CUTLER HYDROELECTRIC PROJECT

FERC NO. 2420

Pre-Application Document

Volume I – Main Document

March 2019

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

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PRE-APPLICATION DOCUMENT

CUTLER HYDROELECTRIC PROJECT

FERC NO. 2420

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MARCH 2019

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DEFINITIONS OF TERMS

TERM	DEFINITION
A	
Acre (ac)	A measure of land area equal to 43,560 square feet.
Acre-feet (af)	The amount of water it takes to cover one acre to a depth of one foot; equal to 43,560 cubic feet or 1,233.5 cubic meters.
Alluvium	Material (e.g. sand, silt, or clay) deposited on land by water, such as on floodplains.
Anadromous fish	Fish that live in saltwater habitats most of their lives but periodically migrate into freshwater to spawn and develop to the juvenile stage (e.g., alewife).
Aquatic Life	Any plants or animals that live at least part of their life cycle in water.
Automatic/ Semi-automatic/ Manual Powerhouses	An automatic powerhouse can be started and stopped and have its load and voltage changed from a remote or master station (e.g. via supervisory control). A semi-automatic powerhouse with Supervisory Control and Data Acquisition (SCADA) may allow a remote station to change load and/or voltage and may allow a remote shutdown but must be started manually. A semi-automatic powerhouse without SCADA will send alarms to a remote or master station. A manual powerhouse must have all its functions performed at the powerhouse.
B	
Baseline	A set of existing environmental conditions upon which comparisons are made during the NEPA process.
Bear Lake	Water released from Bear Lake is used for power generation as it passes downstream through PacifiCorp's five hydroelectric plants in Idaho and Utah.
Benthic	Associated with lake or river bottom or substrate.
Benthic Macroinvertebrates	Animals without backbones that are visible and live on, under, and around rocks and sediment on the bottoms of lakes, rivers, and streams.
Bud Phelps Wildlife Management Area (WMA)	The Bud Phelps WMA, located adjacent to the Project Boundary at the south end of Cutler Reservoir, includes 150 acres of wetland, marsh, and associated habitats just south of Cutler Reservoir, managed by the Utah Division of Wildlife Resources.
C	
Capacity	The load for which an electric generating unit or other electrical equipment or power line is rated.
C.F.R.	U.S. Code of Federal Regulations
Clean Water Act (CWA)	The Federal Water Pollution Control Act of 1972 and subsequent amendments in 1977, 1981, and 1987 (commonly referred to as the Clean Water Act [CWA]). The CWA established a regulatory system for navigable waters in the United States, whether on public or private land. The CWA set national policy to eliminate discharge of water pollutants into navigable waters, to regulate discharge of toxic

	pollutants, and to prohibit discharge of pollutants from point source without permits. Most importantly, it authorized the Environmental Protection Agency (EPA) to set water quality criteria for states to use to establish water quality standards.
Commission	Federal Energy Regulatory Commission also referenced as FERC.
Conduit	A tunnel or pipe used for diverting or moving water from one point to another; typically used when there is no existing streambed or waterway.
Critical Energy Infrastructure Information (CEII)	Project-related documents related to the design and safety of dams and appurtenant facilities that are restricted from public viewing in accordance with FERC regulations (18 CFR 388.113) to protect national security and public safety.
Cubic Feet (cf)	The volume of a cube with edges one foot in length.
Cubic Feet per Second (cfs)	A measurement of water flow representing one cubic foot of water moving past a given point in one second; equal to 0.0283 cubic meters per second and 0.646 million gallons per day (mgd).
Cultural Resources	Includes items, structures, etc. of historical, archaeological, or architectural significance.
Cumulative Impact	The effect on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseen future actions; can result from individually minor but collectively significant actions that take place over a time.
Cutler Dam	Refers to the Cutler Dam structure; includes the dam, flowline, penstocks, surge tank, and powerhouse.
Cutler Hydroelectric Project	Federal Energy Regulatory Commission (FERC) Project No. 2420, located on the Bear River in Box Elder and Cache counties, Utah includes all the lands, waters and structures enclosed within the FERC Project Boundary.
Cutler Reservoir	Cutler Reservoir spreads out from the canyon into flat land consisting of pasture, meadows, meandering river channels, marshes, wetland, agricultural land, and forest
D	
Dam	A structure constructed across a water body typically used to increase the hydraulic head at hydroelectric generating units. A dam typically reduces the velocity of water in a particular river segment and increases the depth of water by forming an impoundment behind the dam. It also generally serves as a water control structure.
Demand	The rate at which electric energy is delivered to or by a system at a given instant or averaged over a designated period, usually expressed in kilowatts or megawatts.
Dependable Capacity	The maximum dependable megawatt (MW) output of a generator or group of generators during the critical hydrologic period coincident with peak electrical system load.
Dike	A raised bank, typically earthen, constructed along a waterway to

	impound the water and to prevent flooding.
Dissolved Oxygen (DO)	Perhaps the most commonly employed measure of water quality. Low DO levels adversely affect fish and other aquatic life. The total absence of DO leads to the development of an anaerobic condition and the eventual development of odor and aesthetic problems.
Distribution Lines	Power lines, such as those in neighborhoods, used to distribute moderate voltage electricity that is "stepped down" to household levels by transformers on power poles.
Drawdown	The distance the water surface of a reservoir is lowered from a given elevation as the result of releasing water.
E	
eComment	eCommenting allows the public to submit comments up to 6,000 characters in length to FERC and does not require a subscription to FERC's website, or intervention to a specific docket.
eSubscription	By eSubscribing, users receive a notification whenever a document is added to FERC eLibrary for the subscribed docket. Additionally, the user will be sent an e-mail notification with a link that allows them to access the document.
Energy	Average power production over a stated interval of time, expressed in kilowatt-hours, megawatt-hours, average kilowatts, and average megawatts.
Eutrophic	Waters with a high concentration of nutrients and a high level of primary production.
F	
°F	Degrees Fahrenheit
Federal Energy Regulatory Commission	FERC; The governing federal agency responsible for overseeing the licensing, relicensing, and operation of non-federal hydroelectric projects in the United States.
Federal Power Act (FPA)	Federal statute enacted in 1920 that established the Federal Power Commission (now the FERC) and the statutes for licensing hydroelectric projects.
Federal Power Commission (FPC)	Predecessor of the FERC.
Federal Register	A publication of the federal government that includes official transactions of the U.S. Congress and all federal agencies. Copies of the Federal Register are usually available at large public and university libraries.
Flow	The volume of water passing a given point over a given amount of time.
Flow Duration Curve	A graphical representation of the percentage of time in the historical record that a flow of any given magnitude has been equaled or exceeded.
Francis turbine	A radial-inflow reaction turbine in which the flow through the runner is perpendicular to the turbine shaft.

G	
Generation	The process of producing electricity from other forms of energy, such as steam, heat, or water. Generation refers to the amount of electric energy produced; expressed in kilowatt-hours.
Generator	A machine that converts mechanical energy into electricity; often powered by a turbine.
GIS	Geographic Information System
Gross Storage	The sum of the inactive storage and the active storage volumes of a reservoir; the total amount of water contained in a reservoir at its maximum normal operating elevation.
H	
Habitat	The locality or external environment in which a plant or animal normally lives and grows.
Head	The distance that water falls in passing through a hydraulic structure or device such as a hydroelectric plant. Gross head is the difference between the headwater and tailwater levels; net head is the gross head minus hydraulic losses, such as friction, incurred as water passes through the structure; rated head is the head at which the full-gate discharge of a turbine will produce the rated capacity of the connected generator.
Horsepower (hp)	A measure of power; equal to about 746 watts.
Hydraulic	Relating to water in motion.
Hydroelectric Plant	A facility where the turbine generators are driven by falling water.
Hydroelectric Power	Capturing flowing water to produce electrical energy.
Hydrologic Unit Code (HUC)	Developed by the Water Resources Council; corresponds to a hierarchal classification of hydrologic drainage basins in the United States. Each hydrologic unit is identified by a unique hydrologic unit code (HUC).
Hyrum Reservoir	Little Bear River feeds the 475-acre Hyrum Reservoir located beside the town of Hyrum, 15 miles south of Cutler Reservoir
I	
Impoundment	The body of water created by a dam.
Installed Capacity	The nameplate MW rating of a generator or group of generators.
Integrated Licensing Process (ILP)	The ILP is the default process by which a hydroelectric project obtains a new license to operate from the FERC.
Interested Parties	Individuals who have expressed an interest in the relicensing proceeding; similar to a stakeholder.
Intervention	Intervention means that the party becomes a legal party of the proceeding. Parties that intervene incur a legal obligation to serve documents on other parties and will be served copies of all subsequent filing by other parties. FERC uses the eService system to serve issuances and decision to participants.

K	
Kilovolts (kV)	A unit of pressure, (or push) of an electric current equal to 1,000 volts.
Kilovolt-ampere (kVA)	A unit of apparent power equal to 1000 volt-ampere.
Kilowatt (kW)	A unit of electrical power equal to 1,000 watts or 1.341 horsepower.
Kilowatt-hour (kWh)	Basic unit of electric energy equal to an average of one kilowatt of power applied over 1 hour.
L	
Lacustrine	Pertaining to or living in lakes or ponds.
License	FERC authorization to construct a new project or continue operating an existing project. The license contains the operating conditions for a term of 30 to 50 years.
License Application	Application for a new license that is submitted to the FERC no less than 2 years in advance of expiration of an existing license.
Licensee	PacifiCorp, a subsidiary of Berkshire Hathaway Energy.
Littoral	Associated with shallow (shoreline area) water (e.g., the littoral zone of an impoundment).
Load	The total consumer demand of electric service at any given time.
M	
Mainstem	The main channel of a river as opposed to the streams and smaller rivers that feed into it.
Mantua Reservoir	Mantua Reservoir is located along Highway 89/91 approximately 4 miles east of Brigham City and 25 miles south of Cutler Reservoir. The 554-acre reservoir is used for irrigation water storage and is owned and managed by Brigham City.
Megawatt (MW)	A unit of electrical power equal to one million watts or 1,000 kW.
Megawatt-hour (MWh)	A unit of electrical energy equal to 1 MW of power used for one hour.
N	
Nameplate Capacity	A measurement indicating the approximate generating capability of a project or unit, as designated by the manufacturer; also called Installed Capacity.
National Environmental Policy Act (NEPA)	A law passed by the U.S. Congress in 1969 to establish methods and standards for the review of development projects requiring federal action such as permitting or licensing.
Newton Reservoir	Located approximately 5 miles north of Cutler Reservoir, Newton Reservoir was originally built for irrigation supply purposes and is managed by the U.S. Bureau of Reclamation.
Non-Governmental Organization (NGO)	Local, regional, and national organizations such as conservation, sportsman's, or commerce groups.

Normal Operating Elevation	The reservoir elevation approximating the average surface elevation at which a reservoir is kept.
Normal Operating Elevation Range	The elevation difference between the normal maximum and normal minimum operating elevations.
O	
Off Peak	A period of relatively low demand for electrical energy, such as the middle of the night.
On Peak	A period of relatively high demand for electrical energy.
Outage	The period during which a generating unit, transmission line, or other facility is out of service.
P	
Peak Demand	A 1-hour period in a year representing the highest point of customer consumption of electricity.
Peaking Operations	A power plant scheduled to operate during peak energy demand; operation of generating facilities to meet maximum instantaneous electrical demands.
Pineview Reservoir	Pineview Reservoir is located on the Ogden River approximately 8 miles east of Ogden and 50 miles south of Cutler Reservoir. Recreation facilities and management are provided by the USFS. The reservoir has a surface area of 2,870 acres and a shoreline of 25 miles
Pool	Refers to the reservoir or an impounded body of water.
Power Factor	The ratio of actual power to apparent power. Power factor is the cosine of the phase angle difference between the current and voltage of a given phase. Unity power factor exists when voltage and current are in phase.
Powerhouse	The building that typically houses electric generating equipment.
Pre-Application Document (PAD)	A document required by FERC when relicensing a project that brings together all existing, relevant, and reasonably available information about the project and its effects on resources; includes a well-defined process plan that sets the schedule for developing the license application and a list of preliminary studies and issues.
Project	All the components of a hydropower development (i.e., dam, powerhouse, transmission junctions, reservoir, rights-of-way, lands). Project: the impoundment and any associated dam, powerhouse, reservoir, intake, water conveyance facility, and any other structures, rights, lands, and waters (the complete unit of development), as well as property rights in lands and waters as necessary for construction, operation, and maintenance of a project. For the purposes of this document, Project is defined as the Cutler Hydroelectric Project (FERC Project No. 2420), located on the Bear River in Box Elder and Cache counties, Utah.
Project Area	The geographic area comprised of the lands and waters within the Project Boundary and those lands immediately adjacent to the Project Boundary. For the purposes of this document, the Project Area is the area which contains all Project features (encompassing the Project Boundary as

	defined below), and which extends out for the purposes of characterization and analysis from the edge of the Project Boundary plus a 0.5-mile buffer.
Project Boundary	The boundary defined in the project's license issued by FERC outlining the geographic area needed for project operations and maintenance. Project Boundary: includes all structures (e.g., dams, powerplants or other structure used for generation of electricity), lands and waters included in a license or exemption. The Project Boundary must enclose only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources, as designated in the project license. Project boundaries are used to designate the geographic extent of the hydropower project that FERC determines a licensee must own or control on behalf of its licensed hydropower project. For the purposes of this document, the Project Boundary is defined as all lands and waters within the existing FERC Project Boundary for the Cutler Hydroelectric Project No. 2420, as denoted on the Project's Exhibit G.
Project Drainage Basin	The land area from which surface water flows to the project.
Project Vicinity	Refers to a larger geographic area near a project, such as a county; used for characterization or analysis of specific resources. For the purposes of this document, Project Vicinity is defined by resource in relevant sections of the document.
Project Works	All the infrastructure associated with the operations of the project and included in the project license.
Public Reference File	A listing of important materials pertaining to the relicensing.
Public Utility	A business enterprise rendering a service considered essential to the public and, as such, is subject to regulation.
R	
Ramping	The act of increasing or decreasing stream flows from a powerhouse, dam, or diversion structure.
Relicensing	The administrative proceeding in which FERC, in consultation with other federal and state agencies, decides whether and on what terms to issue a new license for an existing hydroelectric project at the expiration of the original license.
Relicensing Participants	Individuals who actively participate in the relicensing proceedings.
Reservoir	A man-made lake into which water flows and is stored for future use.
Resident Fish	Fish that spend the entire life cycle in freshwater, such as trout and bass.
Resource Agency	A federal, state, or interstate agency with responsibilities in the areas of flood control, navigation, irrigation, recreation, fish or wildlife, water resource management, cultural, or other relevant resources of the state in which a project is or will be located.

Riparian Area	A specialized form of wetland with characteristic vegetation restricted to areas along, adjacent to, or contiguous with rivers and streams. Also, periodically flooded lake and reservoir shore areas, as well as lakes with stable water.
River Miles (RM)	Miles from the mouth of a river; for upstream tributaries, miles from the confluence with the main river.
Run-of-River	A term used to describe the operation of a hydroelectric project in which the quantity of water discharged from the project essentially equals the flow in the river.
Runner	The rotating part of a turbine.
S	
Salt Creek Waterfowl Management Area	The management area is managed by the UDWR and is located at the mouth of the Bear River Valley, north of the Bear River Migratory Bird Refuge and approximately 1616 miles southwest of Cutler Reservoir.
Scoping Document 1 (SD1)	A document prepared by FERC as part of NEPA environmental review that initially identifies issues pertinent to the FERC's review of a project. The FERC circulates the SD1 and holds a public meeting to obtain the public's comment.
Scoping Document 2 (SD2)	A revision of the SD1 that considers public comment on that document.
Scoping Process	The process of identifying issues, potential impacts, and reasonable alternatives associated with the operation of a hydroelectric project. "Scoping" is a process required when any federal agency is taking an action that might affect the quality of the human environment, pursuant to the National Environmental Policy Act (NEPA) of 1969. In the case of hydroelectric projects, FERC's issuance of an operating license qualifies as a federal action.
Secchi Depth	Average depth that a standard sized black and white disk disappears and reappears when viewed from the lake surface as the water is lowered; an indicator of water clarity.
Spawn	The act of fish releasing and fertilizing eggs.
Spillway	A passage for releasing surplus water from a reservoir or canal.
Stakeholder	Any individual or organization (government or non-governmental) with an interest in a hydroelectric project; similar to an interested party.
State	State of Utah
Stock	The existing density of a particular species of fish in an aquatic system.
Stratification	A physical and chemical process that results in the formation of distinct layers of water within a lake or reservoir (i.e., epilimnion, metalimnion, and hypolimnion).
Streamflow	The rate at which water passes a given point in a stream, usually expressed in cubic feet per second (cfs).
Study Plan	The aggregate of all study descriptions.
Submerged Aquatic Vegetation	Plants with rigid stems and/or leaves rooted in substrate and generally covered by deep water (greater than 6.6 feet depth) with all of the plant parts covered by water.

