study, PacifiCorp will collect new data and analyze existing data sets to compile structural, spatial, terrain, and hydrologic data for the Project. Once compiled the data will be used as inputs and calibration for a U.S. Army Corps of Engineers (USACE) HEC-RAS hydraulic model. The calibrated model will provide an understanding of the existing hydraulic conditions in Cutler Reservoir. The hydraulic model will be used to predict hydraulic conditions, sediment transport capacity, and water surface elevations for a range of Project operations. Specifically, the models will provide detailed water surface elevations and flow pattern results at any number of reservoir operation levels. The hydraulic models will also provide analysis for other studies being conducted as part of the relicensing.	Resolved
7.	City of Logan	It is not adequate for PacifiCorp to evaluate the impacts of varying operations by simply measuring discrete points of drawdown under controlled inflow conditions. PacifiCorp should be required to create the 2D model to allow the evaluation of the boundary conditions to determine overall impacts.	Comment noted. PacifiCorp 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.	**PacifiCorp clarified that the Hydraulic Study Plan includes both 1D and 2D reservoir modeling.** PacifiCorp agrees a 2D model will be helpful to evaluate a range of operations including current and future reservoir conditions. The Hydraulic Modeling Study Plan filed September 11, 2019 included 1D and 2D hydraulic models. The Hydraulic Modeling Study is described earlier in this revised comment response table. Please refer to that earlier description of the Hydraulic Modeling Study.	Resolved
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 devasting to Cutler Reservoir and the downstream Bear River.	Comment noted. PacifiCorp intends on building a Hydraulic Model as a result of the Hydraulic Modeling Study plan. The 2D model will allow PacifiCorp to evaluate future PME measures.	~~Comment noted.~~ **PacifiCorp** ~~intends on building a Hydraulic Model as a result of~~ **clarified that the Hydraulic** ~~Modeling~~ **Study** ~~plan. The~~**Plan includes both 1D and 2D** ~~model~~**reservoir modeling; the models will** ~~allow PacifiCorp~~**be used to evaluate several issues, including future** ~~PME measures.~~**mitigation options.** PacifiCorp agrees a 2D model will be helpful to evaluate any number of mitigation alternatives. The hydraulic model, in combination with analysis of sediment core constituents, will help predict potential mobilization of contaminants from reservoir sediments at respective reservoir elevations. The Hydraulic Modeling Study Plan filed September 11, 2019 included a 1D and 2D hydraulic model. The Hydraulic Modeling Study is described earlier in this revised comment response table. Please refer to that earlier description of the Hydraulic Modeling Study.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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 PacifiCorp 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. PacifiCorp'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. PacifiCorp 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 PacifiCorp 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).	**PacifiCorp clarified that the Land Use and Shoreline Habitat Characterization Study Plans include assessments of bank stability under potential future operating conditions; these assessments can be used to evaluate a number of issues, including future mitigation options.** The Land Use and Shoreline Habitat Characterization studies will evaluate potential effects on bank erosion at a range of reservoir elevations. Furthermore, Table 2 in FERC's Scoping Document 2 (SD2) incorrectly labeled the drawdown evaluation as a proposed operations plan for the future license. PacifiCorp submitted a clarification letter to FERC regarding Table 2 on October 4, 2019. Future operations of Cutler Reservoir will be evaluated as part of the licensing studies. Wide fluctuations in reservoir pool elevations are not anticipated. PacifiCorp's proposed Hydraulic Modeling Study, filed September 11, 2019 and described previously in this comment table, will quantify the range of hydraulic conditions caused by potential changes in water surface elevations associated with reservoir operations. The Land Use Study filed September 11, 2019 included a section specifically designed to investigate bank conditions before, during, and after the 2019 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. If the City of Logan has any specific locations of particular concern with regard to bank erosion or sloughing taking place, please share those with PacifiCorp.	Resolved
10.	City of Logan	Organize a technical advisory committee to help provide technical oversight of the studies on the proposed operations.	PacifiCorp is conducting the Cutler relicensing using 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, PacifiCorp intends to continue on-going PacifiCorp-sponsored collaboration efforts, which will include workshops to address technical issues on an as-needed basis.	**PacifiCorp disagrees that a TAC is necessary, given the parallel collaborative process being undertaken as part of the FERC relicensing process. PacifiCorp continues to welcome Logan City and other stakeholders' participation in the Cutler Relicensing Process.** PacifiCorp is conducting the Cutler relicensing using 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, PacifiCorp intends to continue on-going PacifiCorp-sponsored collaboration efforts, which will include workshops to address technical issues on an as- needed basis. PacifiCorp welcomes Logan City's participation in the FERC licensing process and PacifiCorp's ongoing collaborative efforts and parallel process to the FERC ILP.	Logan City is encouraged to continue to participate in PacifiCorp's collaborative relicensing process.
11.	City of Logan	Consider the effects on the bank stabilization efforts implemented with nearly stable ~~WSL~~WSEL restrictions that would potentially no longer be effective.	Comment noted. PacifiCorp'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.	**PacifiCorp clarified that the Land Use and Shoreline Habitat Characterization Study Plans include assessments of bank stability under potential future operating conditions; these assessments can be used to evaluate a number of issues, including future mitigation options.** The Land Use Study filed September 11, 2019 includes methods to document bank conditions before, during and after the 2019 reservoir 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 field effort will help document areas of potential shoreline erosion~~Comment noted. PacifiCorp'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. Bank stabilization efforts already implemented were designed to be effective at a range of WSELs.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
12.	City of Logan	The data presented in the ~~TDML~~TMDL 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. PacifiCorp 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.	**PacifiCorp clarified that the Water Quality, Fish and Aquatic Resources, and Hydraulic Modeling Study Plans include assessments of water quality parameters and aquatic biota under potential future operating conditions; these assessments can be used to evaluate a number of issues, including future mitigation options.** PacifiCorp filed the PSP on September 11, 2019 to investigate water quality, fish and aquatic resources, and hydraulic modeling. These studies will investigate the effects of proposed reservoir elevation changes on the prominent environmental issues that exist in the reservoir. PacifiCorp will also amend the Water Quality Study Plan to add a two-phased study plan approach as described previously in this table of revised responses to comments.	Resolved
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~~WSELs 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 FERC has specified in SD1. PacifiCorp's Water Quality Study will inform this analysis.	~~Comment noted.~~ **PacifiCorp** ~~believes this comment is consistent with~~ **agrees that the cumulative effects analysis** ~~that~~ **of water quality should include existing and proposed upstream BMPs, considering potential future operating conditions.** PacifiCorp is not requesting to raise the maximum water surface elevation of Cutler Reservoir in the new license application. As part of the environmental analysis, FERC ~~has specified in SD1. PacifiCorp's~~will evaluate cumulative effects including actions in the Bear River system potentially effecting water quality. The actions to improve water quality listed in Logan City's letter will be identified in the cumulative effects' analysis during the National Environmental Protection Act process. The Water Quality Study will identify sources of water quality impairment and analyze the interaction of potential future reservoir operations with water quality conditions in the reservoir and downstream. The proposed Water Quality Study will help inform ~~this~~FERC's cumulative effects analysis.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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: 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.	**PacifiCorp does not agree to conduct modeling exercises within irrigation canals as specified to inform items 1 through 4.** As stated in the previous comment, PacifiCorp hosted collaborative meetings with BRCC on October 28 and November 14, 2019 to discuss study requests and comments. As stated in the PSP and at both meetings with BRCC, PacifiCorp has agreed to collect LiDAR data and provide the data to BRCC on up to 2 miles of BRCC irrigation canals. Responses to BRCC comments 1 through 4 are as follows: 1. PacifiCorp will prioritize and continue to honor all water delivery contracts. As a result, PacifiCorp does not see the need to conduct a modeling exercise within irrigation canals to demonstrate that the company will continue to meet these contract obligations. Further, as discussed at the November 14, 2019 meeting, PacifiCorp presented a cross-section of Cutler Dam demonstrating that the proposed fluctuations in operations will not affect water delivery to BRCC canals. 2 - 4. LiDAR data collected in November 2019 should help BRCC identify future weir locations and confirm quantities of water deliveries within irrigation canals. The need for new devices to measure water delivery within irrigation canals falls under water delivery contracts and is outside the FERC relicensing process. Given the outcome of the J-U-B Engineers data review (see Enclosure 4), PacifiCorp believes the current water delivery measurement system is accurate, meets industry standards and complies with the 1912 contract. Items 2, 3, and 4 do not warrant study or modeling within the relicensing process as they are not related to hydro project license operation.	Resolved See BRCC PSP comment 1 and 2 in Appendix B withdrawing study request.
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: 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.	**PacifiCorp does not agree to expand the Sedimentation Study as requested in this comment.** PacifiCorp will evaluate LiDAR and bathymetric data in combination with TSS and other water quality data to assess future management actions for best operations of company facilities, while also maintaining contractual obligations to BRCC. Further, although not related to relicensing, BRCC, in the subsequent meetings with PacifiCorp on November 14, 2019, indicated the request to expand the Sedimentation Study to include BRCC canals may no longer be a concern if its grant application with Bureau of Reclamation to line the BRCC canal is awarded. Responses to BRCC numbered comments are as follows: 1. Per BRCC's request, PacifiCorp collected TSS data from the West and Hammond canals beginning on October 25, 2019 to help quantify sediment inputs to the canal system during the reservoir drawdown in the fall of 2019. This data will be provided in the FERC ISR in 2020, and in the Initial Study Report at the end of the first year of field study (early 2021). The hydraulic models will estimate the general sediment transport within the reservoir based on the incoming and outgoing sediment data, calculated reservoir velocities, depth calculated from reservoir bed elevation data, and operating water surface elevations. 2. One of the outcomes of the relicensing studies will be, in part, an evaluation of deposition of sediments within the reservoir, movement of sediment under a range of operating conditions, and an evaluation of potential tools to manage sediment in the Cutler system.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
16.	BRCC	Expand the LiDAR readings to include the two main BRCC canals to the same 2-mile-distance. PacifiCorp'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: 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.	PacifiCorp intends to collect LiDAR data on up to 2 miles of BRCC canals as requested by BRCC. 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. 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.	**PacifiCorp agrees to include LiDAR on the 2-miles of canals specified; however, PacifiCorp notes that sub-items 1-4 are instead irrigation contract related and as such are outside of the scope of relicensing.** On October 28, 2019 and November 14, 2019, PacifiCorp hosted collaborative meetings with BRCC to discuss Cutler relicensing study requests and comments. As stated in the PSP filed September 11, 2019 with FERC, and stated in both meetings with BRCC, PacifiCorp has agreed to collect LiDAR data and provide the data on up to 2 miles of BRCC canals that originate from Cutler Dam as requested by BRCC. Future operations at the Cutler Hydroelectric Project would be evaluated to determine the hydro projects' impact on the surrounding environment, PacifiCorp intends to honor the terms of our irrigation contract with BRCC. The need for new devices to measure water delivery, specifically those listed in items 1 through 4 in BRCC's comments, fall under water delivery contracts and BRCC operational issues. These items are separate from project operation under the license, and hence, outside the FERC relicensing process. PacifiCorp appreciates the importance of water delivery to BRCC's business. Accordingly, PacifiCorp hosted the second meeting with BRCC to further discuss the items not related to the FERC relicensing. Additional meetings on these items are likely to occur.	Resolved See BRCC RSP comment 1 and 2 in Appendix B withdrawing study request.
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 ~~date~~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 PacifiCorp 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.	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.	**As previously stated, although LiDAR data will be collected and provided to BRCC, PacifiCorp does not plan to model sediment deposition in the irrigation canals. As noted below, BRCC has also suggested that this study may no longer be necessary, given their recent plans.** PacifiCorp agrees with BRCC that sedimentation is an issue of interest to all entities with canals in the Bear River system. PacifiCorp will evaluate the LiDAR and bathymetric data in combination with TSS and other water quality data to assess whether project operations impact sediment levels in irrigation water delivered to BRCC. Per BRCC's request, PacifiCorp collected TSS data from the West and Hammond irrigation canals beginning on October 25, 2019 to help quantify sediment inputs to the canal system during the reservoir drawdown in the fall of 2019. This data will be provided in the FERC ISR in 2020, and in the Initial Study Report at the end of the first year of field study (early 2021). BRCC, in the subsequent meetings with PacifiCorp on November 14, 2019, indicated the comment regarding studying sediment in BRCC canals may no longer be a concern if its grant application with Bureau of Reclamation to line the BRCC canal is awarded.	Resolved
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 PacifiCorp'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.	PacifiCorp 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.	**As part of the relicensing effort, PacifiCorp is investigating the condition and potential for rehabilitation of the low-level outlet structure for operational purposes.** PacifiCorp will include the condition of the low-level outlet combined with the LIDAR and bathymetry data to help inform future project operations. The potential benefits and impacts of rehabilitating the low-level outlet structure will be considered in the alternatives analysis as part of the National Environmental Policy Act (NEPA) environmental analysis. See also the previous revised comment responses in this table regarding BRCC requests to study sediments.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
19.	BRCC	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: 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. 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.	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.	**PacifiCorp does not agree with the need for an Aquatic Weeds and Algae Study, and in subsequent discussions, BRCC indicated that the study may not be necessary and would instead prefer to work cooperatively with PacifiCorp on this issue outside of the relicensing process.** For the purposes of the FERC relicensing process, the issue of aquatic weeds and algae will be one of the cumulative effects addressed in the environmental analysis. PacifiCorp and BRCC both agree that aquatic weeds and algae are an ongoing issue in the Bear River system compounded by the nutrient loading from municipal sources and multiple land use practices in the watershed. This is a watershed-scale problem not isolated to Cutler Reservoir alone. As highlighted in the Middle Bear and the Cutler Reservoir total maximum daily loads (TMDL), water quality degradation (specifically nutrient inputs) to Cutler Reservoir are substantial and in large measure are independent of Cutler Project operations. This degradation to water quality in Cutler Reservoir can be attributed to a myriad of upstream sources in the Bear River Basin. Specifically, these include the municipal effluent from cities and towns upstream of Cutler Reservoir, industrial effluent including inputs from commercial meat packing plants, animal feed operations, storm water inputs from each of the municipalities as well as most of Cache County, and all tributaries upstream of Cutler Reservoir. The TMDL noted elevated phosphorous levels which promote algal growth. In short, water quality in the reservoir is affected by inputs throughout the basin stretching from Cutler Dam to the headwaters and covering three state water quality jurisdictions. PacifiCorp believes this is an issue that reaches far beyond PacifiCorp's ability to resolve and is being addressed cooperatively through the TMDL process. In subsequent discussions with BRCC on October 28, 2019 and November 14, 2019, BRCC and PacifiCorp agreed that the near-term construction and operation of the Logan Wastewater Treatment Plant would potentially ameliorate nutrient inputs and water quality degradation to Cutler Reservoir. BRCC believes this may reduce the problem with aquatic weeds and algae plants in BRCC canals. BRCC indicated they prefer to work with PacifiCorp outside the FERC relicensing process to cooperate on this issue in lieu of their aquatic weeds and algae study request.	Resolved
20.	Mitchell Moncur; Private Citizen	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.	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.	No study plan adjustments proposed in the RSP. The boat ramp condition will be evaluated in the recreation facility inventory and recommendations to improve the ramp will be included in the Recreation Resources Study Final Report.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
21.	USFWS	Study Request: Effects of Cutler Reservoir fluctuations on flows and water levels at Bear River Migratory Bird Refuge facilities downstream of Cutler Dam 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. 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).	PacifiCorp maintains the Hydraulic Modeling Study plan scope is an appropriate level of effort given the direct and indirect effects identified in 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.	**PacifiCorp agrees and maintains that the potential effects of reservoir fluctuations downstream of Cutler Dam (including at BRBR) will be assessed by the Hydraulic Modeling Study Plan. PacifiCorp clarified current and potential future reservoir operation regimes with USFWS staff, as follows:** On August 22, 2019, the USFWS and PacifiCorp staff held a conference call to discuss the USFWS Scoping comment letter on the Cutler Hydroelectric Relicensing project. Subsequently, PacifiCorp staff met with USFWS BRBR personnel on October 7, 2019 to better understand the agency's concerns regarding general Cutler operations, as well as to discuss current and potential future operational scenarios. In that meeting, PacifiCorp explained that the purpose of the drawdown was to conduct preliminary required relicensing studies and clarified it was not a proposal for future operations. The SD2 table labeling the analysis range as the proposed operations range was clarified and addressed in additional detail. PacifiCorp's hydrologist gave a presentation with additional detail regarding current Cutler operations, as several USFWS staff are relatively new to BRBR.	Resolved
22.	USFWS	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. 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).	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.	**PacifiCorp agrees and maintains that the effects of both potential reservoir fluctuations and Wheelon Dam removal will be addressed with the Hydraulic Modeling Study Plan.** As noted previously, PacifiCorp staff met with USFWS staff on August 22, 2019 and October 1 and 7, 2019, to better understand and address the agency's concerns. In those meetings, PacifiCorp explained the drawdown study was being conducted for evaluation purposes only and clarified it was not a proposal for future operations. Additional discussions regarding the 1- and 2D modeling proposed in the Study Plan clarified what information would be available to assess and what, if any, changes could occur regarding sediment load at BRBR resulting from future Cutler operations.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
23.	USFWS	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. 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.	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.	**Following additional discussions and clarifications regarding current fishery, habitat, and Bear River instream flow conditions below Cutler Dam, PacifiCorp and the USFWS agree that the issues cited in this July 2019 comment (fish passage and fish screens) are not issues requiring additional study as part of the Cutler Relicensing process.** PacifiCorp and the USFWS met twice to better understand the agency's concerns and to address this specific issue, on August 22, 2019 and on October 1 and 7, 2019. The October meeting also included representatives from the Utah Division of Wildlife Resources (UWDR). In the first meeting, PacifiCorp clarified river flows and availability below Cutler, specifically noting the historic irrigation water rights governed by both contract and the Bear River Compact, which, by design, preclude the potential for any flows below the irrigation canals (located at Cutler Dam and upstream of the hydroelectric plant intake) during much of the irrigation season. The impacts of this annual lack of river flow on both the native fishery and the aquatic habitat, which is outside of the influence of the Cutler Project, were discussed. The results of UDWR's June 2019 electrofishing efforts downstream of Cutler were also discussed, and a second meeting with UDWR staff was arranged for October 1, 2019. At the October 2019 meeting, UDWR provided more detail to the group on recent electrofishing efforts downstream of Cutler. UDWR crew electrofished 15 miles of Bear River starting at the tailrace below Cutler powerhouse. UDWR found absolutely no native fish in the reach of the Bear River below Cutler. UDWR also noted they are not planning to attempt to recover bluehead sucker or other native fish in this segment of the Bear River given the current habitat quality and lack of instream flows resulting from irrigation water deliveries during certain periods of the year. UDWR also stated that Cutler Dam currently serves as a beneficial and wanted upstream migration barrier to non-native fish that UDWR wants to maintain to prevent these non-native species reaching the middle Bear River upstream of and including Cutler Reservoir. In light of the lack of native species, inability to increase instream flows through the license process, resultant degraded aquatic habitat, and need to maintain an upstream passage barrier for non-native fish, USFWS withdrew their comment to investigate fish passage and fish screens at Cutler Dam. USFWS would like PacifiCorp to include a summary in the aquatic resources technical report of sampling efforts for bluehead sucker and other native species in the lower Bear River since 1994.	Resolved
24.	USFWS	Study Request: Effects on water quality from fluctuating reservoir levels and Wheelon Dam removal 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. 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.	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.	**PacifiCorp agrees and maintains that the Water Quality Study (as noted in the PSP) will address the potential effects on water quality of increased water level fluctuations, and the potential removal of Wheelon Dam.** PacifiCorp staff met with USFWS personnel on August 22, 2019 and October 1 and 7, 2019, to better understand the agency's concerns related to Water Quality, specifically, mobilization of nutrients and metals. The water quality sections of the PSP were discussed; the USFWS staff participating noted that the PSP should address the issues listed in the USFWS Scoping response letter.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
25.	Utah Rivers Council	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.	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, PacifiCorp is bound by contractual agreements with irrigators to meet their water needs before using water for Project purposes. PacifiCorp 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.	**FE RC's SD2 expanded the scope of analysis is for cumulative impacts for several resources. The RSP will include additional details regarding the downstream scope of the analysis, and how the affected area downstream of the dam will be calculated through the hydraulic modeling and sedimentation analyses. Sediment core samples will be analyzed for a variety of pollutants, including heavy metals.** See the PSP (filed September 8, 2019) for additional details regarding the 1- and 2D hydraulic modeling proposed. Per SD2, FERC's cumulative effects analysis will address the scope of the cumulative analysis as follows: "As evidenced by sediment and soil deposition within the Cutler Reservoir, the Bear River and its basin is susceptible to soil erosion and deposit…it is appropriate to include [these] resources as resources that may be cumulatively affected" (SD2, page 7). "Regarding the downstream extent of the analysis…we do not recommend including the Great Salt Lake within the scope of this analysis" (SD2, page 7).	This is part of FERC's cumulative analysis.
26.	Utah Rivers Council	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.	Comment noted. The subject of power generation of Cutler, and how that relates to other power generation alternatives, will be addressed in FERC's Developmental analysis under the category of "Need for Power," which will also address the economic viability of Cutler operating in the future.	No update proposed in RSP.	This is part of FERC's cumulative analysis.
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 frequents 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 FERC's 2009 determination that climate change is occurring, PacifiCorp also agrees with 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.	No update proposed in RSP.	FERC's determination is that climate change models are not able to accurately predict future conditions.
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.	No update proposed in RSP.	On-Going
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 FERC's Developmental Analysis and would not normally be a part of a socioeconomic study. Per FERC requirements, an updated socioeconomic analysis will be included in the Draft License Application.	No update proposed in RSP.	This is part of FERC's cumulative analysis.