Summer Channel	Refers to the bank-to-bank of a stream, below the ordinary high-water mark.
T	
Tailrace	The channel located between a hydroelectric powerhouse and the river where the discharged water passes through the turbines.
Tailwater	The waters immediately downstream of a dam; for hydroelectric dams, also referred to as the water discharged from the draft tubes.
Transformer	Equipment vital to the transmission and distribution of electricity designed to increase or decrease voltage.
Transmission	The act or process of transporting electric energy in bulk from one point to another in the power system rather than to individual customers.
Transmission Lines	Power lines normally used to carry high voltage electricity to substations, where it is "stepped down" for distribution to individual customers.
Trash Rack	A series of vertical steel bars found on a dam or intake structure that clears the water of debris before the water passes through the structure.
Turbidity	A measure of the extent to which light passing through water is reduced due to suspended materials.
Turbine	A machine for generating rotary mechanical power from the energy in a stream of fluid (such as water, steam, or hot gas). Turbines covert the energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.
V	
Vantage Point	The location from which a viewer sees the landscape.
Volt (V)	The unit of electromotive force or electric pressure, akin to water pressure in pounds per square inch.
W	
Watershed	An entire drainage basin including all living and nonliving components of the system.
Wetlands	Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; 3) the substrate is on soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

ACRONYMS

µg/l	microgram per liter
mg/L	milligrams per liter

A

AFO	Animal Feeding Operation
Act	Magnuson-Stevens Fishery Conservation and Management Act
AIR	Additional Information Request
Amp	Ampere

B

BLM	Bureau of Land Management

C

CAFO	Concentrated Animal Feeding Operation
CAISO	California Independent System Operator
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second

D

DFFSL	Division of Forestry, Fire and State Lands

E

EA	Environmental Assessment
eDNA	Environmental DNA
EFH	Essential Fish Habitat
EIM	Energy Imbalance Market
EIS	Environmental Impact Statement
ESA	Endangered Species Act

F

F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FOIA	Freedom of Information Act

G

GIS	Geographic Information System
GLO	General Land Office

GWh	Gigawatt Hours

H

HAER	Historic American Engineering Record
HCC	Hydro Control Center
hp	horsepower
HPMP	Historic Properties Management Plan

I

IBA	Audubon Important Bird Areas
ILP	Integrated Licensing Process
IPaC	Information Planning and Conservation

K

kW	kilowatt
kya	Thousands of years ago

M

ml	milliliter
MPN	most probable number
MRLC	Multi-Resolution Land Characteristics
msl	Mean Sea Level
MVA	Megavolt-ampere
MW	megawatt
Mya	Millions of years ago

N

NAS	Non-Indigenous Aquatic Species
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Council
NGO	Non-Governmental Organization
NGVD	National Geodetic Vertical Datum
NLCD	National Land Cover Database
NOAA Fisheries	National Marine Fisheries
NOI	Notice of Intent
NRHP	National Register of Historic Places
NTE	not to exceed background level
NTSA	National Trails System Act
NWI	National Wetland Inventory

O

OHV	Off-highway vehicle

P

PAD	Pre-Application Document
PIF	Partners in Flight
PME	Protection, Mitigation, and Enhancement
Project	Cutler Hydroelectric Project
psi	pounds per square inch
PURPA	Public Utility Regulatory Policies Act of 1978

R

RMP	Resource Management Plan
rpm	revolutions per minute
RTE	Rare, Threatened and Endangered
RV	Recreational vehicle

S

SCADA	Supervisory Control and Data Acquisition
SCORP	Statewide Utah Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SGCN	Species of Greatest Conservation Need
SGMA	Sage-grouse Management Area
SHPO	State Historic Preservation Office

T

T&C	Terms & Conditions
TDS	Total Dissolved Solids
TIV	turbine isolation valve
TMDL	Total Maximum Daily Loads
TSS	Total Suspended Solids

U

UDAF	Utah Department of Agriculture and Food
UDSH	Utah Division of State History
UDWR	Utah Division of Wildlife Resources
UDWQ	Utah Division of Water Quality
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USU	Utah State University

V

V	Volt
VEP	Vegetation Enhancement Program

W

WECC	Western Electricity Coordinating Council
WMA	Wildlife Management Area

1 INTRODUCTION

1.1 Background

PacifiCorp, a subsidiary of Berkshire Hathaway Energy, plans to file a new application for relicense of a major project, the Cutler Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 2420, located on the Bear River in Box Elder and Cache counties, Utah. PacifiCorp is the current licensee, owner, and operator of the Project. Appendix A contains the current license, issued for a period of 30 years on April 29, 1994, and will expire on March 31, 2024. The Project has a generation capacity of 30 megawatts (MW) and does not occupy any federal lands. PacifiCorp intends to file an application for a new license prior to March 31, 2022, 2 years before the license expiration date, as required.

PacifiCorp has chosen to use the Integrated Licensing Process (ILP), as defined in Title 18 of the U.S. Code of Federal Regulations (CFR) Part 5. PacifiCorp provides this Pre-Application Document (PAD) as required by CFR, Part 5, and which will accompany PacifiCorp's Notice of Intent (NOI) to seek a new license for the Project. PacifiCorp will distribute this PAD and NOI simultaneously to federal and state resource agencies, local governments, Native American tribes, members of the public, and others interested in the relicensing proceeding. As specified in 18 CFR § 5.6 (c) and (d), the PAD provides FERC and the entities listed above with summaries of existing, relevant, and reasonably available information related to the Project that is in PacifiCorp's possession or was obtained through due diligence. The information required in the PAD is specified in 18 CFR § 5.6 § (c) and (d).

1.2 Purpose

This PAD was prepared in compliance with 18 CFR Part 5, which defines the form and content requirements of the document. The purpose of the PAD is to provide FERC, federal and state agencies, and other interested stakeholders with existing background information related to project facilities and engineering, operational, economic, and environmental aspects of the Project. The PAD defines pertinent project issues and potential study needs. In accordance with the regulations, the PAD and associated NOI will be filed with FERC and distributed to federal

and state resource agencies, local governments, relevant tribal entities, non-governmental organizations (NGO), and other interested parties.

1.3 Client's Agents

The following persons are authorized to act as agents for the applicant pursuant to 18 CFR § 5.6(d)(2)(i):

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1.4 Pre-Application Document Content

This PAD follows the content and form requirements of 18 CFR § 5.6 (c) and (d), with minor changes in form for enhanced readability. This PAD contains all information required by 18 CFR § 5.6 (c) and (d) for distribution to federal and state resource agencies, local governments, Native American tribes, members of the public, and others likely to be interested in the relicensing proceeding.

Volume I is organized as follows:

- Table of Contents; List of Tables; List of Figures; List of Appendices; List of Photographs; and Definitions of Terms, Acronyms, and Abbreviations.
- **Section 1** – Introduction and Background Information
- **Section 2** – Purpose of the PAD
- **Section 3** – Process Plan and Schedule, Communications Protocols and ILP Flow Chart, per 18 CFR § 5.6(d)(1).
- **Section 4** – General Description of the Bear River Basin, per 18 CFR § 5.6(d)(3)(xiii).
- **Section 5** – Project Location, Facilities and Operations, per 18 CFR § 5.6(d)(2).
- **Section 6** – Description of the Existing Environment by Resource Area, per 18 CFR § 5.6(d)(3)(ii)-(xii).
- **Section 7** – Description of Impacts, Issues, Study and Information Needs, Resource Measures and Existing Plans, per 18 CFR § 5.6(d)(3) and (4).

- **Section 8** – Relevant Comprehensive Management Plans
- **Section 9** – Literature and Existing Information Sources Cited

Volume II is organized as follows:

- **Appendices A-E**

As set forth in 18 CFR § 5.6, FERC will issue Scoping Document 1 (SD1) within 60 days of PacifiCorp's filing of the PAD and hold a public scoping meeting and site visit within 30 days of issuing SD1.

2 PURPOSE OF THE PRE-APPLICATION DOCUMENT

By filing the NOI and PAD with FERC, PacifiCorp is initiating the FERC ILP relicensing process for the Cutler Hydroelectric Project. The purpose of this PAD is to: (1) describe the existing facility and current and proposed operations at the Project, and (2) summarize existing information relevant to the evaluation of project relicensing. In addition, this PAD is intended to assist resource agencies, municipalities, Native American tribes, NGOs and interested parties in identifying potential resource issues and related informational needs, and to develop potential study requests (18 CFR § 5.6(b)). The PAD is a precursor to the environmental analysis section of the license application and to FERC's Scoping Documents and Environmental Impact Statement (EIS) or Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). Filing the PAD concurrently with the NOI enables those who plan to participate in the relicensing to familiarize themselves with the Project at the beginning of the proceeding. This familiarity is intended to enhance the FERC scoping process that follows the filing of the PAD.

FERC's regulations require that a licensee exercise due diligence in obtaining and including existing relevant and reasonably available information about the Project and related resources. To accomplish this, PacifiCorp has thoroughly reviewed its own files for relevant information and has contacted all appropriate resource agencies, and requested information and data they may have about the Project or project resources via a PAD questionnaire (Appendix B). In addition, PacifiCorp conducted searches of other potential information sources, including peer-reviewed journal articles, reference books, and the internet. All information sources cited in this PAD are appropriately referenced in Section 9.

To facilitate communication during the relicensing process, PacifiCorp established a publicly-accessible website for the Cutler Project relicensing[1] which contains information regarding past and current relicensing activities, including meeting notices and agendas, meeting summaries, documents distributed to participants, reference materials, key decisions, and links to relevant information sources such as FERC's ILP regulations. Updates to the process plan and schedule will be posted on PacifiCorp's website. In addition, PacifiCorp distributed a PAD questionnaire to appropriate agencies and an introduction e-mail to the initial stakeholder list on January 10,

[1] http://www.pacificorp.com/es/hydro/hl/cutler.html

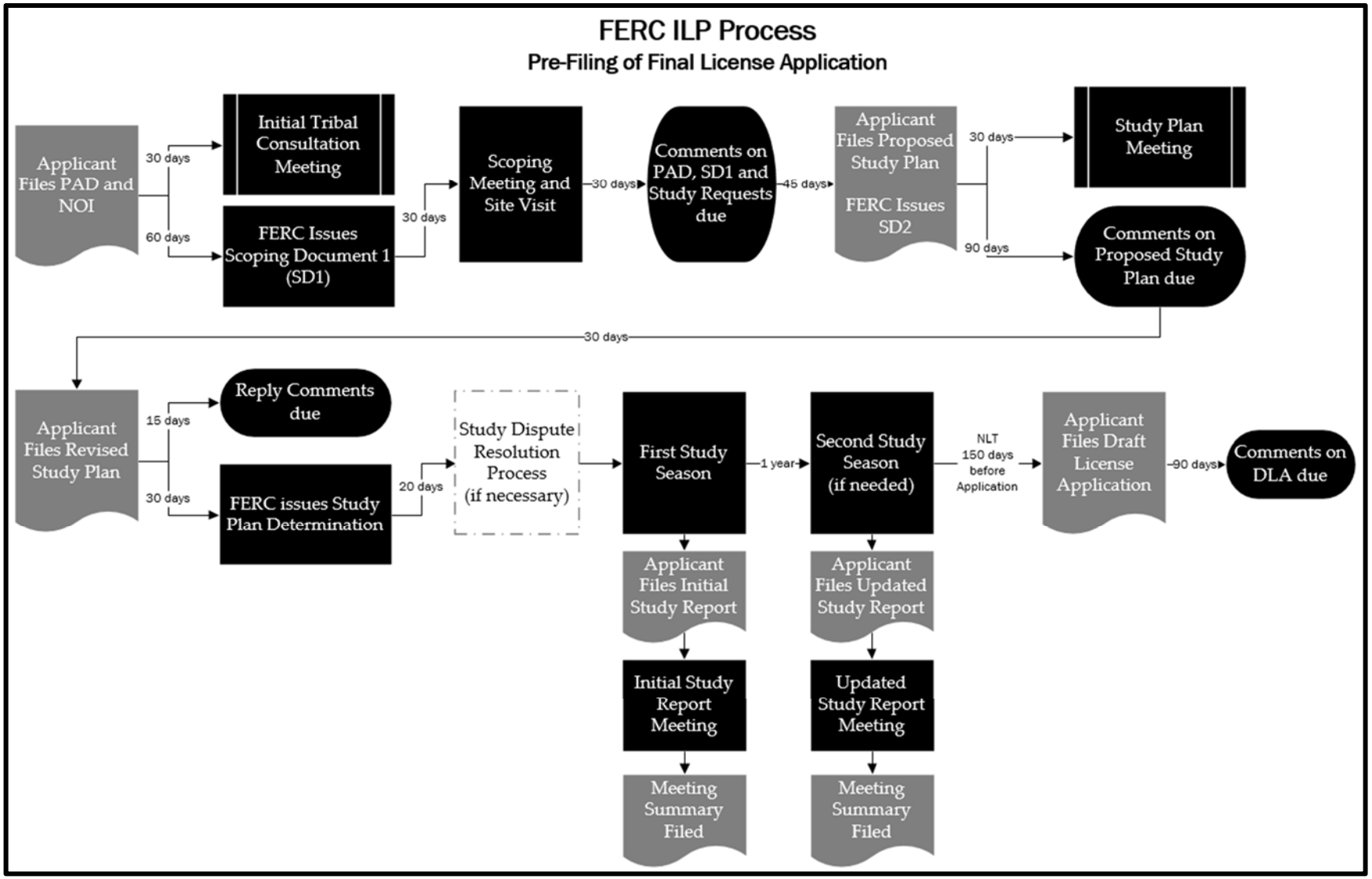
2019. The questionnaire introduced the project's relicensing process and asked questions pertaining to the organization's interest in participating in the process, if the organization knows of any existing, relevant and reasonably available information or literature that describes the project's existing or historical environment, and if the organization is aware of any specific resource issues at or near the Project. Appendix B provides a copy of the questionnaire as well as a summary of responses PacifiCorp received.

3 PROCESS PLAN, SCHEDULE AND PROTOCOLS

3.1 Process Plan and Schedule

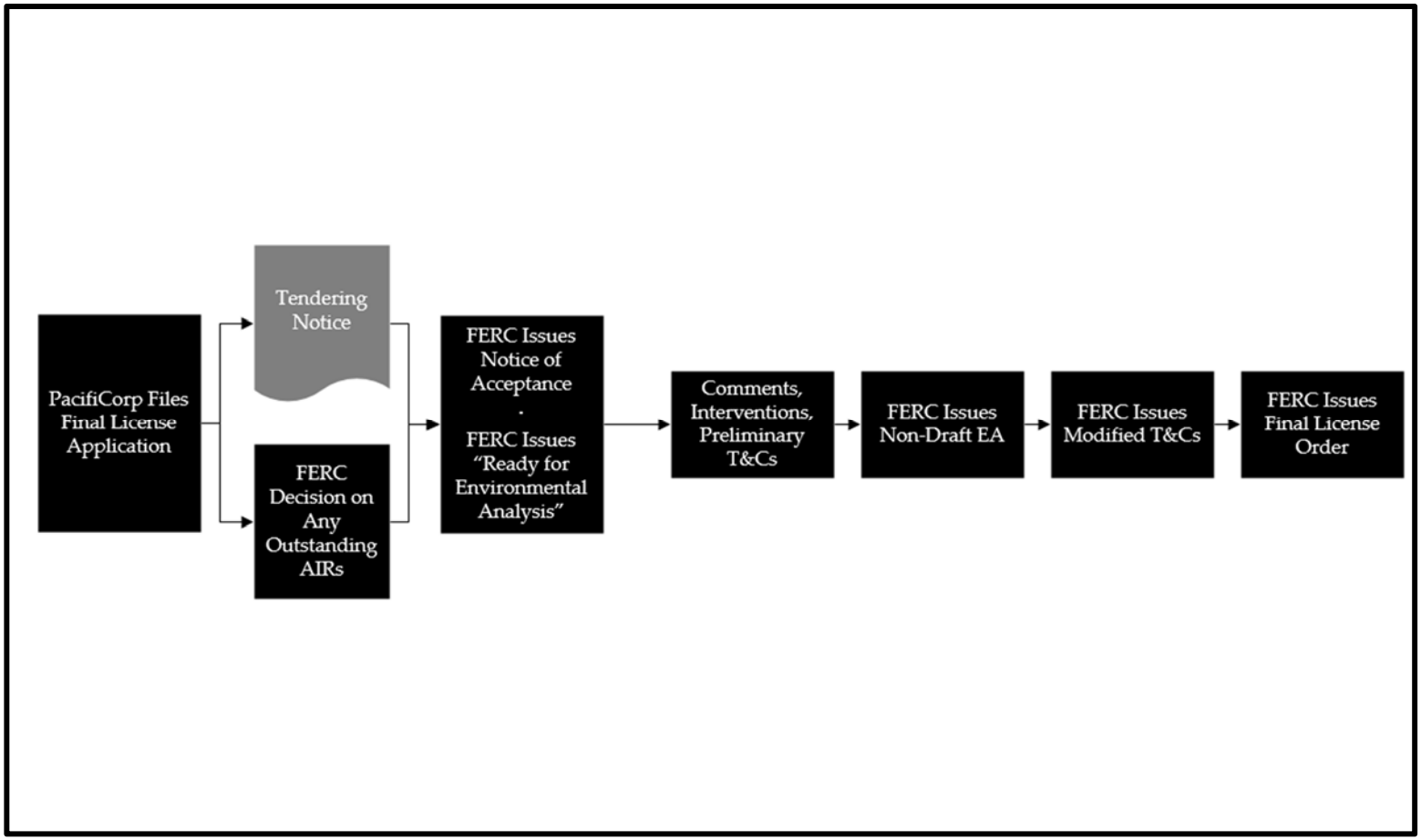
The process plan and schedule outline actions by FERC, PacifiCorp and other participants in the relicensing process through the filing of the Final License Application (FLA). The following diagrams prepared by FERC (Figure 3-1 and Figure 3-2) illustrate the ILP pursuant to 18 CFR § 5. The proposed relicensing process plan and schedule for the Cutler Project was developed consistent with the regulations provided in Title 18 CFR Part 5 - Integrated License Application Process. PacifiCorp's proposed schedule (Table 3-1) provides each of the major relicensing activities in the ILP, the associated CFR reference, the party responsible for implementation of the activity, and the deadline for each activity.

The proposed process schedule is based on PacifiCorp filing the Cutler Project NOI and PAD on approximately March 29, 2019, and prior to the statutory deadline of March 31, 2019. The deadlines presented in the schedule identify the specific date that each activity must be completed to comply with federal regulations; however, relicensing activities may be completed earlier than the deadline. The ILP regulations provide flexibility regarding the timing when some relicensing activities must be completed. Additionally, the initiation of some activities is dependent upon the completion date of other activities. As necessary, PacifiCorp will revise the process plan and schedule for the Cutler Project and post the updated version on the Cutler relicensing website (http://www.pacificorp.com/es/hydro/hl/cutler.html).



Source: FERC 2018a

FIGURE 3-1 INTEGRATED LICENSING PROCESS FLOW CHART



Source: FERC 2018b

FIGURE 3-2 INTEGRATED LICENSING PROCESS FLOW CHART 2 YEARS PRIOR TO EXPIRATION

TABLE 3-1 TIMELINE OF PROCESS PLAN AND SCHEDULE

RESPONSIBLE PARTY	PRE-FILING MILESTONE	DATE	FERC REGULATION
PacifiCorp	Issue Public Notice for NOI/PAD	3/29/19	5.3(d)(2)
PacifiCorp	File NOI/PAD	3/29/19	5.5, 5.6
FERC	Tribal Consultation Meeting	4/28/19[2]	5.7
FERC	Issue Notice of Commencement of Proceeding and SD1	5/28/19	5.8(a)(c)
FERC	Scoping Meetings and Project Site Visit	6/26/19	5.8(b)(viii)
Stakeholders	File Comments on PAD/SD1 and Study Requests	7/26/19[2]	5.9(a)(b)
FERC	Issue SD2 (if necessary)	9/10/19	5.10
PacifiCorp	File Proposed Study Plan	9/10/19	5.11(a)
Stakeholders	Proposed Study Plan Meeting	10/9/19	5.11(e)
Stakeholders	File Comments on Proposed Study Plan	12/9/19	5.12
PacifiCorp	File Revised Study Plan	1/8/20	5.13(a)
Stakeholders	File Comments on Revised Study Plan	1/23/20	5.13(b)
FERC	Issue Director's Study Plan Determination	2/7/20	5.13(c)
Mandatory Conditioning Agencies	File Any Study Disputes	2/27/20[1]	5.14(a)
Dispute Panel	Select Third Dispute Resolution Panel Member	3/3/20[1]	5.14(d)
Dispute Panel	Convene Dispute Resolution Panel	3/13/20[1]	5.14(d)(3)
PacifiCorp	File Comments on Study Disputes	3/23/20[1]	5.14(i)
Dispute Panel	Dispute Resolution Panel Technical Conference	4/2/20[1]	5.14(j)
Dispute Panel	Issue Dispute Resolution Panel Findings	4/17/20[1]	5.14(k)
FERC	Issue Director's Study Dispute Determination	5/7/20[1]	5.14(l)
PacifiCorp	First Study Season and Study Review	2/7/20 – 1/7/21	5.15(a)
PacifiCorp	File Initial Study Report	2/5/21[2]	5.15(c)(1)
Stakeholders	Initial Study Report Meeting	2/19/21[2]	5.15(c)(2)
PacifiCorp	File Initial Study Report Meeting Summary	3/8/21	5.15(c)(3)
PacifiCorp	Second Study Season and Study Review	2/6/21 – 1/7/22	5.15(a)
PacifiCorp	File Updated Study Report	2/4/22[2]	5.15(c)(1)
Stakeholders	Updated Study Report Meeting	2/21/22	5.15(c)(2)
PacifiCorp	File Updated Study Report Meeting Summary	3/8/22	5.15(c)(3)
PacifiCorp	File Draft License Application	11/2/21	5.16(a)-(c)
Stakeholders	File Comments on Draft License Application	1/31/22	5.16(e)
PacifiCorp	File Final License Application	3/31/22	5.17, 5.18
FERC	Issue Tending Notice and Decision on AIRs	04/14/2022	5.19
FERC	Issue Notice of Acceptance and Ready for EA	06/13/2022	5.22
Stakeholders	Comments/Interventions and Preliminary T&Cs	08/12/2022	5.23
FERC	Issue Non-Draft EA	2/8/2023	5.24
FERC	Issue Modified T&Cs	5/9/23 – 5/24/23	5.24
FERC	Issue Final License Order	8/22/2023	2.25

1 Activities in shaded areas are not necessary if there are no study disputes.
2 If the due date falls on a weekend or holiday, the deadline has been backdated to the prior Friday.
3 Early filings or issuances will not result in changes to these deadlines.
4 The schedule is subject to change throughout the relicensing proceeding. For updated schedules, refer to http://www.pacificorp.com/es/hydro/hl/cutler.html.

3.2 Proposed Communications Protocols

Effective communication is essential for a timely and cost-effective relicensing process. PacifiCorp's goal is to maintain open communication during the licensing process and to provide public access to relevant project licensing information. PacifiCorp anticipates that the primary means of communication will be meetings, documents, email and telephone. The communication protocols outlined below will provide guidelines for participation in the relicensing process by PacifiCorp and interested parties, including governmental agencies, NGOs, Native American tribes and members of the public. PacifiCorp will maintain documentation of all electronic correspondence as part of formal agency consultation proceedings.

Relicensing documents can be downloaded from the project's relicensing website at: http://www.pacificorp.com/es/hydro/hl/cutler.html. All requests for hard copies of relicensing documents should be sent to the Cutler correspondence electronic inbox at cutlerlicense@gmail.com, and should clearly indicate the document name, publication date and FERC Project No. 2420. A reproduction charge and postage cost may be assessed for large quantities of hard copies requested.

Additionally, relicensing documents are available to the public through the FERC eLibrary, a records information system on the internet that contains documents submitted to and issued by FERC. The eLibrary can be accessed through FERC's homepage, at http://www.ferc.gov, or directly at https://elibrary.ferc.gov/idmws/search/fercgensearch.asp. Documents filed with FERC as part of the project licensing process are available for viewing and printing via eLibrary by searching under the project's docket number, P-2420. Interested parties can subscribe to Docket P-2420 for the Project under eSubscription on FERC's website to receive notifications of all FERC issuances and filings by all parties by e-mail. In addition, all materials filed with or issued by FERC will be available for review and copying at the FERC offices in Washington, DC:

Federal Energy Regulatory Commission
Public Reference Room, Room 2-A
Attn: Secretary
888 First Street, N.E.
Washington, D.C. 20426

public.referenceroom@ferc.gov
Telephone: 202-502-8371 (Local)
Toll-free: 1-866-208-3676

3.2.1 How to Participate in FERC Relicensing Process

Anyone with internet access can open the public documents in eLibrary and a description of non-public records (no registration or login in required). eLibrary contains most of the FERC's documents, including microfilm records from 1981 and forward. Most of the records after 1989 are in PDF format, which can be opened, copied and downloaded to a computer. Documents available only in microfilm form can also be requested from the Public Reference Room (contact information above). There are multiple methods to engage in FERC's public involvement process during a relicensing.

- **eComment:** eCommenting allows the public to submit comments up to 6,000 characters in length. eCommenting does not require a subscription to FERC's website, or intervention to a specific docket. Users fill in their name and e-mail, and receive immediate confirmation of their submission.
- **eSubscription:** This method simplifies keeping track of multiple proceedings in eLibrary. Users will use the eRegistration online system to create a username and password so they can login in and choose which dockets they would like to follow. By eSubscribing, users receive a notification whenever a document is added to eLibrary for the subscribed docket. Additionally, the user will be sent an e-mail notification with a link that allows them to access the document.
- **Intervention:** When FERC is ready for intervenors to become a part of the relicensing process (typically after the filing of the Final License Application), a notice will be issued by FERC requesting intervenors. Intervening means that the user becomes a legal party of the proceeding. Parties that intervene incur a legal obligation to serve documents on other parties and will be served copies of all subsequent filing by other parties. The FERC uses the eService system to serve issuances and decision to participants.

More information about the FERC public involvement process can be found at https://www.ferc.gov/docs-filing/elec-info-guide.pdf?csrt=11990913533746702879 or by visiting the FERC general website at https://www.ferc.gov/docs-filing/esubscription.asp.

For documents issued by FERC, PacifiCorp anticipates that FERC will distribute these documents in accordance with FERC's protocols. FERC will use the FERC mailing list for such distributions, and those documents will be posted and publicly available in the eLibrary on FERC's website.

3.3 Telephone

PacifiCorp anticipates that telephone calls among interested parties and licensing participants will be treated informally, with no specific documentation unless specifically agreed upon in the discussion or as part of formal agency consultation proceedings.

PacifiCorp anticipates that FERC will distribute to the FERC project mailing list, summaries of any informal decisional telephone calls in which it participates.

3.4 Meetings

PacifiCorp will work with all interested parties to develop meeting schedules that include practical locations and times to accommodate as many participants as practicable. In general, PacifiCorp will schedule meetings between the hours of 8:00 a.m. and 5:00 p.m., although some meetings specifically designed for public involvement will also have an evening time scheduled. PacifiCorp will make every effort to begin and end meetings on time; meetings will be located in or near Logan, UT.

When timing allows, PacifiCorp will make a good faith effort to notify all interested parties at least 2 weeks prior to the next planned public meeting. At that time, PacifiCorp will provide a meeting agenda via email. PacifiCorp's preferred method of contact with interested parties will be via email. PacifiCorp will also post on its website or distribute as requested any documents or other information that will be the subject of meeting discussions, as well as meeting minutes and summaries as appropriate.

3.5 Scoping Meeting and Site Visit

As set forth in the ILP regulations, FERC will issue the SD1 within 60 days of the filing date of the NOI and PAD. In addition, pursuant to 18 CFR § 5.8(b)(3)(viii), FERC will provide public notice and schedule a public scoping meeting and a Project site visit, to be held within 30 days of issuing SD1. FERC will notice the dates, times and location of the scoping meetings and publish that information in local papers after the filing the NOI and PAD.

PacifiCorp hosted a Stakeholder Relicensing Workshop on February 13, 2019, prior to issuing the NOI and PAD. Materials presented at the workshop are available on the relicensing website provided above, and appended to this document in Appendix B.

3.6 Mailing Lists

FERC maintains a mailing list of interested parties for the Project. PacifiCorp anticipates that once the relicensing proceeding begins, PacifiCorp's relicensing mailing list and FERC's mailing list will be consolidated into one official list, the service list. PacifiCorp will maintain a list of all interested stakeholders. After PacifiCorp files the FLA, FERC will establish and maintain an official service list (Table 3-2) for parties who formally intervene in the relicensing proceeding. A Certificate of Service must be included with the document filed with FERC.

TABLE 3-2 CUTLER PROJECT MAILING LISTS

ENTITY	TYPE	DESCRIPTION
PacifiCorp	Project No. 2420 Interested Parties Relicensing Mailing List	A list of interested parties prepared by PacifiCorp in anticipation of project relicensing proceeding.
FERC	Project No. 2420 Mailing List	A list of interested parties prepared and maintained by FERC throughout the project relicensing proceeding.
FERC	Project No. 2420 Service List	A list of parties that have formally intervened in the relicensing proceeding, prepared and maintained by FERC after it accepts the license application.

3.7 Federal Energy Regulatory Commission Communication

FERC has presently assigned Ms. Khatoon Melick to serve as an advisor during the project's ILP proceeding. Ms. Melick will participate in relicensing meetings and provide guidance during the relicensing process in accordance with rules and regulations for the ILP. For questions related to FERC communications, please contact Ms. Melick at 202-502-8433 or email at khatoon.melick@ferc.gov.

3.8 Restricted Documents

Certain project-related documents known as Critical Energy Infrastructure Information (CEII) are restricted from public viewing in accordance with FERC regulation 18 CFR 388.113. CEII documents related to the design and safety of dams and its appurtenant facilities, as well as information that is necessary to protect national security and public safety are restricted. Anyone seeking CEII information from FERC must file a CEII request. FERC's website at www.ferc.gov/help/how-to/file-ceii.asp contains additional details related to CEII.

Information related to protecting sensitive archaeological or other culturally important information is also restricted under Section 106[2] of the National Historic Preservation Act. In addition, information related to threatened and endangered species are protected under Section 7 of the Endangered Species Act (ESA). Anyone seeking this information from FERC must file a Freedom of Information Act (FOIA) request. Instructions for FOIA are available on FERC's website at www.ferc.gov/legal/ceii-foia/foia.asp.

3.9 Study Requests

Throughout the relicensing process, PacifiCorp will work with interested parties and relicensing participants to identify areas where there is little or no information relevant to issues of potential concern for project effects to the human and natural environments. Stakeholders may identify additional studies for consideration. As specified by CFR 18 § 5.9(b), any study request must:

- Describe the goals and objectives of each study proposal and the information to be obtained.
- If applicable, explain the relevant resource management goals of the agencies or Native American tribes with jurisdiction over the resource to be studied.
- If the requestor is not a resource agency, explain any relevant public interest considerations regarding the proposed study.
- Describe existing information concerning the subject of the study proposal, and the need for additional information.
- Explain any nexus between project operations and effects (direct, indirect and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.
- Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

[2] The National Historic Preservation Act of 1966 (originally part of Title 16) was repealed and re-codified in Title 54 by Congress (http://www.achp.gov/nhpa.pdf). In legal terms, Section 106 is 54 U.S.C. 306108 (in long-hand, Title 54 of the United States Code, Subtitle III – National Preservation Programs, Division A – Historic Preservation, Subdivision 5 – Federal Agency Historic Preservation Responsibilities, Chapter 3061, Subchapter I – In General, Section 306108 – Effect of undertaking on historic property).

- Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.
- Describe any available cost-share funds or in-kind services that the sponsor of the request may contribute towards the study effort.

Study requests must be in MS Word or PDF format and be uploaded to the FERC eLibrary with a copy to: Eve Davies (see Section 1.3 of this PAD for contact information).

4 GENERAL DESCRIPTION OF RIVER BASIN

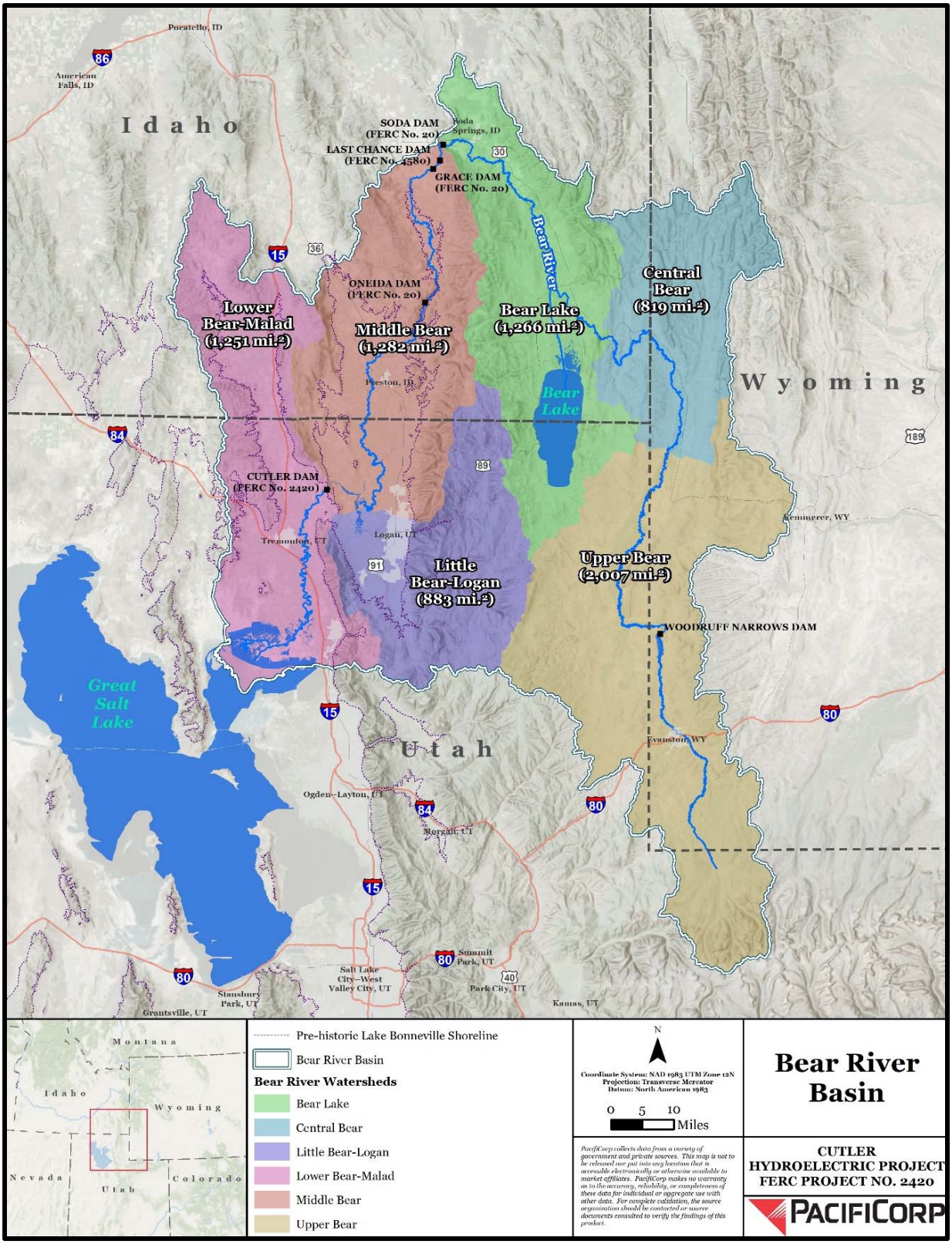
4.1 Overview

The Bear River is a 350-mile-long river that forms a large U-shape around the northern end of the Wasatch Mountain Range spanning across southwestern Wyoming, southeastern Idaho and northeastern Utah (Hopkins 1997). 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 (USGS 2018a). The Bear River is the largest tributary, both in length and volume, to the Great Salt Lake. The tributary drains mountainous areas and farm lands northeast of the Great Salt Lake and southeast of the Snake River Plains, forming an approximately 7,500-square-mile basin (Hopkins 1997) (Figure 4-1).