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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. FERC will consider alternatives in its NEPA analysis.	No update proposed in RSP.	This is part of FERC's cumulative analysis.
31.	Utah Rivers Council	Suggests a full EIS to be conducted instead of an EA.	Comment noted. Ultimately, FERC will decide whether an EA is sufficient or an EIS is required based on its NEPA implementing regulations and other factors.	No update proposed in RSP.	This is part of FERC's cumulative analysis.
32.	Bear Lake Watch	Geographic scope of cumulative efforts should be the entire Bear River Basin.	Comment noted. 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.	No update proposed in RSP. FERC's SD2 details the current scope of cumulative impacts for each of the resources identified. FERC modified Section 4.1.2, Geographic Scope, to include a cumulative effects analysis of geology and soil resources from the Bear River Hydroelectric Project P-20 downstream to Great Salt Lake (SD2, page 7).	This is part of FERC's cumulative analysis.
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 update proposed in RSP.	Resolved
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.	No update proposed in RSP.	Outside scope of Cutler relicensing.
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.	**PacifiCorp does not agree to include the upriver BRB lands in the Cutler Study Plan Area for direct effects (some cumulative effects analysis may occur in the BRB parcels).** At the October 8, 2019 PSP meeting, FERC stated that no mechanism has been identified linking effects at Cutler Reservoir with effects upstream in these specified riparian lands. On October 29, 2019, PacifiCorp held a collaborative meeting with BAS to discuss study requests and comments received. PacifiCorp affirmed their original response that operation of Cutler Reservoir does not impact the 1,900 acres of PacifiCorp- owned riparian lands upstream of the Cutler Hydroelectric Project. Due to the lack of nexus to project operations, PacifiCorp will not include these lands in the proposed studies.	Outside scope of Cutler relicensing.