The Bear River is identified as the longest river in North America that does not reach the ocean (USGS 2006). From the Uinta Mountains, the Bear River flows north towards Wyoming, through the town of Evanston, then meanders along the Wyoming-Utah state border, until it turns west into Idaho, past the city of Montpelier where it meets with the Bear Lake Outlet Canal that flows from Bear Lake. At the north end of the Wasatch Range near the city of Soda Springs, Idaho, the Bear River makes a U-turn and heads south past the towns of Cornish and Newton. The Bear River then enters Utah and flows through the Cutler Project. After passing Cutler Dam the river flows through the Bear River Migratory Bird Refuge and ends at the Great Salt Lake. Historically, the Bear River was part of the Snake River system, but lava flows north of Soda Springs diverted the Bear River into what was historical Lake Bonneville, a prehistoric pluvial lake that covered much of present-day Utah and extended into Idaho and Nevada (Utah Geological Survey 2018).

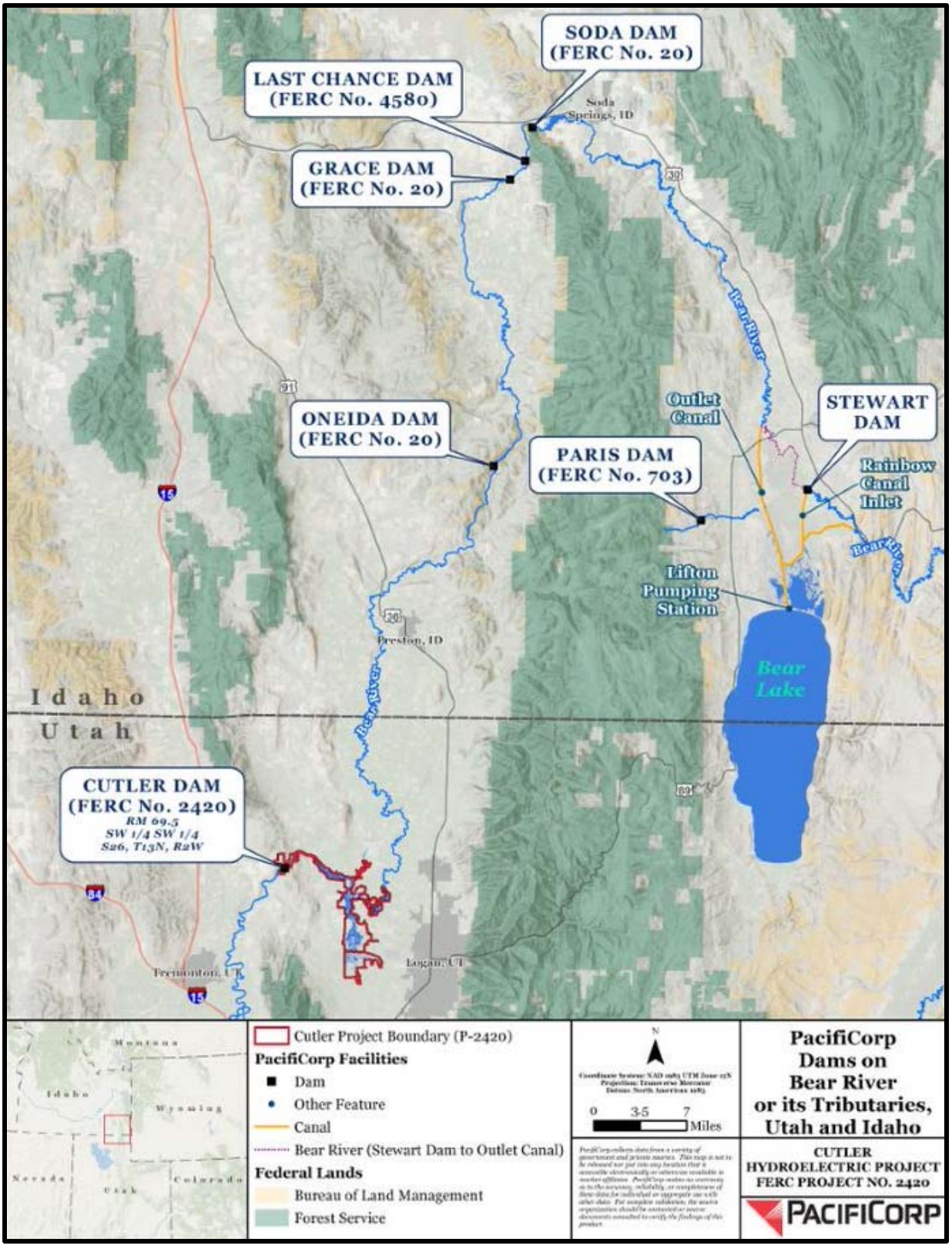
The hydrology of Bear River is heavily influenced by dams and diversions that are used for agricultural and hydroelectric purposes. On the mainstem Bear River in the Bear River basin downstream of Bear Lake and upstream of Cutler, there are three (3) hydroelectric plants and five (5) dams. The Soda (FERC No. 20), Grace (FERC No. 20), and Oneida (FERC No. 20) developments were all licensed together 16 years ago as the Bear River Project (FERC No. 20). Additionally, Last Chance (FERC No. 4580), Cutler (FERC No. 2420), Paris (FERC No. 703), and the Lifton Pump Station at Bear Lake, are all owned by PacifiCorp and operated in a

coordinated fashion (Figure 4-2). The Project is heavily influenced by the nearby agricultural land; there are an estimated additional 450 irrigation companies that own and operate other water withdrawal and delivery systems within the Bear River watershed (SWCA 2010).



Source: PacifiCorp 2018a

FIGURE 4-1 BEAR RIVER BASIN AND SUB-BASINS, UTAH, IDAHO AND WYOMING



Source: PacifiCorp 2018a

FIGURE 4-2 PACIFICORP DAMS ON BEAR RIVER OR ITS TRIBUTARIES, UTAH AND IDAHO

4.2 Major Land Uses

The Cutler Project resides in the Middle Bear – Little Bear-Logan Watershed (Figure 4-1), which is entirely in the southern portion of Cache County (Utah DNR 2018) excluding the western and narrowest part of Cutler Canyon and Cutler Dam, which are located just west of the Cache County line in Box Elder County. These two (2) sections of the watershed drain approximately 2,165 square miles. The top five (5) land cover types in the watershed include shrubland, pasture and hay, small grains, grasslands and herbaceous plants, and evergreen forest. Land cover types that dominate the watershed are depicted in Figure 6-18.

Under Utah Administrative Code Rule R652-2-100, the Equal Footing Doctrine serves as the basis for the state of Utah's claim to sovereign lands (also known as submerged lands). Sovereign lands are defined as "those lands lying below the ordinary high-water mark of navigable bodies of water at the date of statehood and owned by the state by virtue of its sovereignty" (Utah DNR 2018). The Utah State Legislature declared the Division of Forestry, Fire and State Lands (DFFSL) as the executive authority for the management of these lands.

The state of Utah manages portions of the Bear River, and the Utah portion of Bear Lake as sovereign lands. Specifically, the state of Utah claims fee title ownership to the summer channel[3] of the Bear River from the Utah/Idaho border to the Amalga Bridge (Amalga, Utah), and from top-of-bank to top-of-bank for remaining portions of the Bear River located downstream of the Amalga Bridge to the Bear River Migratory Bird Refuge (USFWS 1997; USFWS 2004). The DFFSL is "required to ensure the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality" (Utah DNR 2018).

The Middle Bear - Little Bear-Logan Watershed is dominated by private landownership as shown in Table 4-1.

[3] "Summer channel" refers to the bank-to-bank, *below* the ordinary high-water mark.

TABLE 4-1 ESTIMATED MIDDLE BEAR-LOGAN LAND OWNERSHIP IN BEAR BASIN BY ENTITY IN UTAH

LAND OWNERSHIP	MI^2	PERCENT
Private (including PacifiCorp land)	434	49%
U.S. Forest Service	396	45%
State	50	6%
Water	3	0.4%

Source: USU 2007

The 2012 Census of Agriculture estimated that there were approximately 268,511 acres of farms or ranches in Cache County with an average farm/ranch size of 221 acres (USDA 2014). Cache County is one of the highest agricultural production regions in Utah and leads the state in barley production (USDA 2014). Additionally, Cache County has the second largest inventory of cattle and calves, and second largest number of milk cows in the state of Utah (USDA 2014). Only 1 percent of land ownership in Cache County is water-covered.

The 2012 Census of Agriculture estimated that there were 1,170,736 acres of farms and ranches in Box Elder County with an average size farm/ranch size of 948 acres (USDA 2014). Box Elder County has 33 percent federal landownership, which is primarily under the jurisdiction of the Bureau of Land Management (BLM). When compared to Cache County, Box Elder has much higher water coverage of 16 percent (USDA 2014). Box Elder County is the top producing region for winter wheat, spring wheat, oats and corn in Utah. Box Elder County also has the highest inventory of cattle, calves and beef cattle (USDA 2014). Approximately 60 percent of the irrigation water that is used in Box Elder County is provided by the Bear River Canal System, originating at Cutler Dam (USDA 2014). Table 4-1 outlines the land ownership for the Middle Bear – Logan Watershed, which includes portions of Box Elder and Cache counties, which are not differentiated in the table.

4.3 Major Water Uses

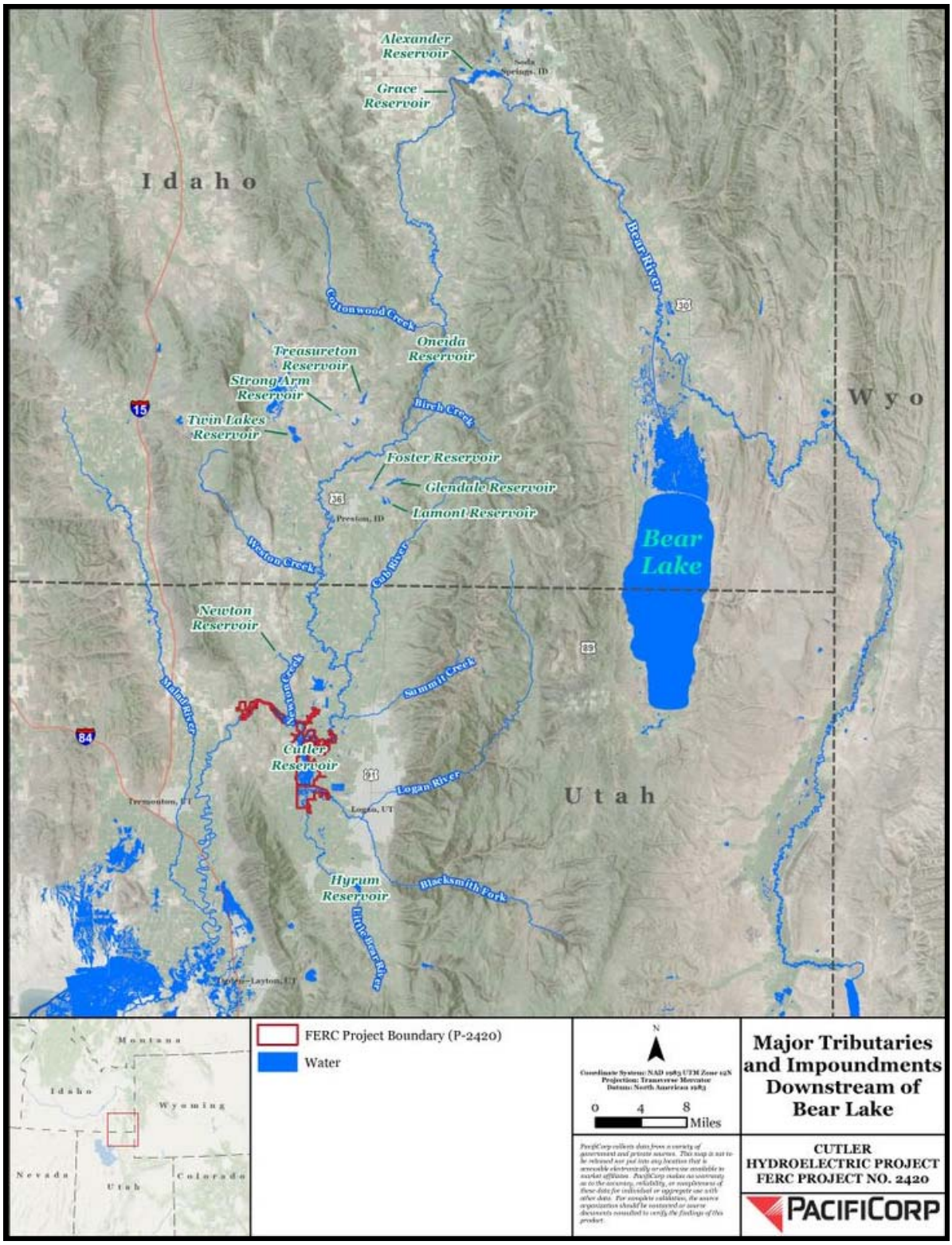
The amount of water available in the Bear River and its tributaries varies seasonally and annually. Snowmelt that originates on the north slope of the Uinta Mountains in the High Uintas Wilderness Area (and is the source of the Bear River) results in high flows in the early spring and is responsible for the base flows that maintain the river naturally throughout the rest of year (Utah DNR 2017a). However, these flows are often altered due to irrigation diversions, and can

be modified based on dam releases and storage in Bear Lake (Utah DNR 2017a). When water is withdrawn from the Bear River system, most of the water is used within the states of Utah and Idaho, with the least amount being used by the state of Wyoming.

Major water uses in the Bear River basin (both consumptive and non-consumptive) include agriculture, irrigation, municipal and industrial uses, power generation, and recreation (Utah DNR 2017a). In 1958, the Bear River Commission was formed to allocate water use throughout the basin. Fifty-eight percent of the Bear River basin's total water supply is consumed by vegetation and natural systems (2,152,715 acre-feet) (Utah DNR 2017a). Another 11.6 percent (430,793 acre-feet) is used for agricultural purposes, 0.7 percent (25,323 acre-feet) is used for municipal and industrial purposes, and 7.3 percent (271,878 acre-feet) is lost in the basin's open areas and evaporation in the Bear River Migratory Bird Refuge (Utah DNR 2017a). Approximately 23 percent (845,863-acre-feet) of the water flows into the Great Salt Lake annually (2017). The Bear River's average annual flow into the Great Salt Lake is approximately 1.9 billion cubic yards (USU 2007). In the next 20 to 30 years, it is anticipated that the Bear River basin will be developed further to accommodate growing population needs (USU 2007).

4.4 Project Drainage Basin's Tributary Streams

Bear River flows are supplied by several tributaries upstream of Cutler Reservoir in Utah including the Cub River, Logan River, Blacksmith Fork River, and the Little Bear River. The Malad River is the first major tributary that enters the Bear River downstream of Cutler Dam. Other smaller tributaries to the Bear River include Cottonwood Creek, Weston Creek, Newton Creek, Summit Creek and Birch Creek (Figure 4-3). Large reservoirs within the basin include Hyrum and Newton reservoirs in Utah, and Foster, Glendale, Lamont, Strong Arm, Twin Lakes, Treasureton, Grace, Alexander (the reservoir formed by Soda Dam) and Oneida reservoirs in Idaho (USU 2007) (Figure 4-3).



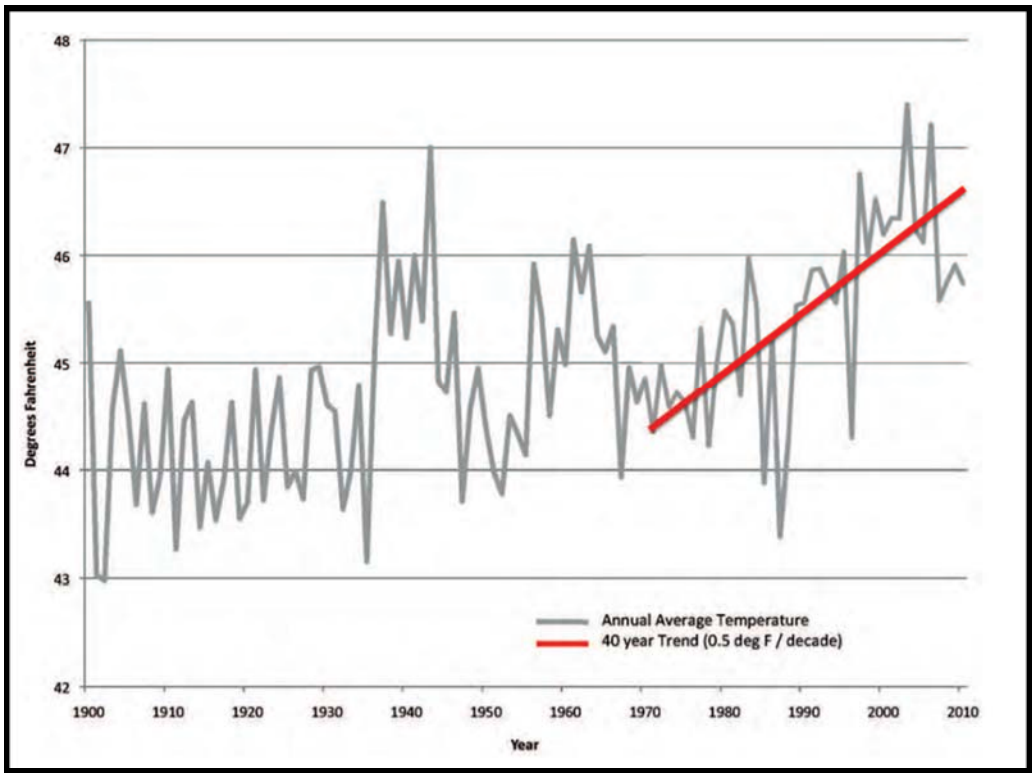
Source: PacifiCorp 2018a

FIGURE 4-3 MAJOR TRIBUTARIES AND IMPOUNDMENTS DOWNSTREAM OF BEAR LAKE

4.5 Climate

Precipitation in the Bear River basin primarily falls at the higher elevations in the form of snow, and ranges from 11 inches to 57 inches of precipitation per year, with an average of 22 inches per year (USU 2007). During the summer months, temperatures in the basin can range between 80 and 90 degrees Fahrenheit (F), occurring approximately 53 days each year with July and August being the hottest months (USFWS 2004; USU 2007). In the winter, average temperatures can range from -1 to 16 degrees F, averaging 128 days at or below freezing (USFWS 2004; USU 2007). Peter Sinks, a natural sinkhole in northern Utah located east of Logan in the Bear River Mountains, consistently has some of the lowest recorded temperatures in the lower 48 states, dropping as low as -69.7 degrees F in 1985 (USU 2019). Daily and cumulative snowpack information available on the Natural Resources Conservation Service's website states that Median Peak Snowpack in the Bear River basin from 1981 to 2010 was 25 inches (NRCS 2018).