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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.	**PacifiCorp does not agree to requested surveys but is proposing to instead analyze potential effects to various affected habitats and to include other sources of bird occupancy data to correlate potential effects to species occupying Cutler Reservoir.** On October 29, 2019, PacifiCorp held a collaborative meeting with BAS to discuss study requests and comments received. Based on the discussions at the October 29, 2019 meeting with BAS, PacifiCorp has elected to amend the Shoreline Habitat Characterization Study Plan filed September 11, 2019 with an expanded description of methods and data analysis. These study plan changes will be included in the RSP submitted to FERC on or before January 10, 2020. The following is a list of the changes to the Shoreline Habitat Characterization Study designed to investigate potential project effects on the avian community: 1. Include description of LiDAR and bathymetry data analysis used to delineate reservoir pool elevations for respective shoreline habitats 2. Further describe shoreline mapping process using aerial imagery, LiDAR data, and on-the-ground field documentation to delineate shoreline habitats 3. Explain how existing bird data, such as (U.S. Geological Survey (USGS) Breeding Bird Survey data, eBird data, Utah Division of Wildlife Resources (UDWR) data, and BAS monitoring data will be used to determine potential bird species that could be present at the Cutler Project; 4. Explain how the bird lists from item 3 above will be matched with habitat types, identified using methods described in item 2, to determine which of those species may nest at habitats around Cutler Project; 5. Explain how nesting season data for each species from the list generated in item 4 will be gathered from existing sources such as the online reference Birds of North America curated by the Cornell Lab of Ornithology, and eBird species arrival data for migratory species 6. The study report will include descriptions of seasonal restrictions on Project operations and reservoir pool imposed by water delivery contracts and other issues restricting operations 7. The study report will also analyze the impacts of a range of Project operations on reservoir associated habitats for each species that could nest at the Cutler Project, from the list generated in bullet 4 8. Results will be entered in the context of larger population trends by examining USGS Breeding Bird Survey trend data	Resolved. A staged study implement-ation is now proposed.

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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-minutes 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.	**PacifiCorp agrees to collect cross-sectional transect data for DO during the 2019 drawdown and has also agreed to a phased approach to the Water Quality Study to further address this request.** On October 29, 2019, PacifiCorp held a collaborative meeting with BAS to discuss study requests and comments received. In a subsequent individual stakeholder meeting (Logan City), PacifiCorp, and meeting participants agreed to adopt FERC's recommendation for a two-phased approach in the Water Quality Study. PacifiCorp believes the revised Water Quality Study described as follows addresses BAS's comment regarding DO sampling. Phase 1 will include a synthesis of existing WQ data for Cutler reservoir. This effort will include a table of existing WQ data sources, parameters collected, field sampling period, and field sampling locations. Data sources will include PacifiCorp, UDWQ, Utah State University, the 2010 Total Maximum Daily Load study, and other sources where available. PacifiCorp will file an ISR with FERC in early 2021 which will summarize WQ conditions in Cutler Reservoir, identifying WQ data gaps and recommendations for the Phase 2 study. As provided for in the ILP regulations (18 Code of Federal Regulation [CFR] § 5.15), BAS and other stakeholders will have an opportunity to review and comment on the WQ interim report as well as provide comments on need for a second field season. In addition, DO data was collected along study transects during the drawdown sampling in October and November 2019. UDWQ will complete a WQ study in the BRB in WY2021. PacifiCorp will collaborate with Mike Allred, UDWQ, to add Cutler Reservoir locations for DO profiles, if approved by UDWQ management.	Resolved
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 establish that would help PacifiCorp consider if study is merited.	No update proposed in RSP.	This is part of FERC's cumulative analysis.
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 update proposed in RSP.	Resolved
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. FERC will consider alternatives in its NEPA analysis.	No update proposed in RSP.	This is part of FERC's cumulative 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~~wintertime ice fluctuations. This study can be explored through modeling effort and real time data collection.	The hydraulic model will quantify ~~WSL~~WSEL 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.	**In response to this UDWQ/UDAF comment, PacifiCorp has modified the Land Use Study to include monitoring of bank erosion at downstream locations during the winter period.** The study plan has been modified in section 2.3.5.3 to include monitoring the Bear River below Cutler Dam at 5-6 representative locations to identify potential impacts from fluctuating water levels. Monitoring will take place below Cutler Dam in the area of flow attenuation as defined by the hydraulic model.	Resolved

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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~~Project 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.	**PacifiCorp agrees that the cumulative effects analysis of Project impacts should include the area affected by potential Project operations, consider changes resulting from potential future operating conditions; and the analysis of the area of direct effects be made in part from the results of the Hydraulic study models.** On October 29, 2019, UDWQ, UDAF and PacifiCorp held a collaborative meeting to discuss study requests and comments received. In this meeting, PacifiCorp, UDWQ and UDAF discussed the ability of the proposed hydraulic model to model downstream effects that Project operations may potentially have on the bird refuge. As described in the PSP filed September 11, 2019 and further discussed at this meeting, the Hydraulic Modeling Study will develop both one-dimensional (1D) and two-dimensional (2D) hydraulic models capable of illustrating inflows, reservoir volume and outflow under a range of operational scenarios. Field data used to calibrate the model will be collected at the upstream FERC Project Boundary on the Bear River to a location 2 miles downstream of the Project Boundary. The modeled area will include all facilities within the current Project Boundary, as well as up to 2 miles (initially) of the Bear River downstream of the Project Boundary. This includes measuring flow, suspended sediment and turbidity, reservoir stage, and imagery at various locations throughout the modeled area. The field data will be compared to model output as part of the calibration process. PacifiCorp will expand the description of the Hydraulic Modeling Study in the RSP submitted to FERC by January 10, 2020. Stakeholders will have an opportunity to review and comment on the RSP. PacifiCorp will with FERC an Interim Study Report in early 2021 that captures the findings of the Hydraulic Modeling Study. At that time, as provided for in the ILP regulations (18 CFR § 5.15), UDWQ/UDAF and other stakeholders will review and comment on the adequacy of the hydraulic model to represent downstream effects resulting from Project operations. If additional field data is determined necessary for the model, then FERC could require additional field study in the second study season in 2021. Future Project operations will continue to be bound by existing water delivery agreements with irrigators. Due to the operational constraints imposed by the water agreements and other issues, PacifiCorp does not anticipate a substantive change in operations resulting in impacts approximately 48 miles downstream to the Bear River Migratory Bird Refuge. Potential impacts, if any, to the Bear River Migratory Bird Refuge will be included in FERC's environmental analysis of cumulative effects.	Resolved
43.	Michael Allred: Utah DEQ	Suggests looking into dredging for the positive impact on the fishery, water quality and potentially reduce the *Phragmites* 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 FERC, the agency should thoroughly explain how the study request relates to that management goal.	**PacifiCorp agrees that the effects of dredging could be informed through various aspects of the Hydraulic, Sedimentation, and WQ Study Plans.** Dredging is a future management action that could be considered as a potential PME measure in the new Cutler FERC license. Dredging is not necessarily a study plan request or comment but could be identified as a PME measure following the completion of the studies proposed in this RSP that are designed to collect information on water quality, fisheries and other aquatic resources. This information, combined with the LIDAR and bathymetry data, would be analyzed upon completion of the field work. Suggestions for future management actions would be one of the outcomes in the data analysis. The potential benefits and impacts of dredging would be considered in the alternatives analysis as part of the NEPA environmental analysis.	Resolved
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, FERC will consider cost of new license measures and determine new license period accordingly.	**PacifiCorp clarified that this issue will be addressed through the FERC relicensing process.** Length of the license term is decided by FERC. FERC makes a determination on a license term in consideration of mitigation and capital improvements to the Project, but also in considering opportunities for aligning the license with other activities in the basin. FERC will make this determination at the conclusion of the environmental analysis.	This is part of FERC's cumulative analysis.

NO	COMMENTER/ REQUESTER	COMMENT	PACIFICORP RESPONSE SEPTEMBER 2019	PACIFICORP REVISED RESPONSE NOVEMBER 2019	RESOLUTION
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 FERC, the agency should thoroughly explain how the study request relates to that resource management goal.	**In response to this UDWQ/UDAF comment, PacifiCorp has modified the Land Use Study to include monitoring of bank erosion at downstream locations during the winter period.** The study plan has been modified in section 2.3.5.3 to include monitoring the Bear River below Cutler Dam at 5-6 representative locations to identify potential impacts from fluctuating water levels. Monitoring will take place below Cutler Dam in the area of flow attenuation as defined by the hydraulic model. At the October 29, 2019 meeting in Logan Utah, Mike Allred, UDWQ, agreed to help select sample locations.	Resolved
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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.
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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.
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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.
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 update proposed in RSP.	No change needed. Already incorporated into study plan.
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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.

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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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.
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 update proposed in RSP.	No change needed. Already incorporated into study plan.
53.	Jason Watterson: Private Citizen	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: Irrigation**:** pumps along the reservoir could be have their ability to pump irrigation water impacted. 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. Agriculture**:** high water levels impact soils and agriculture by pushing salts into the surrounding soils and impact agricultural production. Invasive Species**:** ~~phragmites, gaotsrue, dyers~~*Phragmites*, goatsrue, dyer's woad and another species have dramatically spread through the Project and adjacent areas, increasing water consumption and damaging habitat and agriculture.	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.	No update proposed in RSP.	No change needed. Already incorporated into study plan.

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**~~

PSP RESPONSE TO COMMENTS TABLE

CONSULTATION CHRONOLOGY WITH BRIDGERLAND AUDUBON SOCIETY

- BAS original Study Plan Requests prior to release of the PSP and comments on FERC SD1 were submitted July 29, 2019 as shown in Appendix A (Comments 35-37).
- PacifiCorp responded to these initial comments as part of the September 11, 2019 PSP submittal.
- PacifiCorp hosted a Study Plan Meeting on October 8, 2019. BAS was in attendance. The following verbal/whiteboard BAS comments were captured.

STUDY PLAN	COMMENT	COMMENTER	RESPONSE
Shoreline Habitat Characterization	How to characterize weed transport from upstream?	Bryan Dixon, Bridgerland Audubon Society	See PacifiCorp Response to BAS Comment #2 (below).
Shoreline Habitat Characterization	Should study area or FERC boundary extend upstream to include PacifiCorp-owned land (non-Cutler) re: Bear River Bottoms [FERC response: no nexus]	Bryan Dixon, Bridgerland Audubon Society	See PacifiCorp Response to BAS Comment #2 (below).
Water Quality	Review transects for dissolved oxygen monitoring for 2020 sampling.	Bryan Dixon, Bridgerland Audubon Society	See PacifiCorp Response to BAS Comment #4 (below).
Sedimentation	Consider moving Little Bear and Logan sites upstream (however, PacifiCorp wants to sample sites that have been sampled in the past).	Bryan Dixon, Bridgerland Audubon Society	Sampling sites in the South Marsh are generally predicated on past sampling locations. Exact locations will be dependent on sediment structure as outlined in Section 3.4.5.1. Moving sites upstream into riverine habitats will not benefit or enhance the study and understanding with the exchange of P between the water column and the sediment bed.