Models predict that between 2040 and 2060, the Bear River basin's climate could be 5 to 6 degrees F warmer, have a 5 to 13 percent decrease in annual runoff, 10 to 15 percent lower peak accumulation of snowpack, earlier spring melt by 2 to 4 weeks, and increased precipitation in the winter months (Degiorgio et al. 2010). Figure 4-4 is a graph of the trend of increasing temperatures in the Bear River basin (Idaho, Utah and Wyoming) over the last 100 years (USFWS 1997). The red line represents a 40-year trend of 0.5 degrees warmer per decade.



Source: USFWS 1997

FIGURE 4-4 AVERAGE ANNUAL TEMPERATURE TRENDS IN BEAR RIVER BASIN

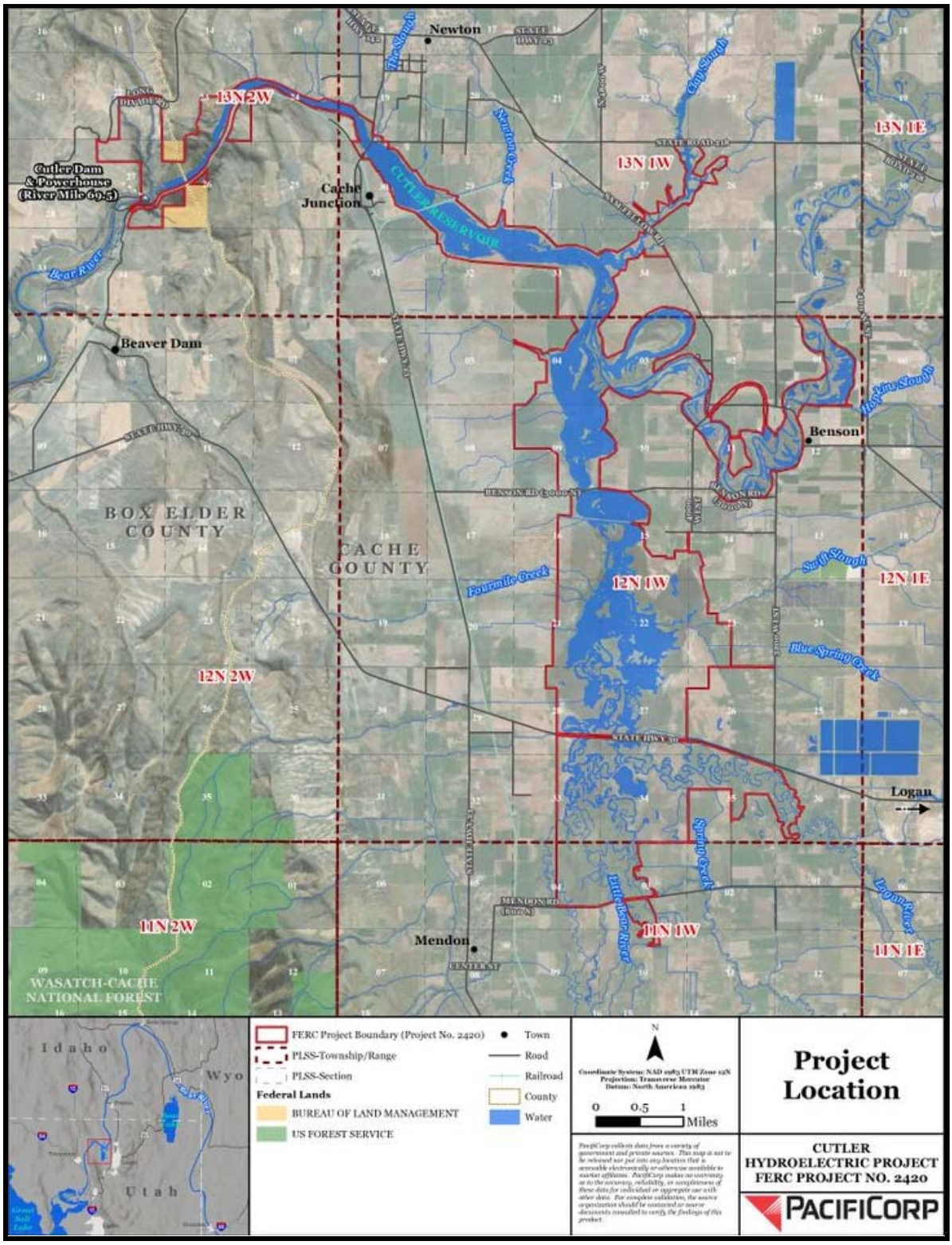
5 PROJECT LOCATION, FACILITIES AND OPERATIONS

5.1 Existing Project Facilities

5.1.1 Project Location

The Project is located on the Bear River in Cache Valley, Utah, between the Wasatch and Wellsville mountains. While the Cutler dam is located in Box Elder County, most of the reservoir lies within Cache County (Figure 5-1). FERC Exhibit G boundary maps are provided as Appendix C in Volume II. The reservoir is formed at the confluence of the Bear, Logan, Spring Creek, and Little Bear rivers. In addition to the Cutler Project, PacifiCorp owns and operates four (4) other hydroelectric developments on the Bear River; all of which are located further north and upriver, in Idaho. These are the Bear River Project (FERC No. 20) which includes the 14.7-MW Soda development, the 33-MW Grace development, and the 30-MW Oneida development (Figure 5-1), and the 1.7-MW Last Chance Project (FERC No. 4580) which is a single development is operated under its own license. The Last Chance Development was built by the Last Chance Canal Company and subsequently acquired by PacifiCorp.

Additionally, there are seven (7) hydroelectric developments located on the Logan River, Blacksmith Fork, Mink Creek and Paris Creek, all Bear River tributaries. PacifiCorp owns the hydroelectric development on Paris Creek.



Source: PacifiCorp 2018

FIGURE 5-1 CUTLER HYDROELECTRIC PROJECT LOCATION

5.2 Project Overview

The Project has been in operation since 1927, although an earlier predecessor dam, the Wheelon Dam, created a smaller reservoir beginning around 1896. Excavation on the dam began in September of 1889 at the site of the old power plant at Wheelon. A diversion dam was built in the Bear River just east of the Cache divide. The Wheelon dam was 375 feet long, 18 feet deep and 100 feet thick (Box Elder County 2007). The Wheelon Dam was inundated by the construction and operation of the larger Cutler Dam in 1927, and remains submerged in place approximately 1 mile upstream of the Project dam.

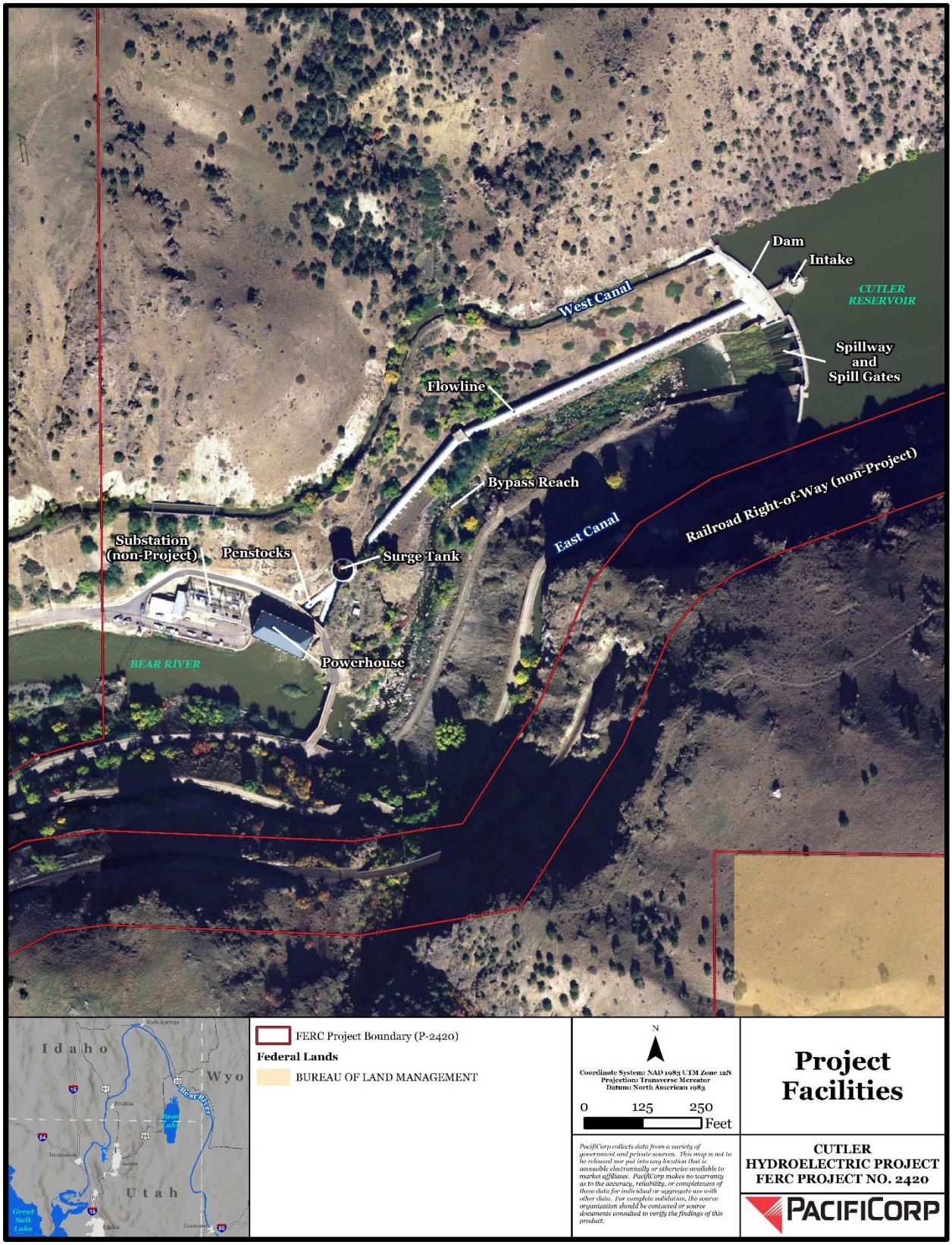
PacifiCorp operates the Project by diverting flows from the Bear River. Although the Project is typically operated in a run-of-river mode, some of the 13,200-acre-foot (af) storage capability of the reservoir can be utilized for minor load-following purposes when sufficient inflows are available. Based on the 30-year average from 1988 to 2017, the Project produces approximately 72.5 gigawatt hours (GWh) of electric energy annually serving residential and commercial customers. The Project Boundary[4] covers approximately 9,191 acres of open water and associated wetlands and uplands surrounding Cutler Reservoir, including the areas of confluence with its major tributaries.

The Project contains the following existing features (Figure 5-2):

- A reservoir with a surface area of approximately 5,459 acres, with storage of approximately 13,200-af at a normal maximum operating elevation of 4,407.5 feet, mean sea level (msl) U.S. Geological Survey (USGS)[5];
- 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. It is 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 sluiceway 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 (one located on either abutment of the dam, each controlled by 8-foot by 8-foot gates, two on the west intake and two on the east intake – one of which is not functional and as the capacity is not needed, there are no plans to repair it);

[4] Project boundary definition can be found in the Definitions of Terms section of this PAD
[5] All elevations in this PAD refer to USGS mean sea level datum (National Geodetic Vertical Datum or NGVD).

- A 1,157-foot-long by 18-foot-diameter steel flowline;
- An 81-foot-high by 45-foot-diameter Johnson Differential surge tank;
- Two 118-foot-long by 14-foot-diameter steel penstocks that bifurcate from the surge tank into the powerhouse;
- A brick 60-foot by 123-foot powerhouse;
- Two General Electric 15,000 kilowatt (kW), 6,900 volt (V), 1,570 ampere (Amp), 0.8 Power Factor generating units with a total installed capacity of 30 MW, and appurtenant facilities;
- Two I.P. Morris Vertical Francis turbines:
    - Unit 1 (2008 efficiency upgrade): 23,602 horsepower (hp), 124-feet static head, and 150 revolutions per minute (rpm).
    - Unit 2 (2007 efficiency upgrade): 21,180 hp, 124-feet status head, and 150 rpm.
- Two Westinghouse Type R-4 Vacuum Circuit Breakers with 15,000 V, 3,000 Amps, and 25,000 Amps fault current;
- Two Westinghouse 3-Phase Step-Up Transformers:
    - No. 1 138kV-46kV-6.6kV 50MVA Generator Step-up Transformer (not part of Project; associated with transmission);
    - No. 2 46kV-7.2kV 20MVA Generator Step-up Transformer (part of Project);
- Two accumulator tanks located in the powerhouse;
- One air compressor located in the powerhouse; and
- A 115-kw emergency generator installed next to the surge tank.



Source: PacifiCorp 2018

FIGURE 5-2 CUTLER HYDROELECTRIC PROJECT FACILITIES DETAIL

5.2.1 Gravity Arch Dam

Designed in 1924 with construction completed in 1927, the concrete gravity-arch dam has a height of approximately 109-feet above the riverbed and a maximum thickness at the base of 50 feet. The overall length along the centerline of the crest is 545 feet including two (2) irrigation canal intakes near the top at the abutments. The upstream face of the arch is vertical, except for the corbel in the spillway section of the dam at approximate elevation 4,372.5 feet. The downstream face of the arch has a slope ratio of 5 and 3/8 horizontal to 12 vertical. The upper 12 feet of the arch on either side of the spillway is 7-feet-wide at elevation 4,412.0 feet. Decking spans the spillway from pier to pier at elevation 4,413.24 feet.

A 7-foot diameter low-level passage is located near and through the base of the dam, on the right side of the spillway. The low-level passage is controlled by a slide gate installed on the downstream face. The invert of the sluice passage is at elevation 4,312.46 feet. Currently the sluice passage is non-operational due to silt blockage at the passage's entrance.

Source: Kleinschmidt 2018

PHOTO 5-1 CUTLER DAM, PENSTOCK AND SPILL GATES FROM DOWNSTREAM

5.2.2 Spillway Gates and Apron

The gated overflow-spillway located in the center portion of the arch dam includes four (4) spillway gates, each 30-feet-wide by 14-feet-high. The gates are operated with a traveling-carriage-type electric chain hoist. Five (5) concrete piers divide the spillway bays that support the spillway gates and bridge decking. The centerline of the spillway gate trunnion pins is at elevation 4401.5 feet. The top of the spillway gates in a closed position is elevation 4408.5 feet. Normal maximum pool elevation is 4407.5 feet and the ogee spillway crest elevation of 4394.5 feet. The capacity of the spillway at reservoir elevation of 4407.5 feet is 21,000 cubic feet per second (cfs).

5.2.3 Irrigation Canal Intakes

Two (2) irrigation canal intakes are included in the original dam construction (one located on either abutment of the dam). Each intake is controlled by 8-foot by 8-foot gates, two (2) on the west intake and two (2) on the east intake. One of the east intake gates is not in operation and the capacity is not needed to supply water to the canal.

5.2.4 Flowline Intake

The flowline intake is a concrete tower located in the reservoir approximately 60 feet upstream from the dam. The intake is equipped with trash racks and a cylindrical gate that is operated by an electric hoist. A gantry crane mounted on a circular track services the trash racks and cylindrical gate. The invert of the intake gate is at elevation 4379.0 feet with a maximum travel of the cylindrical gate to full open of 17.75 feet. The intake connects to an 18-foot-diameter steel flowline extending through the base of the dam (Photo 5-1).

5.2.5 Flowline, Surge Tank and Penstock

An 18-foot-diameter steel flowline parallels the right bank of the Bear River for approximately 1,157 feet to a point downstream of the surge tank located near the powerhouse. The steel flowline is supported on concrete cradles spaced 16-feet-apart. A concrete thrust block is located approximately 700 feet downstream of the dam and at a bend in the flowline. The 45-foot-diameter surge tank is constructed of riveted steel on a concrete and rock foundation. The riveted steel portion is 81-feet-high. Downstream of the surge tank (Photo 5-2), the flowline bifurcates

into two (2) 14-foot-diameter riveted-steel penstocks which extend into the powerhouse. The penstocks are partially embedded in concrete support cradles.

5.2.6 Powerhouse

The powerhouse is a brick structure 60-feet by 123-feet containing two (2) vertical reaction type turbines rated at 23, 602 hp and 21,180 hp with a static head of 124 feet. Upstream of each turbine has a 13-foot-diameter butterfly turbine isolation valve (TIV). The maximum discharge with both units operating is approximately 3,900 cfs. However, the Project's transmission is limited to 30 MW total, which corresponds to a maximum discharge flow of approximately 3,600 cfs. Two (2) 15,000 kW, 0.8 Power Factor generators are attached to the turbines. The powerhouse contains a circuit breaker for each generator.

Source: Kleinschmidt 2018

PHOTO 5-2 CUTLER HYDROELECTRIC POWERHOUSE, SURGE TANK AND SUBSTATION

5.2.7 Cutler Substation

The substation is the point of interconnection from the powerhouse to the electrical grid system. The substation is located within the Project Boundary, but is not part of the Project, except for the No. 2 generator step-up transformer which is connected to the No. 2 generator. The primary purpose of the No. 1 transformer is for transmission at the voltages from 138 kV to 46 kV. This transformer has an additional or third (tertiary 6.6 kV) winding that is used as a step-up for the No. 1 generator. This transformer would be part of the Cutler Substation with or without the Project.