- BAS and PacifiCorp met on October 29, 2019 to discuss the original comments/responses.
- On November 30, 2019 PacifiCorp released a letter to stakeholders and FERC documenting the October 29th discussions, and revising their original responses to comments based on new dialogue.
- PacifiCorp's revised responses from November 2019 are captured in Appendix A (above).
- On December 11, 2019, BAS submitted the following comments documenting what BAS believes are outstanding and/or resolved items.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
1.	Bridgerland Audubon Society	**Settlement Agreement Approach:** 1. BAS states that "two big advantages of the Settlement Agreement approach are an ongoing funding stream for new projects not yet envisioned and an advisory committee made up of expertise from PacifiCorp, agencies, and non-governmental organizations (NGOs) that know and have the greatest interest in the environment affected by the project. 2. Ongoing funding vastly increases the opportunities to respond to changing conditions, such as invading non-indigenous plants or changes in ranges of various bird species. Since the funding comes from private sector, it also offers the opportunity for leveraging many federal, state, and private sector funding programs, thereby vastly increasing the capacity for mitigation. We can't know or prioritize the best approaches to ensuring healthy habitats twenty years from now, much less forty years. A shorter license period or a dynamic advisory committee offers that opportunity" (BAS Comments, pg. 2).	PacifiCorp appreciates BAS's interest and long-term commitment to be actively engaged in the management of Project lands. Settlement agreements can occur as part of or outside the FERC regulatory process for relicensing projects. Settlement agreements are not required to establish dynamic management approaches or leverage funding sources dependent on private sector contributions, although that was the approach taken with PacifiCorp's Bear (FERC Project No. 20) relicensing in 2003, that specific type of relicensing outcome is no longer allowable under current FERC policy. PacifiCorp will incorporate the results of the respective resource studies into the Draft License Application submitted to FERC as part of this relicensing process. The Draft License Application will include proposed measures to manage resources in the Project during the next license term. The need for partnerships and technical committees for input on respective resource management plans will be considered in the Draft License Application.
2.	Bridgerland Audubon Society	**Expansion of Project Boundaries:** 1. [On the topic of upstream BRB lands]: BAS states "that FERC and PacifiCorp maintain that the boundaries of the Cutler Hydroelectric Project cannot be extended further upstream because operation of the project doesn't affect upstream flows and conditions. But, since PacifiCorp owns those lands and is responsible for their management and the management of those lands affects conditions at Cutler (e.g., weeds, sedimentation), considerations at Cutler do affect PacifiCorp's management of those lands. 2. FERC acknowledged that management and mitigation strategies on those upstream lands could be dictated in part by considerations at Cutler, but we believe that these lands, lying as they do between Oneida Reservoir and Cutler Reservoir and encompassing nearly thirty-five miles of river banks, do have a "nexus to the downstream Cutler Project" and should be part of the Cutler project so that ratepayer funds can be legitimately spent on land management" (BAS Comments, pg. 3).	PacifiCorp responded to this December 2019 comment in Appendix A, Comment 35. As noted in that response, PacifiCorp does not intend to include the upriver BRB lands in the Cutler study plan area for analysis of direct effects. As discussed at the October 8, 2019 Study Plan Meeting, FERC stated that no mechanism has been identified linking effects at Cutler Reservoir with effects upstream in these specified riparian lands. Subsequently, on October 29, 2019, PacifiCorp held a collaborative meeting with BAS to discuss study requests and comments. PacifiCorp affirmed their original response that operation of Cutler Reservoir does not impact the 1,900 acres of PacifiCorp-owned riparian lands upstream of the Cutler Hydroelectric Project. As noted in 18 CFR 5.9(b)(5), PacifiCorp believes there is a lack of nexus to project operations, and therefore, does not plan to include these lands in the proposed studies.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
3.	Bridgerland Audubon Society	**Avian Population Surveys** 1. BAS states that "PacifiCorp amended the Shoreline Habitat Characterization Study Plan filed September 11, 2019 with an expanded description of methods and data analysis. These study plan changes are to be included in the Revised Study Plan (RSP) submitted to FERC on or before January 10, 2020 [a list of changes implemented into the Shoreline Habitat Study were outlined]." 2. "PacifiCorp is still relying almost exclusively on "desktop analyses." No surveys of actual bird populations around Cutler are proposed, either short or long term." 3. PacifiCorp is still relying "entirely on correlations with habitat, identified using aerial imagery and in only broad categories ("such as short herbaceous vegetation, tall herbaceous vegetation, woody vegetation, and bare ground", page 2-9 of PSP2). Those correlations and relationships may be changing substantially with climate change, making future correlations less useful." 4. PacifiCorp does "propose to map weeds…but only plan to consult existing data from Cache County, PacifiCorp, and adjacent landowners; "No separate systematic on-the-ground inventory of weeds in the Project Area will be conducted." To their credit, however, they propose to extend the study boundary for invasive species to include upland islands and peninsulas." 5. "The breeding season is the most critical time and the most likely to be affected by changes in operation of Cutler; data collected during the drawdown in November 2019 is of little use in assessing future habitat." 6. As a result of the reliance on remote sensing and correlations with habitat, there will be no testing or development of avian population censusing techniques that could be repeated in the future (by either professionals or volunteers) to assess changes in populations that might suggest a closer look at operations." 7. There are no BBS routes in the Cache Valley bottom, approximately 4,500'. The closest BBS routes are in Temple Fork twenty miles east at 6,500', Blacksmith Fork to Hardware Ranch 20 miles southeast at 4,800' (and not currently assigned), near Plymouth 15 miles northwest at 4,500', and near Honeyville 20 miles southwest at 4,240' (and not currently assigned)." 8. "eBird depends too heavily on the convenient participation of interested individuals." 9. "PacifiCorp is only proposing studying shoreline habitat within the ordinary high-water level (OHWL). That excludes adjacent habitat where species may rely on access to water but may not otherwise spend time in that habitat; e.g., Greater Sandhill Crane, herons, White-faced Ibis, Marsh Wren, Song Sparrow." 10. "Section 2.2.7 claims "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 (protection, mitigation, and enhancement) actions." But without direct data on avian populations, we won't have very concrete information on which PME actions to undertake."	As a result of comments from the Bridgerland Audubon Society as well as the National Audubon Society, PacifiCorp has agreed to amend the Shoreline Habitat Characterization Study (SHCS) in Section 2.2 of this RSP to include a second study phase, that, if necessary, would include surveys of bird use in the Project Boundary during the breeding and non-breeding season. The adjustments in the study plan are reflected in Section 2.2 of this RSP. Beyond substantially changing habitat relationships, climate change may also substantially alter species distributions. No analysis we conduct today can avoid this issue, and a habitat-based approach does not seem any more vulnerable to climate change related drawbacks than any other approach. As part of the accuracy assessment, a substantial amount of anecdotal weed data will be collected. It is PacifiCorp's opinion that this new data, in conjunction with existing data, will be adequate for the analysis of future changes in weed distribution as they pertain to operational changes at Cutler. The SHCS will incorporate eBird and BBS data since both of these datasets, while they do not fully capture the information that is needed, will provide useful information. Additionally, Section 2.2.4 has been amended to include the areas surrounding the OHWL. As a result of these revisions to the SHCS, these comments have been resolved.
4.	Bridgerland Audubon Society	**Assessing Dissolved Oxygen Conditions Outside of the Main River Channels:** 1. "UDWQ limited their sampling to easy-to-reach sites, such as under bridges. These locations were not representative of the bulk of the reservoir because bridges were placed where there was a narrowing of the water, creating a restriction which increases water velocity and turbulence, and which, in turn, increases dissolved oxygen. Left unmeasured were the backwaters of the reservoir, the majority of the areal extent of potential habitat. It may be that these areas are supersaturated as a result of algal photosynthesis, but we don't know. Further, the times when dissolved oxygen is lowest is during the warmest months (typically July and August) when water temperatures are higher and DO capacity lower." ○ BAS "appreciates" and supports PacifiCorp's revised plan: "UDWQ will complete a WQ study in the BRB in WY2021 (water year 2021). PacifiCorp will collaborate with Mike Allred, UDWQ, to add Cutler Reservoir locations for DO profiles, if approved by UDWQ management."	At the October 29, 2019 consultation meeting with Logan City, PacifiCorp agreed to collect cross-sectional transect data for DO during the 2019 drawdown, and also agreed to a phased approach to the Water Quality Study to further address this request. Additionally, a representative from UDWQ who attended the meeting with BAS suggested that with approval of UDWQ management, DO profiles could be added to their WY2021 planned monitoring. For a full description of the revisions to the RSP, please see PacifiCorp's response to Comment 37 in Appendix A.
5.	Bridgerland Audubon Society	**Impacts of Increased Reservoir Drawdowns on Fishes and Benthic Invertebrates:** 1. BAS states that "removing operational procedures that have protected fish spawning and other parts of their life history could have major impacts on the fishery and the entire ecosystem. Drawdowns not only influence the fish community directly, but also can have major impacts on the benthic	As previously noted, PacifiCorp has contractual obligations for irrigation water delivery. Any potential operational changes for Cutler Reservoir will occur in the late fall and winter time frames when irrigation has ceased. During that time of year, fish spawning does not occur, and young-of-year fish have developed sufficiently to avoid stranding. PacifiCorp appreciates the literature suggestions. Carmignani and Roy (2017) is a paper that focuses primarily on winter drawdowns for prolonged duration.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
		invertebrates (Carmignani and Roy 2017; Rose and Mesa 2013). Most studies have addressed seasonal drawdowns (including winter drawdowns that negatively impact fishes), and apparently few have addressed the impacts of short-term hydropower peaking of the type envisioned by PacifiCorp. Frequent drawdowns for hydropeaking could also have important impacts on the invertebrates that are the prey base for both fish and birds" (BAS Comments, pg. 6). 2. BAS requests that "we request that PacifiCorp's evaluation of increased reservoir drawdowns carefully evaluate how both the *magnitude* and the *frequency* of these fluctuations would influence the fish community and benthic invertebrates." 3. BAS requests a "justification of the removal of fish 'spawning' as a consideration for reservoir operations is needed, particularly since the majority of the sport and nongame species mentioned above spawn in the reservoir during the April-June period that is currently protected (PAD; Fig. 5- 3). However, it is not only this spawning period that is important for fishes and invertebrates, and consequently the impact of increased draw-down magnitude and frequency needs to be evaluated throughout the year."	As stated in the BAS comment letter, this common type of operation does not apply to the proposed operations for Cutler Reservoir. Rose and Mesa (2013) focuses on summer drawdowns which do not apply to Cutler operations. PacifiCorp will use the data collected during the drawdown study to evaluate the potential effects of the potential future operating scenarios, particularly to address the effect of the magnitude and frequency of potential fluctuations on fish, birds, or benthic macroinvertebrates. PacifiCorp will evaluate a suite of potential future operating scenarios that include the frequency and magnitude of reservoir fluctuations and the effects on fish and benthic macroinvertebrates. Similar to other aquatic and terrestrial wildlife, hydraulic modeling will be utilized to determine what, if any, effects would be expected for spawning fish resulting from potential future operations.

CONSULTATION CHRONOLOGY WITH BEAR RIVER CANAL COMPANY

- BRCC original Study Plan Requests prior to release of the PSP and comments on FERC SD1 were submitted July 17, 2019, as shown in Appendix A (Comments 14-19).
- PacifiCorp responded to these initial comments as part of the September 11, 2019 Proposed Study Plan submittal.
- PacifiCorp hosted a Study Plan Meeting on October 8, 2019. BRCC was in attendance. The following verbal/whiteboard BRCC comments were captured.

STUDY PLAN	COMMENT	COMMENTER	RESPONSE
Cultural Resources Study Plan	Cultural study indicates old canal channel but only to the boundary.	Trevor Nielson, BRCC	PacifiCorp proposes, per 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 the river flow regime (Figure 4-2). The APE (as agreed to by Utah SHPO office), 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. In addition, canals will be documented 400 meters in each direction outside the survey area per Utah Division of State History guidance for documenting linear sites.
General Comments	PacifiCorp meet with Bear River Canal Company (BRCC) regarding their study plan comments before comment submittal	Trevor Nielson, BRCC	PacifiCorp convened a meeting with BRCC October 28, 2019 and November 14, 2019 to discuss study plan comments and the 1912 contract. PacifiCorp submitted a summary of the discussion in those first meeting and revised responses to BRCC study requests on December 10, 2019. Several Nov/Dec 2019 telephone calls also helped to clarify/resolve study requests. See PacifiCorp revised responses (November 2019) to BRCC Comments 14 through 19 in Appendix A.
	BRCC looking to their TCCC objective	Trevor Nielson, BRCC	BRCC provided additional explanation regarding their objectives to phase in TCCC throughout the BRCC canal system to improve efficiency of water delivery at the October 28, 2019 consultation meeting with PacifiCorp. BRCC explained that accurate, precise and timely information on water delivery to the irrigation system is needed to implement the benefits of the TCCC. See PacifiCorp revised responses (November 2019) to BRCC Comments 14 and 16 in Appendix A regarding accuracy and precision of water delivery to BRCC canal. In their December 11, 2019 PSP comments, BRCC withdrew their July 17, 2019 study request to model the performance of the current gate system in a variable operation system to ensure steady delivery of water to the BRCC canal. See BRCC PSP Comment 1 in Appendix B.
	BRCC looking for partnership with PacifiCorp in objectives.	Trevor Nielson, BRCC	PacifiCorp convened a meeting with BRCC October 28, 2019 and November 14, 2019 to discuss study plan comments and the 1912 contract. PacifiCorp and BRCC identified items where the two parties could potentially work together on items of mutual interest. These areas of agreement are identified in PacifiCorp's December 10, 2019 FERC submittal summarizing discussions in those meetings and revised responses to BRCC study requests. Furthermore, BRCC's PSP comments filed December 11, 2019 to FERC identify areas where the two parties will work together on items of mutual interest. See BRCC PSP comment 1 through 4 in Appendix B. In addition, see PacifiCorp revised responses (11/2019) to BRCC comments 14 through 19 in Appendix A.
	BRCC delivery measurement analysis concern; Not just sedimentation (that is the smaller part)	Trevor Nielson, BRCC	PacifiCorp convened a meeting with BRCC October 28, 2019 and November 14, 2019 to discuss study plan comments and the 1912 contract. A primary concern for BRCC expressed at these meetings was accurate, precise and timely information on water delivery to the irrigation system. See PacifiCorp revised responses (November 2019) to BRCC comments 14 and 16 in Appendix A regarding accuracy and precision of water delivery to BRCC canal. In their December 11, 2019 PSP comments, BRCC withdrew their July 17, 2019 study request to model the performance of the current gate system and install weirs for improved measurement of water delivery. See BRCC PSP Comments 1 and 2 in Appendix B.

- Subsequently, on October 28, 2019, BRCC and PacifiCorp met to discuss the PAD and October 8, 2019 Study Plan meeting comments/responses.
- On November 30, 2019 PacifiCorp released a letter to stakeholders and FERC documenting the October 28 and Nov 14 discussions, and revising their original responses to comments based on new dialogue.
- During the November 14, 2019 meeting, BRCC and PacifiCorp discussed BRCC irrigation canals and how those relate to the 1912 contract and to distinguish between relicensing issues and 1912 contract issues.
- PacifiCorp's revised responses from November 2019 are captured in Appendix A (above).
- On December 11, 2019, BRCC submitted the following comments documenting what BRCC believes are outstanding and/or resolved items.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
1.	Bear River Canal Company	**Flow Modeling to Address Variability in Delivery** 1. "Because of PacifiCorp's and BRCC's willingness to explore programmatic changes to the current automation system, BRCC agrees that modeling does not need to be conducted at this time and retracts its request for this study; however, BRCC expressly reserves the right to request this item be revisited in the between-season data review/study and address this matter directly if these programmatic adjustments do not result in the steady flows. 2. We feel that PacifiCorp could make the adjustments in preparation for the 2020 operating season and allow those changes to be tested through the seasons. If these efforts are unsuccessful, BRCC will renew its request to FERC for flow modeling. 3. **BRCC feels that waiting to see if the programmatic adjustments are effective seems to be the prudent and reasonable course of action at this time**" [bold text added for emphasis] (BRCC Comments, pg. 3-4).	PacifiCorp appreciates BRCC's submission of revised study plan comments reflecting the collaborative efforts to resolve outstanding study requests originally filed July 17, 2019 with FERC. PacifiCorp also appreciates BRCC's willingness to work with PacifiCorp to identify solutions to the current automation system used for water deliveries to BRCC canals. PacifiCorp looks forward to continuing our collaborative efforts to identify solutions to the current automation system used for water deliveries to BRCC canals. See PacifiCorp revised responses (November 2019) to BRCC Comments 14 and 16 in Appendix A regarding accuracy and precision of water delivery to BRCC canal.
2.	Bear River Canal Company	**Study to Inform Site Selection for Improved Measurement Devices** 1. "BRCC adamantly disagrees with PacifiCorp's assertion that updating its measurement equipment is not a PacifiCorp responsibility and rejects PacifiCorp's justification for not improving measurement equipment and protocols…**however** [bold text added for emphasis], after reviewing the available data provided in these meetings, it has become clear to BRCC that t**here is a consensus between the parties on the general area to locate upgraded measurement devices.…BRCC thus conditionally retracts its request for a study to inform site selection for improved measurement devices**." 2. "If in further discussions and deliberations with PacifiCorp it becomes clear that additional study is needed to address the issue, BRCC expressly reserves the right to reopen this request" (BRCC Comments, pg. 4).	PacifiCorp appreciates BRCC's submission of revised study plan comments reflecting the collaborative efforts to resolve outstanding study requests originally filed July 17, 2019 with FERC PacifiCorp also appreciates BRCC's willingness to work with PacifiCorp to identify solutions to the current automation system used for water deliveries to BRCC canals. PacifiCorp looks forward to continuing our collaborative efforts to identify solutions to the current automation system used for water deliveries to BRCC canals. See PacifiCorp revised responses (November 2019) to BRCC Comments 14 and 16 in Appendix A regarding accuracy and precision of water delivery to BRCC canal.
3.	Bear River Canal Company	**Study of Transportation of Sediment to BRCC Canals** 1. "At the time BRCC requested a sediment study, BRCC was in the process of drafting an extensive Master Plan. The BRCC's Master Plan is now complete and calls for installing a several thousand-foot concrete canal liner starting where BRCC takes control of the canal and responsibility for water deliveries. If the liner is installed, it is anticipated that the sediment concerns originally expressed by BRCC will be alleviated and an additional sediment study is not needed. 2. "If BRCC is not successful in its BOR WaterSMART Grant Application…serious concerns over sedimentation in the upper reaches of BRCC canals and their effects on water delivery constraints linked to the Cutler Dam remain. 3. BRCC thus conditionally **retracts its request of a study to the transportation of sediment through BRCC canals**" [bold text added for emphasis] (BRCC Comments, pg. 4).	PacifiCorp appreciates BRCC's submission of revised study plan comments reflecting the collaboration efforts to resolve outstanding study requests filed July 17, 2019 with FERC. BRCC's December 11, 2019 comments on the PSP retract the previous request to study sediment transport in the BRCC canals. PacifiCorp did adjust sampling efforts during the drawdown to address, in part, BRCC's study request 15. See PacifiCorp revised response (November 2019) to BRCC Comment 15 in Appendix A.
4.	Bear River Canal Company	**Aquatic Weed Study** 1. "**BRCC has agreed to withdraw its request for a discreet aquatic weeds study in exchange for PacifiCorp issuing a Revised Study Plan that expands existing water quality studies to include aquatic weed issues in the West and Hammond (East) Canals**. [bold text added for emphasis] 2. BRCC and PacifiCorp have agreed to add to these existing studies an analysis of the effect of 3. phosphorus levels on macrophytes aquatic weed growth. BRCC requests the impacts of phosphorus loading on aquatic macrophyte and algae populations be projected for a 30-year window. PacifiCorp has agreed to use available literature to inform how past, current, and projected phosphorus levels will change aquatic macrophyte and algae production (as a percentage increase/decrease). We request a 30-year projection to inform the NEPA analysis because the new license may be issued to that length of time or longer" (BRCC Comments, pg. 5).	PacifiCorp appreciates BRCC's submission of revised study plan comments reflecting the collaborative efforts to resolve outstanding study requests originally filed July 17, 2019 with FERC. BRCC's December 11, 2019 comments on the PSP retract the previous request to study aquatic weeds in Cutler Reservoir. PacifiCorp and BRCC have reached agreement to expand, describe, and analyze the relationship between phosphorus and aquatic weed growth as part of the Water Quality Study using existing literature. See PacifiCorp revised responses (November 2019) to BRCC Comments 19 in Appendix A.