5.2.8 Emergency Generator

A 140 kW emergency generator is located next to the surge tank. This generator provides backup power to the powerhouse, flowline intake gate, and spillway gates in the event of a loss of normal station service to the dam or powerhouse. Additionally, backup propane-fueled motors are provided to open the flowline intake gate and spillway gates, if necessary.

5.2.9 Project Reservoir

As noted, the Project reservoir (Photo 5-3) has a surface area of approximately 5,459 acres, and storage of approximately 13,200 acre-feet at an elevation of 4,407.5 feet msl. The portion of the reservoir from the dam to where the Bear River enters the reservoir has been heavily impacted by silt deposits. Therefore, the usable storage capacity (the storage accessible to flowline intake structure) is equal to the gross storage capacity of approximately 13,200-acre-feet at elevation 4,407.5 feet msl.

Source: Kleinschmidt 2018

PHOTO 5-3 CUTLER RESERVOIR LOOKING UPSTREAM (EAST) FROM CUTLER DAM ON BEAR RIVER

5.2.10 Project Transmission Facilities

Generators No. 1 and No. 2 are connected to the station step-up transformers by two (2) high voltage, 3-phase underground cables that are approximately 300-feet-long. Generator No. 1 is connected to the transmission grid system through the tertiary winding of a 138/46/6.6 kV transformer located in the plant substation adjacent to the plant. Generator No. 2 is connected to

the transmission grid system through the secondary winding of a 46/7.2 kV transformer located in the adjacent substation. There are no primary transmission lines included in the Project.

Transmission from the Project leaves the Cutler Substation and is distributed to the Wheelon, Bear River, and Honeyville substations.

5.3 Existing Project Operations

The Project is operated in a semi-automatic mode. The generators are started and synchronized to the system automatically by the local hydro operators. Once online, the units are controlled remotely by the Hydro Control Center (HCC) in Ariel, Washington. The HCC controls the load on the generators to follow a generation schedule, while staying within the predetermined reservoir level limits and other operating constraints as discussed below. A protective relay scheme automatically shuts the units down should a problem develop.

The Project is the furthest downstream of the five (5) PacifiCorp hydro developments on the Bear River system. The Bear River system is collectively operated by PacifiCorp and is a coordinated operation of storage reservoirs, diversion dams, canals and hydro plants located within a 3,500-square-mile area of the lower Bear River Basin in Idaho and Utah.

Water is diverted from the Bear River into Bear Lake which is a natural lake via the Rainbow Canal. Since 1911, the lake has been used as a storage reservoir (upper 21.65 feet elevation of the lake). The water diverted and stored annually in Bear Lake provides supplemental water for the vast majority of the water rights that support irrigation and hydroelectric power in the Bear River system. Given the size of the lake, extended multi-annual water storage is possible. This water is then released into the Bear River to supply irrigation supplemental water for 150,000 acres of agricultural land in Idaho and Utah. Much of the water released from Bear Lake is used for power generation as it is conveyed downstream. The river is regulated according to multiple use needs within the basin; primarily for flood control, irrigation, and power generation, as well as recreation, and fish and wildlife enhancement per the Bear River Project (FERC No. 20) license. The flow provided by releases from Bear Lake is the major contributing factor to the generation capability of the Bear River system except at the Cutler Project, where the last diversion of the Bear Lake storage water is made to fulfill Bear River water rights which divert at Cutler, including some of the largest immediately upstream of the Cutler Dam. Outside of the

irrigation season, Bear Lake flood control releases, along with winter and spring Bear River drainage natural water flows, create the base for Cutler Project generation. In southern Cache Valley, there are local drainage basins that also contribute significant inflows to the Project. There have been occasions when flows from the Logan, Blacksmith Fork, and Little Bear drainage basins have equaled 70 percent of the total reservoir inflow.

From mid-June to mid-October, nearly all the natural flow from the Bear River is diverted for irrigation. Supplemental flow comes from water stored in Bear Lake. Approximately 118 different entities have consumptive water rights on the mainstem of the Bear River between Bear Lake and the Great Salt Lake. The drainage area upstream of the Project is approximately 6,200-square-miles. Three (3) U.S. Geological Survey (USGS) gaging stations are located near the Project: Collinston (Station No. 10118000); West Side Canal (Station No. 10117500); and Hammond (East Side Canal) (Station No.10117000). The Collinston gage is located approximately 800-feet downstream from the Cutler powerhouse and is used to determine streamflow data for the Project. The Collinston gage datum is located at elevation 4,276.13 feet.

The Project generally operates as a run-of-river project based on availability of flows and the current license constraints, although it is also utilized for spinning reserves throughout the year. Typically, the spinning reserve operation moves into generation mode about one day per year.

Currently the Project reservoir fluctuates within a 1 foot to 1.5 foot operating range, with a 0.25-foot to 0.5-foot tolerance, depending on the time of year, as shown in Table 5-1. The current FERC license contains reservoir elevation range restrictions that constrain the operational potential of the reservoir.

TABLE 5-1 RESERVOIR ELEVATION FLUCTUATION PROTOCOL BY TIME PERIOD

PERIOD	RESERVOIR ELEVATION (FEET)	TOLERANCE (FEET)	PERCENT OF TIME GOAL MET
March 1 – June 15	4,407.5 – 4,407.0	± 0.25	95%
June 15 – Sept. 30	4,407.5 – 4,406.5	± 0.25	95%
Oct. 1 – Dec. 1	4,407.5 – 4,407.0	± 0.25	95%
Dec. 2 – Feb. 28	4,407.5 – 4,406.0	± 0.25 to 0.5	90%

Source: PacifiCorp 1994

There is currently no minimum flow required or provided in the downstream or bypass reach. There is also no native or sport fishery managed by the Utah Division of Wildlife Resources in

this segment of the river. Flow downstream of the dam is the accumulation of leakage from the dam that flow through uplift drain pipes.

Given that during the irrigation season most of the inflow into the Project is sent to the irrigation canals and the reservoir must maintain certain elevations, generation at the powerhouse is virtually nonexistent from approximately mid-May to the end of September, unless water is available in higher flow years as shown below in Figure 5-3.

FERC's 2002 *Order Modifying and Approving Project Operation Plan per Article 401* (99 FERC ¶62,085) described the evaluation of operational limitations as shown below in Figure 5-3. Although spawning[6] has been removed from the constraints for proposed future operations (see Figure 5-4) the remainder of the constraints remain in place.

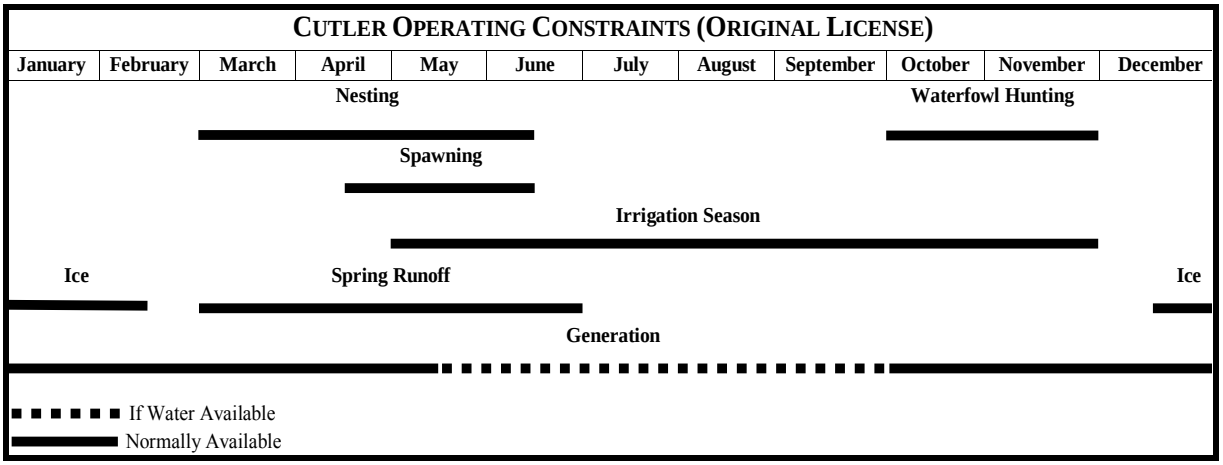


FIGURE 5-3 CUTLER OPERATING CONSTRAINTS IN 1994 LICENSE

5.3.1 Irrigation Season Operations

From May 1 to October 31 each year, the reservoir is held to within 1.5 feet of elevation 4,407.5-feet normal maximum pool elevation 95 percent of the time (the target range or percent of time the goal is met) to) protect wildlife (primarily avian) use and to facilitate direct pumping for irrigation from the reservoir and to accommodate sudden increases or decreases in irrigation demand that occur due to unexpected weather conditions or unexpected irrigation needs. Any

[6] The figure has been modified to remove "spawning" since there are no Bonneville/Bear River cutthroat trout (or other sensitive native or desirable non-native game species) in the reservoir and conditions (temperature, dissolved oxygen, and water quality) are not conducive to a return of these species or other state-sensitive species to Cutler Reservoir.

extra inflow greater than what is required for irrigation is stored to maintain water elevations in the reservoir, and to permit efficient generation when water is available for release. In general, the Project commonly generates very little if any during the mid-summer portion of the irrigation season in drier years. During this period, the reservoir can occasionally drop below the target range because there is a 5-day lag until upstream water releases from Bear Lake reach the Project.

5.3.2 Winter Season Operations

From late-December to mid-February, ice can form on the reservoir and in the river downstream of the Project. During this period, the reservoir is held as constant as possible to prevent ice breakup plugging the intakes and to prevent the sudden increases in flow that could cause ice breakups and jams downstream that may also exacerbate riverbank erosion below the Project.

5.3.3 Spring Runoff and Flood Operations

Spring runoff can occur at the Project from mid-February through the end of June. It generally happens in two (2) phases: when low elevation snow melts, and later when the high snowpack melts. High flows also occur when there are heavy releases from Bear Lake concurrent with natural runoff upstream or in the other tributaries from south of the Project. The highest recorded flows have occurred from rapid low-elevation snowmelts associated with heavy rains. During the spring, as much as 70 percent of the inflow into the Project comes from uncontrolled flows from the Logan, Blacksmith Fork, Little Bear, Spring Creek, and Cub River tributaries. When inflows exceed irrigation demands and plant capacity (3,600 cfs), the spillway gates at the dam are used to pass water. Although not intuitive, high flows most commonly result in the reservoir elevation being below the lower reservoir tolerance limit as measured at the dam, as the Project is operated at or under the lower target range to minimize water levels in the upper portion of the reservoir due to the ‘slope’ of the water surface elevations resulting from the shape and friction of the reservoir. High flows at Cutler move through the lower Bear River in Box Elder County and to the Great Salt Lake, the terminal point of all Bear River flows.

5.4 Generation and Outflow Records

Monthly average energy generation for the period 2013 to 2017 is provided in Table 5-2. Project inflow and outflow records are provided in in Section 6.3.4.

TABLE 5-2 MONTHLY AND AVERAGE ENERGY GENERATION (MWHS)

MONTH	2013	2014	2015	2016	2017	5-YEAR AVERAGE (2013-2017)	30- YEAR AVERAGE (1988-2017)
January	4,268	2,926	4,053	3,864	8,312	4,685	6,581
February	4,544	5,000	5,012	6,071	15,672	7,260	6,561
March	7,458	8,283	4,395	9,882	22,071	10,418	10,647
April	8,857	8,434	4,126	15,520	21,140	11,615	11,573
May	1,190	5,372	7,577	11,307	21,777	9,445	9,865
June	-380	230	3,801	2,185	13,759	3,919	7,163
July	-461	-574	-88	-463	2,287	140	1,419
August	-500	281	-425	-503	1,972	165	986.4
September	-197	-98	527	1,245	5,172	1,330	1,773
October	2,162	3,042	326	3,221	8,757	3,502	3,992
November	2,340	3,767	3,206	4,682	14,405	5,680	5,798
December	2,596	3,947	3,216	7,210	12,285	5,851	6,176
Annual	**31,877**	**40,610**	**35,726**	**64,221**	**147,609**[7]	**64,009**	**72,535**

Source: PacifiCorp 2019

5.5 Proposed Project Operations

Since the Project was last licensed in 1994, 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. This section of the PAD describes PacifiCorp's desire to re-position Cutler's hydropower generation to help with this integration. The overall approach described below is not intended to result in changes to Project capacity, but rather to provide additional operational flexibility. PacifiCorp is proposing an operational plan for the new license that will enable the Project to participate in the western Energy Imbalance Market (EIM) market, and to better coordinate projects upstream of the Cutler Project. To accomplish this goal, PacifiCorp is considering a suite of operational scenarios (described below) that will be evaluated during the relicensing studies; an operational plan will be proposed in the draft and final license applications, with ample opportunity provided to stakeholders for comments.

The California Independent System Operator's (CAISO) western EIM is a wholesale energy trading market that enables participants anywhere in the West to buy and sell energy when

[7] 2017 was an extremely high flow year, created by record high flows originating at Bear Lake.

needed. PacifiCorp and the CAISO launched the EIM on November 1, 2014. The EIM includes electric utility companies servicing portions of California, Idaho, Oregon, Utah, Washington, Nevada and Wyoming, and uses CAISO's advanced market systems that automatically balance supply and demand for electricity every 15 minutes, dispatching the least-cost resources every 5 minutes. NV Energy (Nevada), Puget Sound Energy (Washington), Arizona Public Service (Arizona), Portland General Electric (Oregon) and other California utilities participate in the EIM. Other balancing authorities are currently pursuing participation.

PacifiCorp operates and maintains the Project in accordance with the current Project FERC license requirements, as well as guidelines established by both the Western Electricity Coordinating Council (WECC) and the North American Electric Reliability Council (NERC). The Project resides within the PacifiCorp East Balancing Authority Area. PacifiCorp purchases and sells power in the short-term energy markets to balance the seasonal and daily variations in its customer loads and PacifiCorp's owned and contracted resources. The Cutler Project is a component of PacifiCorp's portfolio used to balance supply and demand in conjunction with other resources such as renewable wind and solar.

For the new license term, PacifiCorp proposes to keep the upper operating limit elevation on the reservoir, with a modest expansion to the tolerance. PacifiCorp also proposes expanding the range of lower operating limit to an elevation that will be determined during the relicensing process.

PacifiCorp proposes to evaluate the impacts of modifying the minimum authorized pool elevation, because recent data has shown that reservoir constraints are difficult to maintain during high run-off events such as summer rain and spring run-off.

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

are considered intermittent resources that fluctuate throughout different time horizons, and in most cases, require the load on the grid to be closely monitored by operators so that dips in solar and wind power are off-set by other resources such as hydroelectric projects which are more reliable and can be generating power in a matter of minutes.

With a larger operating range bandwidth on the reservoir, the Project would have the flexibility to respond to power fluctuations that are characteristic of these intermittent resources. The extent of the fluctuation would still be limited by the available inflow, which limits the refill time for any long duration, maximum generation event. However, it is expected that maximum outflow events (i.e., inflows greater than powerhouse hydraulic capacity) would still need to be passed downstream in order to maintain the reservoir within its tolerance range.[8]

Since implementation of the previous Operational Plan (Figure 5-3), much has been learned about how summer and spring high-flow events impact the Project and its ability to maintain compliance with license operating constraints. The previous Project license cited concerns related to irrigation demand and reservoir fluctuations to meet these changing demands. Since the implementation of the current license, PacifiCorp has approached the upper tolerance on several occasions, and in some cases, exceeded the tolerance in response to summer rain and spring run-off (Table 5-5). These summer events often occur during drought years when Bear Lake is very low. PacifiCorp and the irrigators who use water from Bear Lake desire to preserve as much of this rainfall run-off as possible to improve conditions for future years; therefore, PacifiCorp has requested and received permission several times to exceed the tolerance range.

PacifiCorp proposes to modify the allowable reservoir elevation range, increase the tolerance range, and reduce the target percentage by 5 percent year-round, as shown below in Table 5-3.

[8] Due to plant equipment upgrades, the efficiency of the plant increased, which reduced the previous maximum outflow from 3,900 cfs needed to produce 30 MW down to 3,600 cfs for the same energy production of 30 MW. In other words, the Project now requires less water (3,600 cfs) to produce the same amount of MW as before; in fact, the project is transmission-limited to 30MW.

TABLE 5-3 PROPOSED RESERVOIR ELEVATION FLUCTUATION EVALUATION RANGE

PERIOD	OPERATING RANGE (ELEVATION IN FEET)	TOLERANCE (FEET)	TARGET PERCENTAGE
January 1 – December 31	4,407.5 – 4,395.0	± 0.5 (+0.5 @ 4,408.0) (–0.5 @ 4,394.5)	90%

Note: Elevation 4,394.5 feet represents the bottom of the spill gates.

As indicated, the lower limit of elevation 4,395.0 feet represents the minimum elevation that will be evaluated and is dictated by plant equipment operational limits. The expanded upper target for tolerance range is primarily intended to assist in irrigation operations but would also be of use in responding to generation fluctuations during other portions of the year.