CONSULTATION CHRONOLOGY WITH LOGAN CITY

- Logan City original Study Plan Requests prior to the Scoping Meeting and the release of the PSP, and their comments on FERC SD1 were submitted June 24, 2019 as shown in Appendix A (Comments 1-13).
- PacifiCorp responded to these initial comments as part of the September 11, 2019 Proposed Study Plan submittal.
- PacifiCorp hosted a Study Plan Meeting on October 8, 2019. Logan City was not in attendance.
- Logan City and PacifiCorp met on October 29, 2019 to discuss the original comments/responses.
- On November 30, 2019 PacifiCorp released a letter to stakeholders and FERC documenting the October 29th discussions, and revising their original responses to comments based on new dialogue.
- PacifiCorp's revised responses from November 2019 are captured in Appendix A (above).
- On December 11, 2019, Logan City submitted the following comments documenting what Logan City believes are outstanding and/or resolved items.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
1.	Logan City	Logan City expresses that it is "not clear if they [PacifiCorp] will look at the mass of sediments and phosphorous moving in the system. With fluctuating hydrologic conditions associated with regular drought/flood cycles in the West, increased flows will cause dilution, but the mass of inflow mat not be changing or event increasing. This is important in order to understand the mass loading in the reservoir and downstream. Periodic flushing and dilution from high flows may mask the continuing accumulations, particularly of phosphorus in the system. For these reasons, a mass balanced approach needs to be considered" (Logan City Comments, pg. 4).	Suspended sediment and phosphorus data were collected upstream, downstream, and within the reservoir during the drawdown event. However, there is no plan to continue to monitor these levels as part of the hydraulic modeling study plan. Water quality sampling and analysis for Phase 2 of the Water Quality Study Plan will be determined in the ISR submitted to FERC as part of the relicensing process. See PacifiCorp revised response November 2019 to Logan City comment 2 in Appendix A. The need for increased frequency of water quality monitoring in a new FERC license will be determined by FERC as part of their independent environmental analysis. See PacifiCorp revised response November 2019 to Logan City Comment 1 in Appendix A. The hydraulic/sediment transport model will be able to estimate the total bed sediment mobilized within the reservoir due to potential changes in the operation of Cutler Dam (Section 3.3.5.4 in the RSP). The model will provide key data to understand the operating conditions that mobilize sediment. The study will not have the capability to model a mass balance of phosphorus levels within the reservoir. Cutler Reservoir does not generate phosphorus or sediment but is a sink for incoming load from natural processes as well as NPDES permittees. The reservoir is regulated by Utah water quality standards expressed as concentrations that protect beneficial use. These regulations are not based on loads as are some local NPDES discharge permit holders. PacifiCorp does not believe it is necessary to conduct a mass balance of the system as it provides no benefit to the relicensing process of Cutler. Any limits to the proposed operation would be constrained by water column concentration.
2.	Logan City	After reviewing all of the previous reports from 2002, and in discussions with regulatory agencies, including Utah Division of Water Quality, concerns were raised that the 2013 data were either erroneous or anomalous and not representative of what is taking place in the reservoir and downstream. In June the additional data had not been available for review from the UDWQ. As stated by Eve Davies on the phone call with FERC on October 29, 2019, it appears that the water quality issues have returned to the pre-2013 levels. This again reiterates the discussion in Item 1 of the need for more frequent reporting and moving from mg/L basis, but to also look at the mass balance in future licensing requirements" (Logan City, pg. 4).	PacifiCorp disagrees with the content and intent of the October 29, 2019 statement. The need for increased frequency of water quality monitoring in a new FERC license will be determined by FERC as part of their independent environmental analysis. See PacifiCorp revised response November 2019 to Logan City Comment 1 in Appendix A.
3.	Logan City	"Logan believes that this [*PacifiCorp completing a detailed LiDAR and bathymetry mapping effort, and conduct analysis on phosphorous in bed sediments*] will be critical to being able to model and understand the water quality impacts, both good and bad, of the proposed operational modifications" Logan City Comments, pg. 5).	Comment noted.
4.	Logan City	Logan City clarified that the intent of their comment on common carp in the Bear River and Cutler Reservoir are "to provide clarification that the water quality impacts of the operations of the reservoir may be masked by the carp and invasive species" (Logan City Comments, pg. 5).	See PacifiCorp revised response November 2019 to Logan City Comment 4 in Appendix A.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
5.	Logan City	"While the hydraulic analysis can identify the water surface profile mobilization, it will not identify slope stability. Slope stability is a geotechnical investigation, similar to the Bishops' modified slice method, which will identify the areas where slopes are too steep to be stable with repeated water level fluctuations. FERC is encouraged to consult internally with their Dam Safety experts regarding this methodology. Areas of concern are noted all up and down the Bear River and the Logan River where annual spring high water increases the water level, and then as the water level lowers, the hydrostatic pressures trapped in the slow draining soils cause bank sloughing. These soils then disperse and are carried downstream" (Logan City Comments, pg. 6). Logan City requests that this soil stability component be included in the Land Use Study.	Comment noted. Although the hydraulic model and corresponding analysis will not quantify slope stability of reservoir shores and Bear River channel banks below Cutler Dam, the model can define the range and rate of change in WSEL that reservoir banks would experience under the proposed changes in reservoir management. This information, coupled with existing data from soil surveys and other information, will help identify which bank areas may be susceptible to increased instability as a result of potential future operation changes. PacifiCorp has a robust Dam Safety Program, overseen by FERC, that is in effect with the current license, and will continue to be in any future license period. See PacifiCorp revised response November 2019 to Comments 9, 11, and 41 in Appendix A as well as response to Logan City Comment 8 in Appendix B.
6.	Logan City	On the topic of Water Quality: "When the model type was discussed, one of the participants stated that a full mixing model will be used because of the very shallow nature of the reservoir. However, this comment is opposite of the conditions in a shallow reservoir where varying temperatures, restricted flow paths, and water quality variations create hydraulic separations and flow shortcuts rather than full mixing. These issues can be seen in Google Earth photos, as infrequent as they are collected, on the Bear River, Little Bear River, Swifts Slough, Clay Slough, the Island area adjacent to the Bear River, etc. While the dam may reflect full mixing within the reservoir, the full mixing assumption does not apply because the upper section does not satisfy the conditions for a full-mixing model" (Logan City Comments, pg. 7).	At the October 29, 2019 collaboration meeting with Logan City, PacifiCorp agreed to amend the Water Quality Study adding a two-phased study plan approach. Phase 1 would be filed with FERC as part of the ISR providing recommendations on the Phase 2 scope of work if warranted. As such, it is premature at this time to determine the type of modeling that should occur in advance of Phase 1 being initiated. See PacifiCorp revised response November 2019 to Logan City Comment 2 in Appendix A.
7.	Logan City	"As part of the fieldwork to be completed in the Shoreline Habitat Characterization Proposed Study Plan (TERR2) Section 2.2, Logan City encourages PacifiCorp to also locate key weeds and invasive species to their notes while performing their ENVI calibration and Ute-ladies'-tresses orchid. In addition to *Phragmites*, we recommend mapping and identifying for treatment goatsrue (*Galega officinalis*) which is a Class 1B weed, dyer's woad (*Isatis tinctoria*) which is a Class 2 weed, tamarisk (*Tamarix ramosissima*) a Class 3 weed, field bindweed (*Convolvulus* sp.) a Class 3 weed, Puncturevine (*Tribulus terrestris*) a Class 3 weed, and Russian olive *(Elaeagnus angustifolia*) a Class 4 weed. While Logan recognizes that PacifiCorp has had a monumental task to deal with weeds in the project area, we believe this is a good opportunity to identify potential problem areas while performing the other studies and field calibration" (Logan City Comments, pg. 8).	As requested, PacifiCorp has agreed to add these specific weeds to the list of species to be documented. See Section 2.2.5.2.
8.	Logan City	As part of the Land Use Proposed Study Plan (TERR 3): • PacifiCorp has recognized the potential impacts on pumping stations. the Logan City WWTF (Section 2.3.3. pg. 2-14). and several other uses. The plan specifically recognizes the impacts of possible erosion both in the reservoir and possibly downstream. Logan City recognizes this effort and is appreciative of these efforts. However. one source of sediments, particularly sensitive to rapid increases and decreases in water surface elevations are from sloughing. Where erosion is primarily the result of shear stresses associated with velocities, wind, and flowing water. sloughing may result from unbalanced forces in the soils. generally related to differential heads or pore pressures. According to the NRCS Web Soil Survey, the majority of the soils in the project area are silts, silt loams. and complex soils with silt in excess of 45 percent while clay concentrations in Box Elder County are typically less than 25 percent and 20 to 50 percent in Cache County. These ratios are commonly associated with weak soils that can be slow draining and have low soil shear strength. thereby more subject to sloughing-a type of shear failure. This is seen commonly along the Logan River every summer after the high spring runoff. While mapping the Land Use. Logan City encourages PacifiCorp to perform a bank stability analysis both along Cutler Reservoir and downstream along the Bear River, using the Modified Bishops method or similar applicable method, to determine the stability of the soils in response to the frequent water level fluctuations.	Potential impacts on bank stability resulting from rapid change in water surface elevation are described in Section 2.3.5.3 of the RSP. This section also describes how bank erosion will be monitored in 2020 at several locations downstream of Cutler dam during reservoir discharge events designed to simulate the proposed change in operations. Logan City's concerns with bank stability due to changing WSEL have been addressed previously in PacifiCorp's revised response November 2019 to Comments 9 and 11 in Appendix A and the response to Comment 5 in Appendix B. Additional detail has been added to Section 2.3.5.3 of the RSP to describe existing information and the methods that will be used to evaluate areas of potential instability. Given the proposed narrow range of potential future operational scenarios, corresponding lack of substantial change in water surface elevation, and our understanding of existing bank conditions, we anticipate that a qualitative analysis will suffice to characterize potential impacts on bank stability. If existing data indicate that the potential exists for increased instability, further quantitative analysis of impacts on bank stability (e.g. Modified Bishop's method or other methods approved by the U.S. Army Corps of Engineers) will be conducted. At this time PacifiCorp anticipates that further quantitative analysis will not be needed.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
9.	Logan City	Water Quality is proposed for the study in Section 3.2. a. In section 3.2.3, please also reference R3 I 7-2 Standards of Quality for Waters of the State as established by the State of Utah and as required by the Clean Water Act. This rule defines water quality standards (R317-2-7) and the Antidegradation Policy (R3 I 7-2-3). These standards and policies establish limits for constituents beyond just phosphorus and dissolved oxygen set forth in the TMDL reference in the document. b. Section 3.2.5.1 states that "Any relevant TP. dissolved TP and orthophosphate data from the core analysis will be provided…" Please define the phrase "Any relevant." c. Section 3.2.5.2 states that samples will be selected along several transects for TP, orthophosphate, and DO. These appear to be grab samples and can be useful. However, DO in Cutler is highly affected by the time of day as documented in the TMDL and well known by PacifiCorp. Figure I, taken from the TMDL. Appendix C, reflects the variation of temperature, DO, and the percentage of saturation. Figure I demonstrates that Cutler Reservoir experiences extreme fluctuations at any given point in the system reflecting the strong influence of algae in the system with oxygen ranging from 40 percent to 140 percent of saturation within a 24-hour period. Additionally, the fall drawdown has taken place in November. which may also affect the sensitivity of the data due to the difference in the algae growth and population, water temperature, and increased inflows from freshwater sources associated with the cessation of irrigation diversions. Based on this information, Logan City recommends establishing the sondes at discrete locations around the cross-section to measure the DO over time, similar to the TMDL, at the transects. Logan City agrees that the water quality will vary from the top of the water surface profile to the bottom with the top typically having much better-dissolved oxygen this time of year. As a result, not all points on each transect at both depths would be reasonable. However, establishing the sondes at two locations and two depths for each transect would be reasonable. This recognizes that the transects would be taken on different days. d. Section 3.2.5.3 states that, "If applicable, trend graphs may be incorporated in the synthesis report…" Logan City recommends that trend graphs be included to reflect both mg/L and tons or lbs per year. This will be important since high flow years such as 2011 through 2012 may di lute the mg/L, but actually, increase the mass (tons/year or lbs/year) being carried into or out of the reservoir. e. Section 3.2.5.3 also states that the Study Plan report will provide "A description and analysis of how proposed operations may affect water quality within the study area." How this aa analysis of the proposed operations will be accomplished has not been documented in the Study. Rather, it focuses extensively on data review and collection, but very little on the analyses. In the October 29, 20 I 9 meeting with Logan City, a representative of PacifiCorp stated that a water quality model would be used, and that full mixing would be assumed. However, as stated in Logan City's responses above, the full mixing within the reservoir assumption does not apply. The specific modeling approach and assumptions have not been stated and need to be clarified and justified.	a. The 2010 TMDL, and by association the Utah State Water Quality standards, are referenced in Section 3.2.3 of the RSP. b. Section 3.2.5.1 will be revised in the following manner: "Any TP, dissolved TP and orthophosphate data from the core analysis will be incorporated into the final Water Quality Technical Report." c. Sampling methods described in Section 3.2.5.2 are specifically designed to measure differences between pre-drawdown conditions and conditions during the drawdown period. The recent drawdown sampling reflects conditions expected in late fall and winter. d. Not all the available data correspond directly from study to study so it may not be feasible to develop trend graphs for comparison purposes. As stated, if applicable, PacifiCorp will do so. e. At the October 29, 2019 collaborative meeting with Logan City, PacifiCorp agreed to amend the Water Quality Study adding a two-phased study plan approach. Phase 1 would be filed with FERC as part of the ISR providing recommendations on the Phase 2 scope of work if warranted. As such, it is premature at this time to determine the type of modeling that should occur in advance of Phase 1 being initiated. These changes are noted in Section 3.2.1. See PacifiCorp revised response November 2019 to Logan City Comment 2 in Appendix A.
10.	Logan City	a. The Study states in section 3.3.5.2 that "the 2D model will be used to analyze flow behavior. inundation boundaries, and other hydraulic characteristics…". Logan City recommends that the characteristics of water surface elevations, velocities, and shear stresses be specifically added. They are calculated with the model run and can be used to quickly generate a GIS map useful in demonstrating the overall reservoir flow patterns and the detailed effects of proposed operation modifications. Additionally, it will be useful in documenting any areas that will be sensitive to specific erosion based on shear stresses and the results of the sediment cores and mapping effort. b. To prevent complications in the analyses and the evaluations of the operating conditions being evaluated, Logan City recommends the following: i. In order to fully capture the impact of the changes in operations of the power plant to meet the fluctuations in the power grid associated with solar and wind power supplies, the time step associated with the model may be from 1 minute to 30 seconds, possibly even shorter.	a. PacifiCorp will include water surface elevations, velocities, and shear stress output as part of the Hydraulic Modeling Study (Section 3.3.5.4 of the RSP). b. (i) At this time the final timestep of the hydraulic/sediment transport model is unknown. The model timestep will be finalized after the construction of the 2D mesh is complete, the model has been successfully calibrated, and the interval at which potential future operational changes of Cutler Dam are finalized. Once these items are completed the resulting timestep will be determined based on model run time, model stability, and the interval of any proposed changes in dam operations (i.e., if PacifiCorp wants to see changes made at 5-minute intervals the timestep would not be greater than 5 minutes). b. (ii) The Courant number of the model will be examined as part of the model stabilization and calibration as outlined in Section 3.3.5.3 of the RSP.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
		ii. Based on the time step the expected velocities in the reservoir. it will be necessary to set the grid size such that the Courant number is less than 2.0. The Courant number is defined as: $\frac{Velocity \cdot \Delta X}{\Delta Time} < 2.0.$	
11.	Logan City	Sedimentation Proposed Study Area (AQ4) a. In section 3.4.1, the Study references Clyde's report that the erosion in the Bear River Basin. It references that today the Bear River "continues to transport these fine material deposits along with river banks into the reservoir." Correctly stated, "Even with the efforts in the Bear River Basin to reduce erosion, stabilize private and Federal lands from a sheet, rill, and gully erosion, and bank stabilization efforts the Bear River and its tributaries continue to carry large amounts of fine material deposits into the reservoir." b. Figure 3-5 in the Study shows the locations for proposed sampling locations. Many of the sampling locations are near the channel focus points where velocities will be higher and will tend to mobilize the fine sediments. We recommend some additional sampling locations based on more significant sediment deposition. While these locations are not necessarily subject to erosion with fluctuations. they will identify the conditions that would be experienced if the erosion is increased outside of the concentrated flow areas. Logan has provided recommendations for modifications to the sampling locations. c. Section 3.4.5 parameter #4 states that a small percentage of the cores be tested at depth for various important water quality parameters. However, "small percentage" isn't defined. Please define this percentage. It is recommended that it be at least 25 percent of the samples. d. Section 3.4.5 parameter #5 states that three samples will be tested for pesticides and RCRA metals. The heavy metals and pesticides will tend to bond with the clays. These will be more likely to settle in the deposition areas outside of the main flow areas. Flushing in the areas around flow restriction zones will likely move the fine-grained silts and clays during high flow years such as 2011. This is reflected in the deepwater sections located at the bridge crossings, inflow area of the Bear River, and other flow restriction areas. e. Page 3-34 talks about the field data collection "may" include air temperature, water temperature, DO, and pH to log conditions while sampling. Logan City believes the "may" should be changed to "will." f. Page 3-34. The last paragraph states: Two hours before the beginning of any data collection, the reference GPS base station will allow for stabilization... This sentence is incomplete and needs to be clarified. As an alternative, the Utah HARN network is tied to the Logan City base station and is available through the VRS network with the cell phone. This will simplify the establishment of accurate GPS measurements.	a. Comment noted. b. Comment noted. Clarity is provided in Section 3.4.5.1 of the RSP. Figure 3-5 shows the proposed general sampling locations for phosphorus. Sediment structure will determine the precise sampling location. However, PacifiCorp stands by the general area proposed for sampling locations. The sampling location selected by Logan City in the North Marsh is near the Logan River historical channel. The channel consists of relatively armored bed sediments in the area and has low potential for sediment core sampling. c. PacifiCorp clarified this in Section 3.4.5 of the RSP. Ten percent of the cores will be used for baseline data. d. Comment noted. e. PacifiCorp revised Section 3.4.5.1 in the RSP to reflect the request for collecting baseline ambient and water quality data. f. Comment noted.

CONSULTATION CHRONOLOGY WITH USFWS

- USFWS original Study Plan Requests prior to release of the PSP and their comments on FERC SD1 were submitted July 29, 2019 as shown in Appendix A (Comments 21-24).
- PacifiCorp responded to these initial comments as part of the September 11, 2019 Proposed Study Plan submittal.
- USFWS and PacifiCorp held a phone conference on August 22 and October 1, 2019, as well as an in-person meeting with USFWS Bear River Bird Migratory Refuge staff on October 7, 2019 to discuss the original comments/responses.
- PacifiCorp hosted a Study Plan Meeting on October 8, 2019. USFWS was in attendance.
- On November 30, 2019 PacifiCorp released a letter to stakeholders and FERC documenting the August 22, October 1, and October 7 discussions, and revising their original responses to comments based on new dialogue.
- PacifiCorp's revised responses from November 2019 are captured in Appendix A (above).
- On December 11, 2019, USFWS submitted the following comments documenting what USFWS believes are outstanding and/or resolved items.

NO.	COMMENTER/ REQUESTER	COMMENT RECEIVED ON PSP DECEMBER 2019	PACIFICORP RESPONSE JANUARY 2020
1.	USFWS Mountain Prairie Region – Division of Water Resources	PacifiCorp indicated that the EIM flows will be short in nature (~5 minutes) and that these discharges will be attenuated once the flows reach the Refuge downstream….[USFWS] would prefer to see some sort of mock scenario that details a typical week and how the EIM flows will affect discharge from Cutler Dam."	Proposed change in operations can be simulated using the hydraulic model that will be developed as part of the Hydraulic Modeling Study Plan. The discharge from Cutler Dam as a result of these potential future operations can be extracted and quantified for evaluation to the downstream terminus of the hydraulic model boundary (Section 3.3.4 in the RSP detailing the hydraulic model study area). Effects further downstream can then be extrapolated as needed.
2.	USFWS Mountain Prairie Region – Division of Water Resources	Our concern with EIM flows is not with the cumulative volume being delivered to the Refuge, it is the frequency in changes of the discharge rate and the effect on river stage that may require different water management operations at the Refuge. Th discharge from Cutler Dam may already be an output of the Hydraulic Modeling Study and no additional analysis or changes to the Proposed Study Plan may be needed. USFWS want to ensure that the changes in the Bear River discharge downstream of Cutler due to the proposed EIM operational changes are clearly described and changes are easily reviewed to understand any downstream impacts.	Potential changes from current operations in discharge from Cutler Dam including frequency of discharge fluctuations associated with shifts in Project operations will be documented in the hydraulic model outputs (Section 3.3.5.4 in the RSP).

ADDITIONAL CONSULTATION CONDUCTED WITH STAKEHOLDERS

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED AT OCTOBER 8, 2019 STUDY PLAN MEETING	PACIFICORP RESPONSE JANUARY 2020
1.	Jim Watterson	At the October 8, 2019 Study Plan meeting, there were several noted comments from Mr. Watterson that PacifiCorp captured. Below are those comments/requests. 1. Check with Jim Watterson on cultural sites. 2. How could the state work with PacifiCorp to manage issues (like noise) across jurisdictions? e.g., "No Wake Zone" 3. Evaluate types of access at different sites. 4. Visitor use survey will tease out recreationists and their impacts on wildlife. 5. Can wildlife tracks be documented [used to identify predators]? Attraction may not be there in the fall, so results may not be representative. 6. Make sure to use the right technique on macroinvertebrate study – match geology. 7. ~10 or 11 sites were selected for phosphorus study. Ensure there are enough sites to adequately characterize the very large reservoir 8. Consider looking as far as Amalga Bridge 9. Evaluate impacts at SR 218 (Amalga) bridge 10. Consider flying LiDAR over Amalga Bridge	PacifiCorp Responses to Mr. Watterson's list of comments are tabulated below in chronological order: 1. PacifiCorp contacted Jim and Jason Watterson regarding cultural sites during the 2019 drawdown and will continue to coordinate with the Wattersons regarding cultural sites during the 2020 study season. 2. This is not a study plan comment. Study results may identify opportunities for the state of Utah Division of Parks and Recreation (the regulatory authority over boating and waterways in Utah) to implement regulations consistent with recreation needs, safety and wildlife protection in different zones of Cutler Reservoir. 3. The Recreation Study Plan described in Section 4.1 of the RSP includes an evaluation of access at respective recreation sites and the types of recreation activities associated with those recreation sites. 4. Impacts to wildlife will be described through the Shoreline Habitat Characterization study. The recreation study is not designed to study impacts to wildlife. 5. As discussed in the October 8, 2019 meeting, an effort to survey for predator tracks during the fall 2019 drawdown would serve limited purpose since the attraction of nesting birds would not be present. As a matter of curiosity, any predator tracks present during camera maintenance work were noted. However, on the days this work was conducted, tracks were difficult to detect since temperatures were below freezing and the mud froze rapidly after being exposed. 6. PacifiCorp will employ an Eckman dredge to sample the reservoir bottom for benthic macroinvertebrates (BMI). Most of the substrate in Cutler Reservoir is fine silt and clay, The Eckman dredge is the most suitable device for sampling BMI in this type of substrate. Section 3.1.5.3 in the RSP references this sampling method. 7. The sites selected in the past for PacifiCorp's Resource Management Plan represented the five units in the reservoir (South Marsh, North Marsh, Bear River, Reservoir, and Canyon units) plus the Bear River downstream of Cutler Dam. Sampling in these areas is representative of the different characteristics of the reservoir. In addition, key areas of known phosphorus inputs were selected to capture the major zones of phosphorus loading. The water quality sampling locations including phosphorus are listed in Section 3.2.5.2, Table 3-1 of the RSP. 8. Amalga Bridge is located outside the FERC project boundary and is not proposed as a sampling location. PacifiCorp does not believe Cutler Reservoir water surface elevations have an effect on Bear River conditions at Amalga Bridge, although a pressure transducer was placed there during the 2019 drawdown specifically to address the upstream limits of reservoir flow effects. 9. See response to bullet 8 above. 10. See response to bullet 8 above.
2.	National Audubon Society	**Shoreline Habitat Characterization Study** In general, we are pleased that PacifiCorp plans to undertake a Shoreline Habitat Characterization Study (SHCS) as described in Section 2.2 of the PSP (Sept 2019). However, we have several comments concerning the proposed design of that study as further explained. Comment 1(a): It appears that the SHCS does not incorporate generally accepted standards for habitat-based assessments of project impacts. According to the PSP, the intent of the SHCS is to use a habitat-based assessment to evaluate how altered project operations may affect wildlife species, including shorebirds. Well-established protocols by the U.S. Fish and Wildlife Service outline how such habitat-based assessments should be planned and executed (available at https://www.fws.gov/policy/ESMindex.html). These procedures have been further discussed in publications including: • Brooks, R.P. 1997. Improving habitat suitability index models. Wildlife Society Bulletin. 25:163-167. • Van Horne, B., and J.A. Wiens. 1991. Forest bird habitat suitability models and the development of general habitat models. U.S. Fish and Wildlife Service, Fish Wild. Res. 8. 31 pp. We recommend that PacifiCorp modify the SHCS to better align with well-established protocols in several important (but not exhaustive) ways; in particular:	Habitat types in Section 2.2.5.2 have been revised to more accurately reflect the types of habitat available within the Project Boundary. A more detailed habitat modeling approach, such as those recommended, may be necessary if phase 1 of the study determines that there are areas where habitat would be degraded, and Phase 2 indicates that those habitats are being utilized. The RSP does not select representative species to be evaluated because all species with a specific conservation status will be evaluated. As a result of comments from the Bridgerland Audubon Society as well as the National Audubon Society, PacifiCorp has agreed to amend the Shoreline Habitat Characterization Study (SHCS) in Section 2.2 of this RSP to include a second study phase, that, if necessary, would include surveys of bird use in the Project Boundary during the breeding and non-breeding season. Should these surveys be necessary, PacifiCorp will work with local avian ecologists to select appropriate sites for surveying. The adjustments in the study plan are reflected in Section 2.2 of this RSP. As a result of these changes reflected in the RSP, PacifiCorp believes that National Audubon's comments are resolved.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED AT OCTOBER 8, 2019 STUDY PLAN MEETING	PACIFICORP RESPONSE JANUARY 2020
		1. The SHCS does not select specific species for evaluation. Because individual species have specific habitat requirements and niches, relevant aspects of habitat cannot be assumed to be universally representative. The selection process should consider species of national, regional, and local conservation concern, the importance of Utah to the species' overall conservation, urgency and effectiveness of management actions to benefit the species, the ability to monitor the species, and the ability of the species to act as a surrogate for the health of other species and the ecosystem as a whole. Multiple species that can represent the different habitat types will be necessary to assess adequately the health of habitat types present in the system. There are many examples of species selection in the literature including: • Millsap, B.A., et al. 1990. Setting priorities for the conservation of fish and wildlife species in Florida. Wildlife Monograph No. 111. 57pp. • Carignan, V., and M. Villard. 2002. Selecting indicator species to monitor ecological integrity: a review. Environmental Monitoring and Assessment. 78:45-61. The literature and data source review outlined in the SHCS could form the basis for selecting species for assessment. Additionally, to inform this species selection, we recommend that PacifiCorp also review documentation pertaining to Cutler Reservoir's Important Bird Area status (available at: https://www.audubon.org/important-bird-areas) and further consult with local avian ecologists. Avian experts associated with Audubon organizations would be willing to provide further input to assist PacifiCorp in the species selection process. 2. In the SHCS it appears that methods, rather than selected species, will dictate the vegetation types that will be evaluated. According to the SHCS, LiDAR and aerial imagery will be used to map short herbaceous vegetation, tall herbaceous vegetation, woody vegetation, and bare ground. However, the SHCS does not explain, how and why these vegetation types are relevant to the wildlife species of interest, or if those considerations will be further clarified in a more detailed design of the SHCS. Selecting a specific set of species (see preceding bullet point) will clarify important habitat characteristics and whether LiDAR and aerial imagery can be used to assess those characteristics. 3. The SHCS indicates that field data will be collected to validate maps of vegetation types, but it does not reference any plan to assess the abundance/occupancy/reproductive performance of wildlife species to verify that these vegetation types (or other habitat features) are meaningful to species. Habitat models verified with species-relevant performance metrics increase confidence that models are meaningful and can provide a meaningful assessment of project impacts. We recommend that the SHCS study plan be revised to align with accepted standards for habitat-based assessments of project impacts. Comment 1(b): We agree with Bridgerland Audubon Society's comment from the previous PSP review and their correspondence with PacifiCorp that it is important to incorporate surveys of the temporal and spatial characteristics of the avian community at Cutler Reservoir. Rather than try to merge the vegetation surveys with bird habitat monitoring, or tweaking the vegetation/shoreline monitoring to address bird habitat, another approach that could potentially be used as an alternative to 1(a) above, is for PacifiCorp to use the LiDAR data to identify specific habitats, such as shallow mudflat areas that would be exposed at the various fluctuating operational elevations during appropriate times of year (e.g. spring and fall migrations and breeding season). Target those areas (or subset of them) to monitor using standardized bird survey protocols during appropriate seasons for bird usage to establish baseline data from 2020 and use this information to model potential impacts at various operation levels. PacifiCorp should then continue to monitor target shorebird habitat locations (or subset of them) for at least the first 5 years (and at a lesser intensity for the term of the license) following implementation of any new permitted operational levels to determine usage by shorebirds at target locations and any increases or	