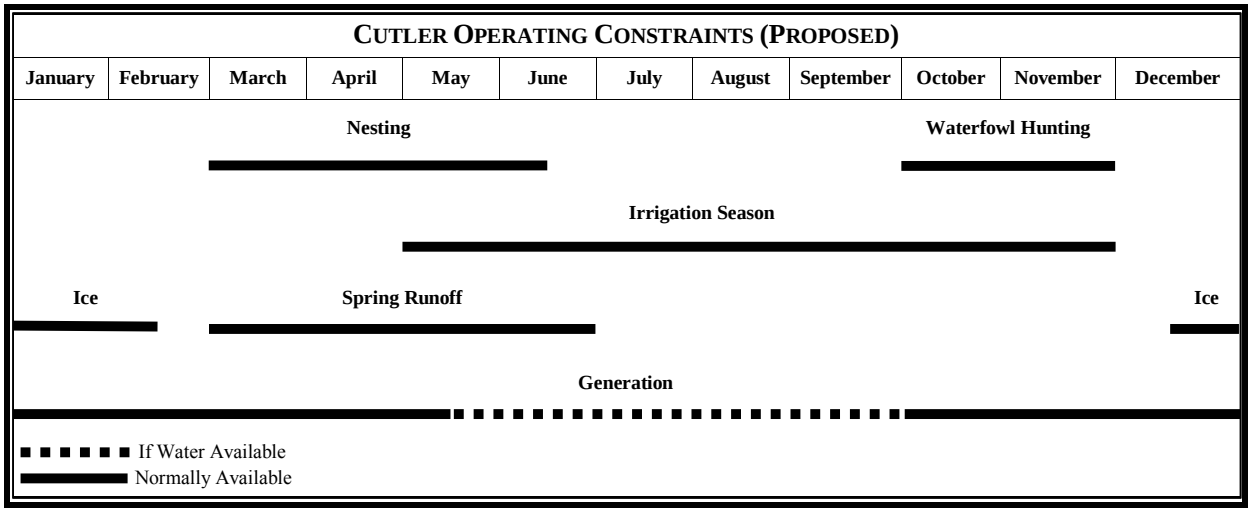
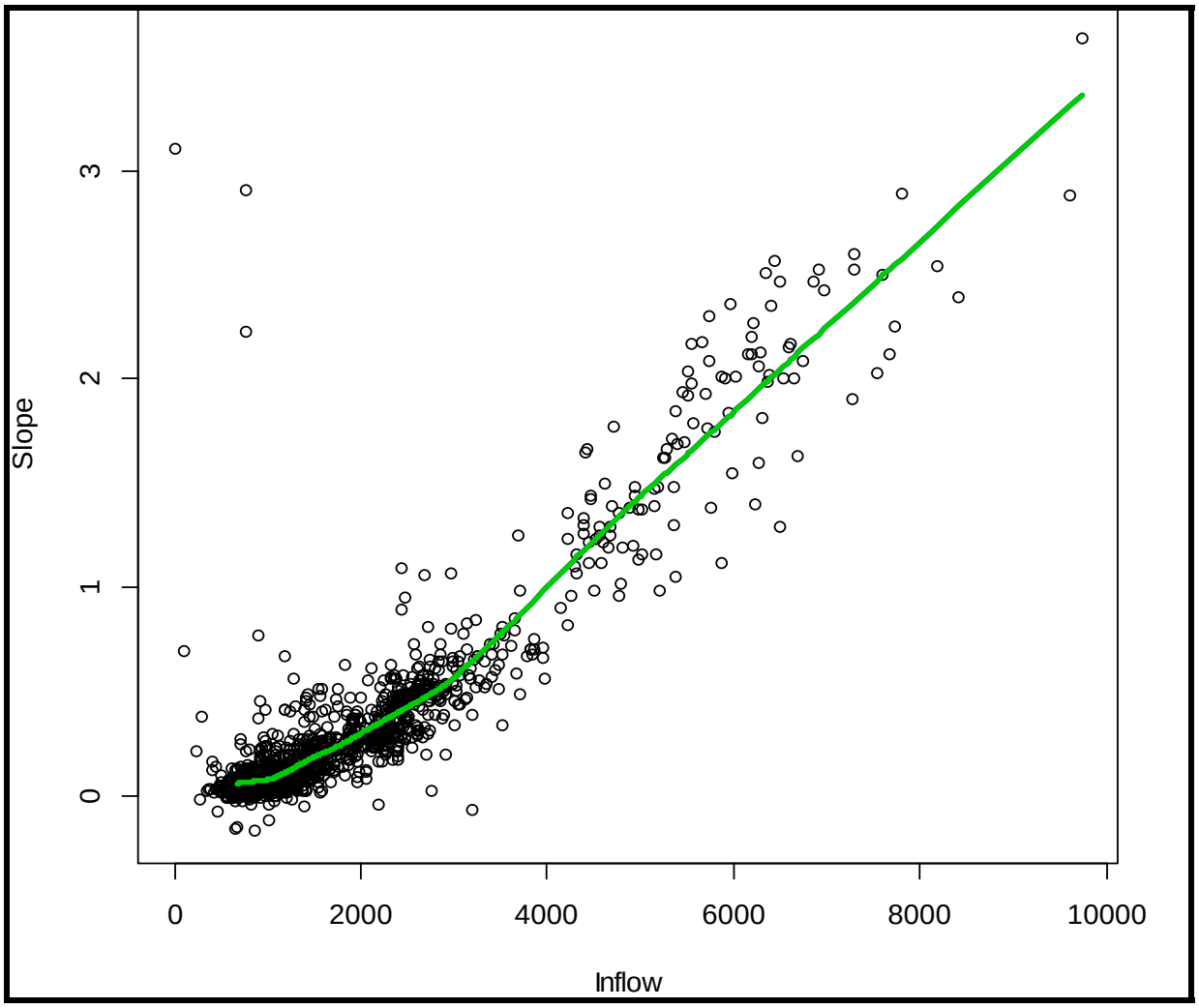


FIGURE 5-4 CUTLER PROPOSED OPERATING CONSTRAINTS

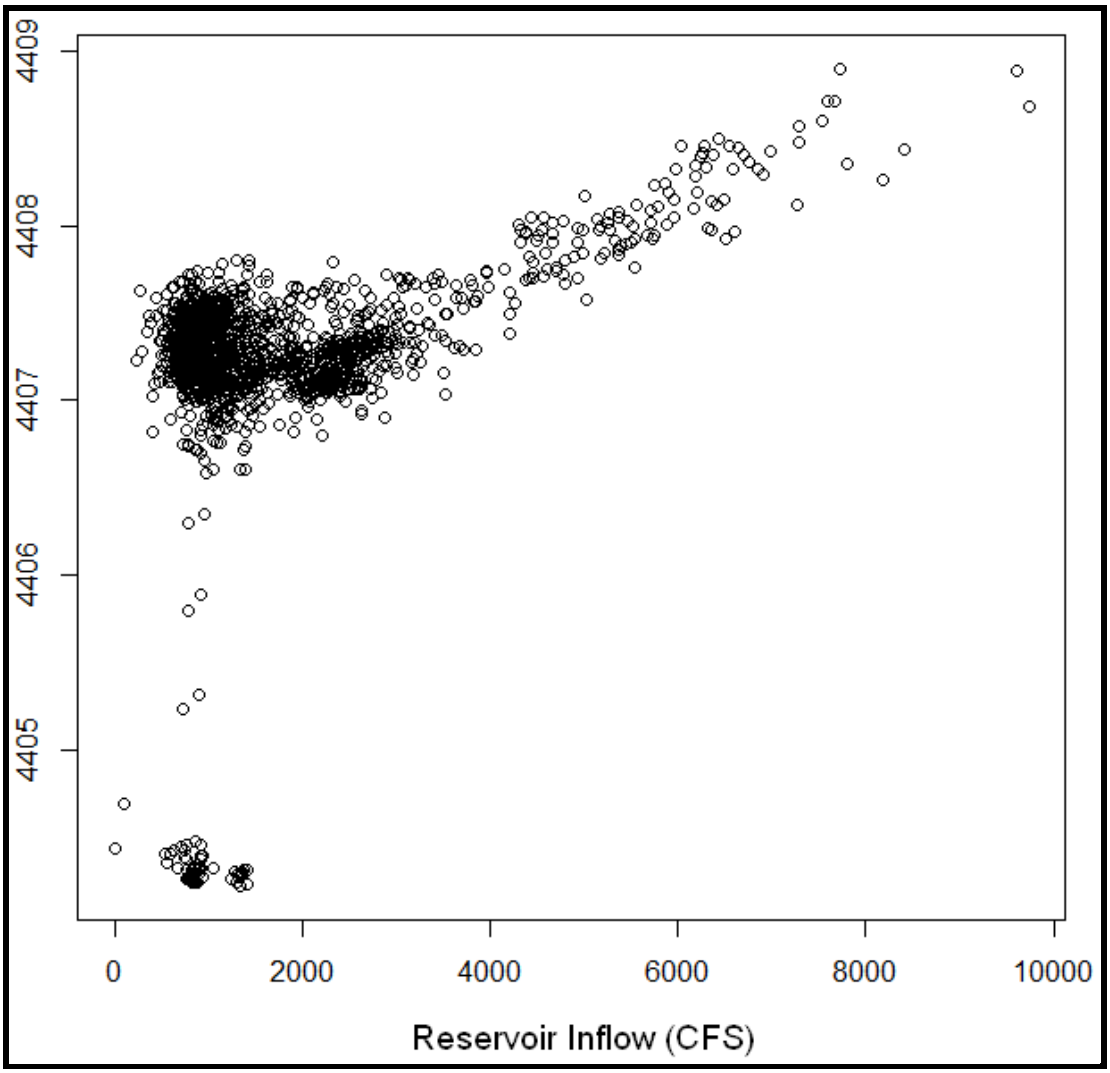
High runoff events in 2005, 2011, and 2017 have highlighted the need cited in the Operational Plan to reduce reservoir elevations below the current tolerance range to help pass high inflows. Figure 5-5 shows the slope on the reservoir (in feet) necessary to pass a given level of inflow while remaining in compliance with the current reservoir elevation operational limits and tolerances. The slope is measured as the difference in elevation between the gage at the dam and the gage at Benson Marina. The elevations used for compliance are adjusted for water surface drawdown due to generation flows into the intake.



Note: Data is based on daily data sampled at midnight from 8/1/2014 through 12/11/2018.
Inflow is measured in cfs.
Slope is measured in feet.

FIGURE 5-5 RELATIONSHIP OF SLOPE ON RESERVOIR BETWEEN BENSON MARINA GAGE AND CUTLER DAM GAGE BASED ON INFLOW TO THE RESERVOIR

When this required slope is combined with the elevations at Benson Marina (Figure 5-6), the reservoir elevation restriction at the dam is pushed down to 4,405.0 feet at the flows observed during the 2017 high run-off event (elevation of 4409.0 feet at Benson Marina for the highest flows, less the 4.0-foot reservoir slope required).



* Based on daily sampled data at midnight from 8/1/2014 through 12/11/2018.

FIGURE 5-6 RELATIONSHIP BETWEEN WATER LEVELS AT BENSON MARINA AND RESERVOIR INFLOW

Although not shown, similar flows occurred in 2005 during an intense rainfall runoff event. In 2011, snow pack conditions were very similar to 2017. Hence, the frequency of these types of events is high enough to warrant expanding the lower tolerance to account for them.

5.6 New Facilities or Components to be Constructed

There are no new proposed facilities planned to increase the generator capacity of the Cutler Project. PacifiCorp plans to make large capital improvements of like-for-like replacement of the spillway gates and flowline support (as needed), once the Project has obtained a new license.

Further, PacifiCorp plans to install a new retaining wall between the flowline and the river near the base of the dam to protect the flowline from being undermined in high flow events. These capital improvements will not result in changes in the Project operation. Additionally, components may be installed to effect EIM capabilities where these EIM components, as described in Section 5.5, may result in short term changes in the Project operation.

5.6.1 Transmission

PacifiCorp proposes no changes to the existing transmission system of the Project.

5.7 Current License Requirements

FERC issued the current Project license to PacifiCorp on April 29, 1994 (67 FERC ¶62,082). The licensed Project is subject to Articles 1-23 of the FERC's standard terms and conditions set forth in Form L-10, (October 1975) entitled "Terms and Conditions of License for Constructed Major Project Affecting the Interests of Interstate or Foreign Commerce" and the following additional Articles 201 - 204, 401 - 404, and 501. Below is a summary of the major license articles for this Project (Table 5-4).

TABLE 5-4 SUMMARY OF MAJOR LICENSE ARTICLES IN P-2420

ARTICLE NO.	LICENSE REQUIREMENT	DATE OF REQUIREMENT
19	Licensee to be responsible for, and take reasonable measures, to prevent soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution.	Ordered: 4/29/1994
401	Bear River Study Plan • Study effects of basin-wide irrigation canal system to minimize Cutler Reservoir fluctuations to balance needs of wildlife, recreation, irrigation and power generation. Specifically determine if the Project gage at Benson Marina can be used to operate the Project (it could not).	Ordered: 4/29/1994 Filed: 10/26/1994 Approved: 3/30/1995
402	Resource Management Plan (RMP) • Establish permanent vegetative buffer strip around the reservoir by fencing the perimeter and planting grasses, forbs, shrubs and trees. • Plant vegetation along sloughing embankments and contouring slopes and install erosion control structures and hydrophilic plants. • Remove old automobiles previously used for erosion control. • Vegetate buffer adjacent to reservoir between Highway 30 and Highway 23 bridges, stabilize 2 miles of shoreline by planting deep rooted shrubs and willows, reseed 50 acres of tilled ground for grassland buffer, and install 6.0 miles of cattle exclusion fencing. • Modify leased Project lands, including 300 acres of tilled ground for migratory waterfowl, and installation of 6 miles of fence. • Recreation Plan (pages 5-28 to 5-36 of RMP), and page 43 of license application: develop recreation at 8 sites, including installation of parking lots, boat ramps, floating docks, picnic tables, barbecue grills, picnic shelters, vault toilets, dumpsters and signage. Also, seasonal removal of trash and snow, seasonal placement of toilets and docks, and regular maintenance. Powerboat use discouraged by signage. • Develop 6.02-acre wetland mitigation site for lands lost to recreation area construction. • Install fish habitat enhancement structures in reservoir. • Monitor recreation, vegetation, water quality and wildlife monitoring every 5 years. Monitor wetlands for first 5 years after construction. File 5-year reports with FERC.	Ordered: 4/29/1994 Filed: 8/1/95 Approved: 11/6/95 Amended: 7/3/06, 9/7/06 Last Report: 3/29/18

ARTICLE NO.	LICENSE REQUIREMENT	DATE OF REQUIREMENT
403	Cutler Reservoir Operating Plan/Final Report: developed under Article 401), including operating levels: **Period** / **Reservoir Elevation (feet)** / **Tolerance (feet)** / **Percent of Time Goal Met** March 1-June 15 / 4,407.5 – 4,407.0 / ± 0.25 / 95% Dec. 2-Feb. 28 / 4,407.5 – 4,406.0 / ± 0.25 to 0.5 / 90%	Ordered: 3/30/1995 Filed: 10/4/1999 Approved: 4/30/02 Last report: 5/19/17
404	Cultural resource discovery provisions, including consultation with Utah State Historic Preservation Office (SHPO), preparation of cultural RMP for newly discovered resources, and to avoid or mitigate any sites eligible for listing in the National Register of Historic Places, take necessary steps for site protection, and file plan for FERC approval.	Order: 4/29/1994
Part 12 CFR	Facilities and measures to assure public safety.	Current regulations. Last Dam Safety Report: 5/30/2018 Last Emergency Action Plan Status Report: 12/18/2017
Part 2.7 CFR	Recreational development	Current regulations
Part 8 CFR	Recreation signage and posting	Current regulations

5.8 Project Compliance History

Table 5-5 provides a report of Project violations or deviations since 2002 per readily available online data.

TABLE 5-5 PACIFICORP DEVIATIONS SINCE 2002

DATE OF REPORT OR VIOLATION	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	FERC RESOLUTION
08/08/2017	Article 403	Reservoir Elevation Deviation	Occurred on 4/10-13, 4/15, 4/24, and 4/25/2017; were not considered violations of the operational plan.
6/16/2009	Article 401	Reservoir Elevation Deviation	FERC Issuance 8/3/2009; was not considered a violation of Article 401
08/28/2004 – 09/03/2004	Article 401	Reservoir Elevation Deviation	FERC Issuance 10/20/2004; was not considered a violation of Article 401
06/04/2004	Article 401	Reservoir Elevation Temporary Variance	FERC Issuance 7/21/2004; was not considered a violation of Article 401
06/28/2003 – 07/08/2003	Article 401	Incidents at the Cutler Reservoir	FERC Issuance 12/09/2003; was not considered a violation of Article 401
12/03/2002	Article 401	Reservoir Elevation Deviation	FERC Issuance 3/11/2003; was not considered a violation of Article 401

Source: FERC 2018[9]

5.9 Current Net Investment

As of December 31, 2018, PacifiCorp has incurred an original cost investment of $36,247,444, accumulated depreciation of $18,424,650, with a net book value of $17,822,794 for the Project.

5.10 Average Annual Energy and Dependable Capacity

Based on the 30-year average from 1988 to 2017, the Project produced approximately 72.5 GWh of electric energy annually. This power is sold to the wholesale market administered by CAISO.

[9] Information obtained from FERC eLibrary in 2018.

Dependable capacity[10] of the Project is 30 MW. November has the lowest historical average flow for the non-irrigation months. Utilizing the historical average available flow and supplementing it with a 0.3-foot draft of the reservoir allows the plant to sustain full generation for an 8-hour period.

5.10.1 Period of Critical Stream Flow Specification

Flows during irrigation season are not typically sufficient to allow sustained generation and therefore the Project does not contribute to PacifiCorp's resource base requirements for summer peak load demands. Outside of irrigation season, however, the Project is important to meet PacifiCorp's winter peak loads. The critical stream flow for this period is based on a non-irrigation month with the lowest historical average flow. At this lowest flow and supplementing flow with a limited drafting of the reservoir, the Project can provide full generation for an 8-hour period.

[10] An estimate of Dependable Capacity and Average Annual Energy Production in kilowatt-hours (or a mechanical equivalent) is supported using the follow data: the minimum, mean, and maximum recorded flows in cubic feet per second of the stream or other body of water at the power plant intake or point of diversion, with a specification of any adjustments made for evaporation, leakage, minimum flow releases (including duration of releases), or other reductions in available flow; OR a flow duration curve indicating the period of record and the gauging stations used in deriving the curve; and a specification of the period of critical stream flow used to determine the dependable capacity.