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED AT OCTOBER 8, 2019 STUDY PLAN MEETING	PACIFICORP RESPONSE JANUARY 2020
		decreases in habitat. This could also be designed for waterbirds and wading birds such as White-faced Ibis, for example. We suggest that PacifiCorp work with local avian ecologists to develop standardized survey protocol for avian monitoring, including identifying appropriate times of year to monitor and species selection (using easily identifiable species to avoid misidentifications). Standardized survey work can be cost effective but needs to be designed appropriately to capture meaningful data and identify changes in habitat use through time. Birds don't always exhibit site fidelity for foraging and breeding so it would be important to document variability associated with foraging and breeding preferences (with longer term monitoring) versus effects of pool elevation changes. The longer the baseline data and the longer the post-elevated pool monitoring, the better.	
3.	National Audubon Society	According to PSP section 2.2.3 and 2.2.5.3, the impact of altered operations on land bridge formation with respect to nesting shorebirds, will be investigated (see concerns in Comment 3 below). In addition to this, the study should evaluate how altered operations will affect water depths and water quality conditions key to the foraging success of shorebirds and other wildlife. PacifiCorp recognized the potential for impacts to foraging in the 'littoral' zone in section 7.1.6 of its Pre-Application Document Volume I (March 2019). The LiDAR data and hydraulic modeling offer clear opportunities for a foraging habitat assessment.	The hydraulic modeling study will produce a reservoir map of spatial depth that can be used to assess the water surface, depths, and velocities of water anywhere within the reservoir (See Section 3.3.5.4 of the RSP).The Water Quality Study (see Section 3.2 of the RSP) will investigate water quality conditions within the reservoir. Results from these two technical study plans will help inform PacifiCorp and participants in the relicense proceeding how proposed project operations may affect food resources for foraging birds in the littoral zone.
4.	National Audubon Society	To the best of our ability to interpret, the SHCS includes a plan to assess predator use of land bridges formed by a reservoir drawdown during fall 2019 (PSP 2.2.5.3). The plan indicates this will include placement of approximately 10 cameras at and around important bird nesting sites. However, without nesting and/or breeding birds present, we do not think it is possible to make a determination concerning the presence of predators and predation on nesting and/or breeding birds. The likely outcome is a study that underestimates the degree of predation pressure on nesting and breeding birds. Given this limitation in the study design, the resulting inferences will not provide an adequate understanding of the impact if land bridges will be in place during nesting and breeding season. As environmental and operational conditions permit, use of land bridges by predators should be evaluated during the nesting and breeding season.	This comment stems from a misunderstanding of the purpose of the time-lapse cameras. While it is true that data from these cameras will be used to analyze the risk posed to nesting habitat on islands if water levels drop, causing land bridges to form and predators to gain access to nesting habitats, the exact way the cameras would be utilized was not fully described and therefore misunderstood. Section 2.2.5.2 has been revised to address this misunderstanding. In short, the primary purpose of these cameras is to calibrate and verify the hydraulic model to ensure that any conclusions drawn by the model match with observations at these locations. PacifiCorp understands the importance of the colonial nesting breeding bird islands in the reservoir. The cameras will document what, if any, effects of potential future changes in operations could result, and will inform the development of PME measures, if necessary. Photographs may be analyzed for the presence of terrestrial predators, but this use is secondary to the model calibration use and only tangentially related to the analysis of the impacts of potential land-bridge formation on breeding birds.
5.	National Audubon Society	We agree with the USFWS requested studies of the effects of Cutler Reservoir operations on downstream flows and water levels and water quality (PSP page A-8). We ask that PacifiCorp reconsider its stated reasons (PSP page A-8) for not pursuing this study, particularly from an ecological perspective. One of the primary reasons given for not pursuing this study is that the altered operations will not change the "…overall quantity of water flowing downstream" (PSP page A-8). However, it is well established that natural and managed ecological systems are sensitive to aspects of water flows beyond simple quantity. Other flow aspects of importance include timing, volume, duration, rate of change, and frequency of flows. For an excellent overview, see: Poff et al. 1997. The Natural Flow Regime. BioScience. 47:769-784. It is unlikely that the altered operations will leave all ecologically important aspects of flow unaltered. Moreover, the Hydraulic Study referenced in 3.3 and as part of the rationale for not adopting the USFWS comment, does not appear to incorporate the potential impacts to the lower part of Bear River or the Refuge. It is unclear how leaving such an assessment to the NEPA cumulative effects analysis as PacifiCorp indicates, without having the underlying study/modeling to inform the cumulative effects analysis will provide a meaningful assessment.	See PacifiCorp's January 2020 response to Comments 1 and 2 from the USFWS for effects of dam operations on downstream flows (Appendix B). See PacifiCorp's September 2019 response and November 2019 revised response to Comment 21 in Appendix A from the USFWS for proposed model extension to Bear River Migratory Bird Refuge.

NO	COMMENTER/ REQUESTER	COMMENT RECEIVED AT OCTOBER 8, 2019 STUDY PLAN MEETING	PACIFICORP RESPONSE JANUARY 2020
		Additionally, flows in the Bear River have been correlated with ecological conditions in areas of Bear River Bay beyond the Bear River Migratory Bird Refuge. See for example: Cavitt, J. 2013. Avian population analysis of the Willard Spur. Final Report to the Utah Division of Water Quality. 25 pp. For this reason, we support USFWS request for a study of downstream effects. We also suggest extending it spatially to consider the impacts on Bear River Bay and recognized areas of importance within the bay, including the refuge and Willard Spur.	
6.	National Audubon Society	We request that PacifiCorp consider designing and implementing its Hydraulic Model (PSP section 3.3) in a manner that will allow it to be integrated with other locally important modeling frameworks. Among these other frameworks are (1) the RiverWare model currently being developed by the States of Idaho, Utah, Wyoming and PacifiCorp to assess the effects of the proposed Bear Lake appropriations on Bear River hydrology; and (2) the Great Salt Lake Integrated Model being used to assess the impacts of land use, water-use, and climate changes on the Great Salt Lake elevation. Model integration will allow PacifiCorp to leverage its existing resource commitments to begin producing a set of models capable of evaluating system-wide operations versus one-off, project-specific models. Importantly, PacifiCorp is involved in both the Bear River hydrology model and the Hydraulic Model referenced in PSP section 3.3. Integrating these tools to assess impacts in the lower Bear River from changes in operations at the Cutler Reservoir would seem to be a reasonable possibility.	PacifiCorp maintains that the proposed boundary of the hydraulic model (including shifting, if any,as indicated by the model analysis, [Section 3.3.4]) includes all areas that would be directly affected by potential future changes in operations. The development, calibration, and use of the hydraulic model for the purposes of answering the questions outlined in the PSP report will be the first priority of the modeling effort. Integration of the model to other software or other models could potentially be used by other parties in the future to assist with their research interests. The tri-state framework and Great Salt Lake model referenced by National Audubon are outside the scope of the Cutler Project relicensing effort.
7.	National Audubon Society	There are various climate scenarios that could be incorporated into the studies and models to develop a better understanding of the potential changes in the project area and Bear River hydrology. These scenarios could at a minimum provide the basis for possible license conditions should those scenarios play out over the long-proposed licensing period of 40 to 50 years. Such an important influencing factor should not be omitted from the studies. Moreover, having the ability to consider climate change in the cumulative effect's analysis (as the response indicates) necessitates the need for at least some climate scenario modeling.	PacifiCorp is not proposing to incorporate various climate scenarios in the resource studies. As the commenter notes, there are numerous climate scenarios available to select but none of the climate change models are known to have the accuracy needed to predict the degree of specific resource impacts or 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 FERC's Cumulative Effects analysis.
8.	Elliott Mott	Drawdown mechanics = water will pass through the units	That is correct. Water will pass through the turbines to implement the drawdown.
9.	FERC	FERC provided valuable insight into improvements that could be made to multiple resource study plans to improve analysis and feedback from stakeholders and FERC. FERC suggested that PacifiCorp improve: • Add descriptions of why specific sampling points or critical areas were chosen to be studied as part of multiple resource study plans. • Specify in study plans the quantity and location of specific sampling sites for the Sedimentation and Water Quality studies. • For the Water Quality study, summarize existing studies references in study plans. • For the Shoreline Habitat Characterization Study, build on existing information in the study plan so that stakeholders can understand what do not need to be ground-truthed. • Follow up with stakeholders on flows downstream of Cutler to the refuge, algae and weeds, and temporal and spatial characteristics of the avian community.	• As shown in Appendix B, and the edits made in specific study plans, PacifiCorp incorporated FERC's suggestion to clarify and specify the details of the study plans. • PacifiCorp has made multiple improvements to the PSP and the RSP that incorporate both stakeholder and FERC feedback. • PacifiCorp has added annotated bibliographies for the studies referenced as part of the Water Quality study. • The Shoreline Habitat Characterization Study has been improved and elaborated upon for the RSP, and responses and specific changes are noted throughout Appendix B. • Several studies, including Water Quality and Shoreline Habitat Characterization, now include a phased approach to better characterize what potential effects may result from possible future changes to operations, based on initial analysis utilizing the new hydraulic model output with other existing information, prior to additional new data collection. • PacifiCorp has been diligently working with stakeholders to understand these study requests, and has incorporated some of the suggested feedback into the studies, as well as expanding the Shoreline Habitat Characterization Study.
10.	UDWQ	The Utah Division of Water Quality (UDWQ) appreciated the opportunity provided by PacifiCorp on October 29, 2019 to discuss comments submitted by UDWQ to the Federal Energy Regulatory Commission (FERC) on PacifiCorp's Proposed Technical Study Plans (PSP) in July 2019. The proposed changes PacifiCorp made in response to comments were incorporated into the Revised Study Plan (RSP) and sufficiently addressed UDWQ's comments and concerns. UDWQ has no additional study-related concerns and supports PacifiCorp proceeding with submitting the proposed RSP to FERC.	Updates per consultation with the UDWQ have been incorporated into the Water Quality Study. See PacifiCorp revised responses in Appendix A for UDWQ Comments 42 through 45. No further updates are proposed in RSP.

APPENDIX C

STUDY PLAN MASTER SCHEDULE

Revised Study Activity 2019-2021	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~~Update													X						
Initial Study Report																		X	X
Fish & Aquatic																			
Drawdown Fieldwork				X	X														
~~First Study Season:~~ Field Studies & Analysis								X	X	X	X	X	X	X	X	X	X		
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X
Hydraulic Modeling																			
Drawdown Fieldwork~~: LiDAR, Bathymetry, Sampling~~				X	X														
~~First Study Season:~~ Field Studies & Analysis							X	X	X	X									
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X
Land Use																			
~~First Study Season:~~ Field Studies & Analysis							X	X	X	X	X	X	X	X	X	X	X		
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X
Recreation																			
~~First Study Season:~~ Field Studies & Analysis									X	X	X	X	X	X	X	X			
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X
Sedimentation																			
~~First Study Season:~~ Field Studies & Analysis			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Revised Study Activity 2019-2021	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	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~~						
~~Initial Study Report~~																			~~X~~

Revised Study Activity 2019-2021	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Shoreline Habitat Characterization																			
Phase 1 Desktop Analysis								X	X	X	X	X	X						
Phase 2 Bird Surveys															X	X	X	X	X
6-Month Progress Update													X						
Initial Study Report																		X	X
Threatened and Endangered Species Survey																			
~~First Study Season:~~ Field Studies & Analysis	X	X	X										X	X					
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X
Water Quality																			
Drawdown Fieldwork				X	X	X													
Drawdown-Specific Reporting							X	X											
~~First Study Season:~~ Field Studies & Analysis																X	X	X	X
6-Month Progress ~~Report~~Update													X						
Initial Study Report																		X	X

X	Estimated proposed study season.
X	FERC/ILP Regulatory Milestone
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

APPENDIX D

CONSULTATION RECORD