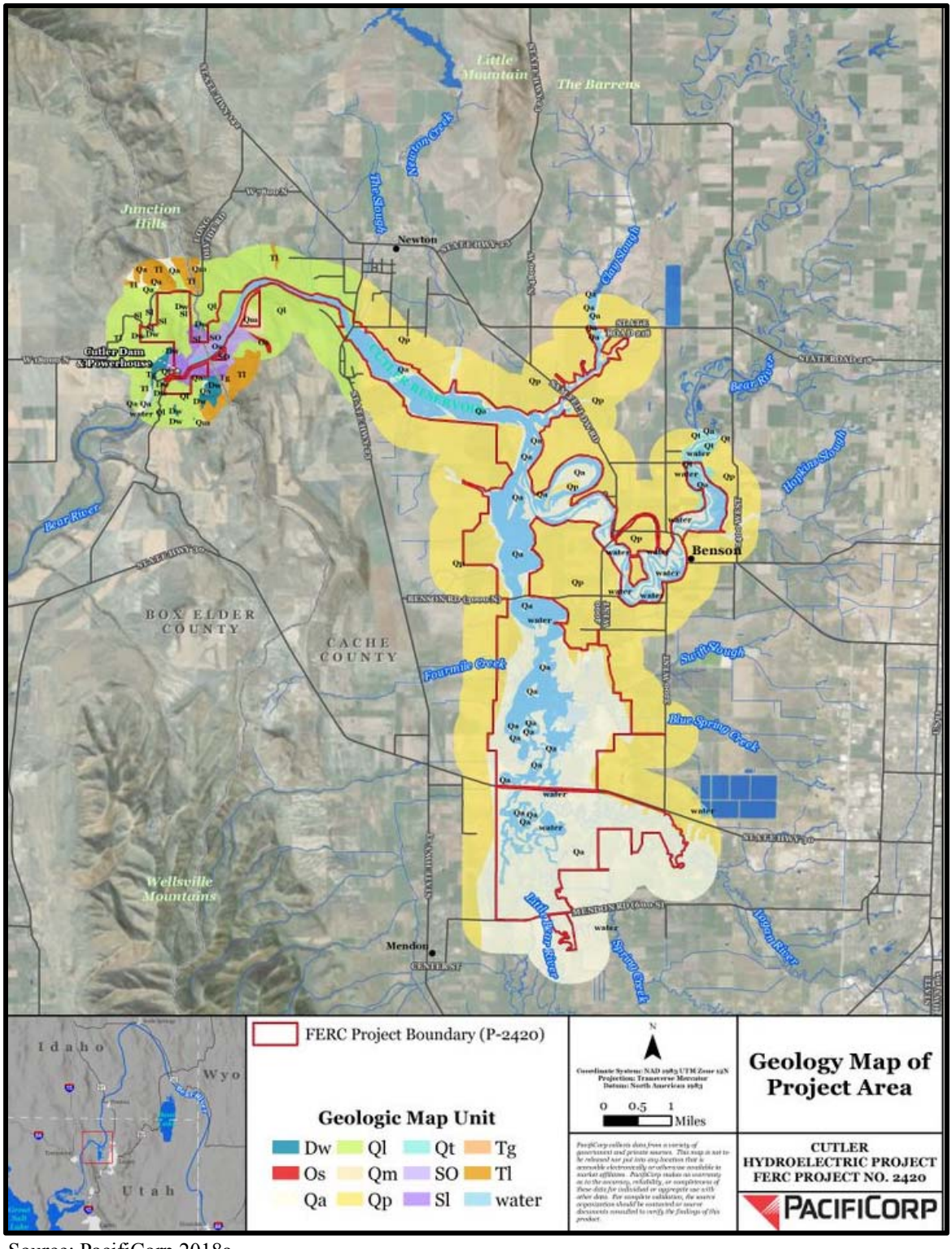
6 DESCRIPTION OF EXISTING ENVIRONMENT

6.1 Geology and Soils

6.1.1 Existing Geological Features

Cutler Reservoir is located in the west-central part of Cache Valley in Northern Utah (Figure 6-1). Cache Valley is a north-trending graben valley occupying approximately 600 square miles (Dames and Moore 1985 as cited in PacifiCorp 1991a). The principal physiographic features of the reservoir area consist of the Junction Hills, the north end of the Wellsville Mountains, Little Mountain, and a low area known as the Barrens. Junction Hills, located adjacent to and north of Cutler Dam, represents the southern end of the Malad Range. The north end of the Wellsville Mountains lies approximately 5 miles south of Cutler Dam. Little Mountain is an isolated small mountain approximately 6 miles northeast of Cutler Dam. The Barrens is a shallow basin situated on the southeast side of Little Mountain that drains to Cutler to the south via the Clay Slough (Photo 6-1).

Cache Valley is drained by the Bear River which originates at the western end of the Uinta Mountains. The Cache Valley floor ranges from approximate elevations of 4,400 to 5,400 feet. Cutler Reservoir is located at the lowest parts of the valley, and ranges in elevation from 4,400 feet to 4,450 feet.



Source: PacifiCorp 2018a

FIGURE 6-1 GEOLOGIC FEATURES AND ROCK FORMATIONS IN THE PROJECT AREA[11]

[11] Geological classification definitions are available in Appendix E.

The Bear River enters the northern end of Cache Valley in southern Idaho and flows south to approximately 8 miles east-southeast of Cutler Dam. The river then takes a turn northwest into the Cutler Canyon where Cutler Dam is located. Cutler Canyon is a nearly-symmetrical gorge eroded by the Bear River that contains no roads but is traversed by Union Pacific Railroad tracks. The highest points on the north and south sides of the gorge are 5,478 and 5,596 feet, respectively.

PHOTO 6-1 LITTLE MOUNTAIN WITH CLAY SLOUGH IN THE MIDGROUND AS IT ENTERS CUTLER RESERVOIR

6.1.2 Bedrock Geology

The stratigraphy of the Project Area consists of five (5) bedrock units and seven (7) surficial units. Some of the geologic characteristics of these bedrock units are listed in Table 6-1. Geologic features are shown in Figure 6-1.

TABLE 6-1 SUMMARY OF BEDROCK UNITS THAT OCCUR IN THE CUTLER PROJECT AREA

GEOLOGIC UNIT	APPROXIMATE AGE (YEARS AGO)	GEOLOGIC CHARACTERISTICS
Salt Lake Group	Pliocene 2 to 5 Mya	Gray-brown conglomerate; exposures approximately 0.5 miles southeast of Cutler Dam and 3 miles south of Cache Junction. Thick bedded, moderately fractured. Estimated compressive strength less than 1,500 pounds per square inch (psi).
Hyram Dolomite	Devonian 370-380 kya	Dark gray to black dolomite; medium grained, thick bedded, moderately fractured with fracture spacing approximately 12 inches. Estimated compressive strength less 10,000 to 15,000 psi.
Water Canyon Formation	Devonian 390-400 kya	Light gray dolomite, very fine grained, thin bedded, moderately fractured with fracture spacing approximately 12 inches. Estimated compressive strength greater than 15,000 psi.
Lake Town Dolomite- Fish Haven Dolomite	Silurian-Ordovician 420-450 kya	Dark gray dolomite; medium grained, thick bedded, moderately fractured with fracture spacing on the order of 12 inches. Estimated compressive strength 10,000 to 15,000 psi.
Swan Peak Quartzite	Ordovician 450-470 kya	Tan quartzite; medium grained massive moderately fractured with fracture spacing approximately 12 inches. Estimated compressive strength greater than 15,000 psi.
Garden City Limestone- St. Charles Limestone	Ordovician-Cambrian 490-510 kya	Gray to dark gray limestone; fine-grained, variable bedded, extremely fractured with fracture spacing approximately only inches. Estimated compressive strength 10,000 to 15,000 psi.

Source: Utah Geological Survey 1996
Notes: kya (thousands of years ago)
Mya (millions of years ago)

The oldest bedrock units are exposed on the northeast side of Little Mountain and an isolated location approximately 2.4 miles southeast of the Project dam. This unit consists of dark gray limestone which is locally siliceous. The second unit consists of dark gray quartzite exposed approximately 0.5 miles upstream of the Project dam in the Cutler Canyon. The third bedrock unit is a dark gray dolomite exposed in the Cutler Canyon and at Black Ridge approximately 3.5 miles southeast of the Project dam. The fourth unit is a gray-brown conglomerate which is thick bedded and moderately fractured and is exposed approximately 0.5 miles southeast of the Project

dam and at Black Ridge. The fifth bedrock unit consists of tuff or tuffaceous sandstone assigned to the Salt Lake Group of probable Pliocene age (2 to 5 million years old). These rocks, exposed at two (2) areas near Cutler Dam, are light greenish-gray, massive and moderately to extremely fractured (PacifiCorp 1991a).

The Project is situated in the Intermountain Seismic Belt (Utah Geological Survey 1996). This belt extends from southern Nevada through Utah and toward Yellowstone and north along the mountainous part of Montana. The Intermountain Seismic Belt is characterized by moderate to large magnitude earthquakes with shallow focal depths. The largest earthquake to occur in the Project Vicinity[12] (defined for Geology and Soils as Cache and Box Elder counties) was the Hansel Valley earthquake of 1934 with an estimated magnitude of 6.6 on the Richter Scale (Utah Geological Survey 1996). The epicenter of the 1934 earthquake was located approximately 30 miles west of the Project. In 1962, an earthquake with a magnitude of 5.7 approximately 15 miles north-northeast of Cutler Dam caused approximately 1 million dollars damage to the city of Logan. No damage was noted at the Project facilities. More recently, an earthquake of magnitude 4.3 occurred on January 25, 2018 near Manson, Idaho (87 miles north of Logan, Utah). No damages or injuries were reported according to the Caribou County, Idaho Sheriff's office.

[12] Project Area definition can be found in the Definitions of Terms section of this PAD

Source: SWCA 2018

PHOTO 6-2 TUFFACEOUS SANDSTONE ASSIGNED TO THE SALT LAKE GROUP JUST DOWNSTREAM OF CUTLER DAM ON THE HAMMOND CANAL

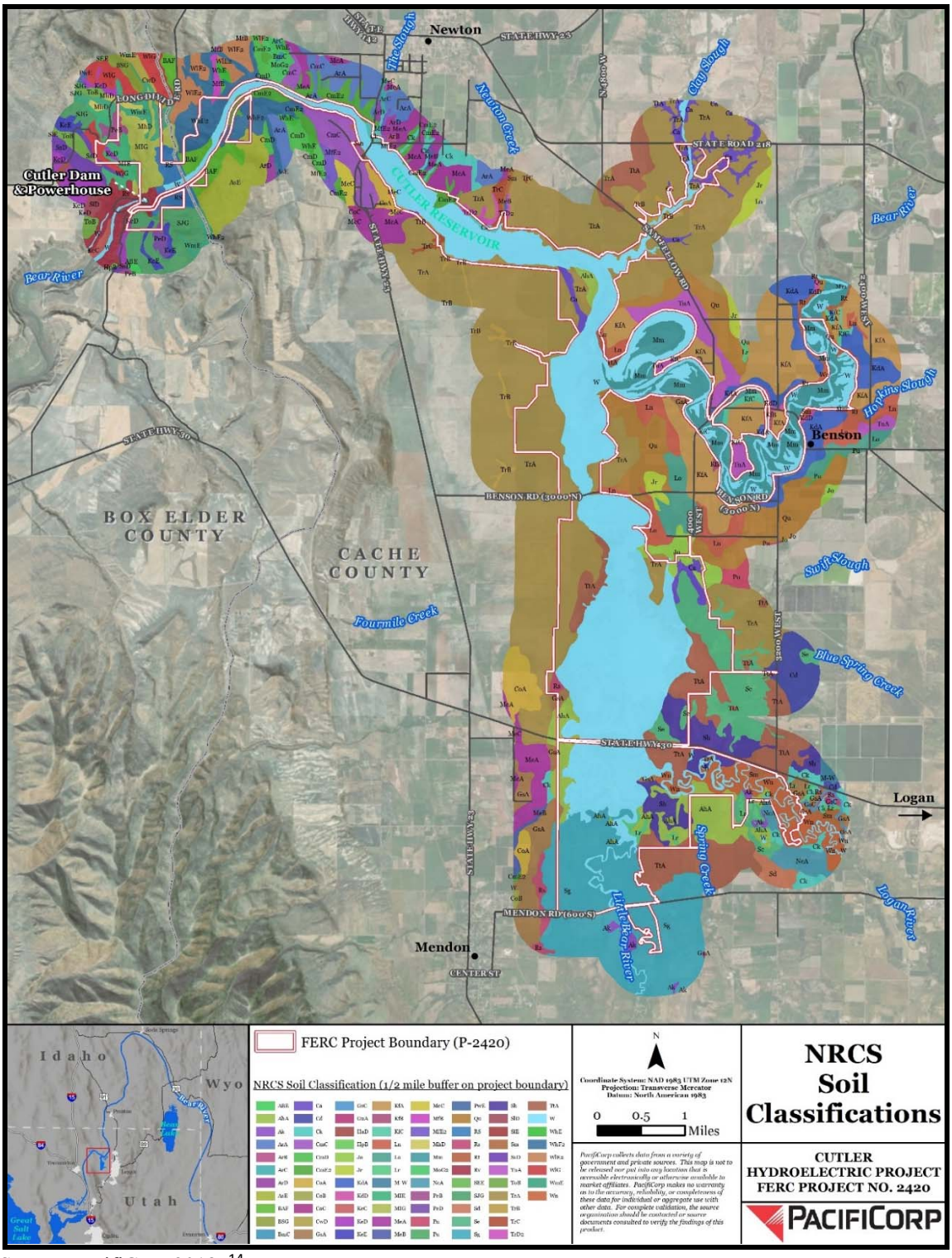
6.1.3 Soils

NRCS soil classifications within the Project Area[13] are shown in Figure 6-2. The dominant surficial material in the Project Area is silty clay deposited as lake bottom sediment in ancient Lake Bonneville (PacifiCorp 1991a). The Cache Valley was inundated by Lake Bonneville approximately 22,000 years ago. The active floodplain of the Bear River is covered by a sandy deposit stemming from the delta and levees of the Bear River.

Most of the beach deposits on the flanks of Little Mountain are covered by a thin veneer of colluvial slopewash of all sizes ranging from silt to cobble. The slopewash deposits are derived directly from the beach deposits. Small alluvial fans are located to the southeast of Little Mountain and at three (3) locations south of Cache Junction, a small town located immediately west of the Project, and just southwest of Newton, Utah. The alluvial fans consist of Lake Bonneville beach deposits originating from higher on the adjacent slopes (USDA 1974, 1975).

From the Utah/Idaho state line to where it enters Cutler Reservoir, an area referred to as the Bear River Bottoms, the soil adjacent to the Bear River is almost entirely classified as mixed alluvial land. This miscellaneous type land type consists of stratified, dominantly sandy alluvial soil in floodplains. Mixed alluvial land includes many abandoned oxbows and wet areas and is subject to overflow during high water events in the Bear River.

[13] Project Area definition can be found in the Definitions of Terms section of this PAD.



Source: PacifiCorp 2018a[14]

FIGURE 6-2 NRCS SOIL CLASSIFICATIONS THE PROJECT AREA

[14] Soil classification definitions are available in Appendix D.

6.2 Reservoir Shoreline and Streambank Conditions

Cutler Dam is located on soils classified as rock land (USDA 1974, 1975). This miscellaneous land type consists of rock outcrop, rock rubble, talus materials, extremely stony land and very shallow soils, with 25 to 90 percent of the area occupied by rock outcrops. The powerhouse is located on soils classified as rough broken land. This miscellaneous land type consists of very steep escarpment-like breaks above river bottomland and very steep drainageways. Geologic erosion is active, soil slippage is common, and runoff is very rapid. Drainage from higher, irrigated areas commonly causes seeps within this land type. These soil types are classified as being a moderate erosion hazard.

Near Cutler Reservoir, immediately upstream of the dam, the soil adjacent to the water is classified as Barfuss-Leatham association with 30 to 50 percent slopes. This association includes 40 percent Barfuss silt loam on south- and west-facing slopes, 20 percent La Plata silty clay loam on north- and east-facing slopes, and 10 percent included soils. The Barfuss and La Plata families are generally classified as being moderately erosive hazards. Other major soil types adjacent to the water along the north end of Cutler Reservoir include Wheelon silt loam with 30 to 50 percent slopes, eroded, and characterized as a high erosion hazard, Collinston loam, 1 to 6 percent slopes and 10 to 30 percent slopes, eroded, and characterized as a moderate to high erosion hazard, and Trenton silty clay loam, 0 to 2 percent and 2 to 4 percent slopes and characterized as a slight to moderate erosion hazard.

At the confluence of the Bear River with Cutler Reservoir, soils adjacent to the water consist primarily of Trenton silty clay loam, 0 to 2 percent slopes.

6.2.1 Erosion

Shoreline soils around most of Cutler Reservoir are primarily deposits from the ancient Lake Bonneville, and therefore, have a high erosion tendency. Since issuance of the current license, PacifiCorp has implemented a multitude of stabilization and buffering measures to reduce bank erosion and improve water quality. This is an ongoing effort where the Project is monitored each year to continue a path toward shoreline improvements which result in erosion control measures, bank stabilization, and reduced turbidity. Those efforts are identified in each of the four 5-year monitoring reports (PacifiCorp 2002, 2008, 2013 and 2018b). Below is a summary of shoreline

buffer monitoring (Table 6-2), bank stabilization monitoring (Table 6-3), and erosion control sediment basin monitoring efforts from the most recent 5-year monitoring report (PacifiCorp 2018b).

6.2.2 Shoreline Buffer

There are 55 buffer parcels that are traversed, observed, and categorized annually to observe the plant community health, erosion, noxious weeds, and encroachments. PacifiCorp photographs each of the 55 sites from the same permanently-marked monitoring point, and ranks the overall condition of each parcel, using 2002 as the baseline data point for comparison (PacifiCorp 2018b). Table 6-2 below summarizes the parcel conditions from excellent to at-risk.

TABLE 6-2 CUTLER RESERVOIR BUFFER PARCELS BY CONDITION PER YEAR

CONDITIONS OF BUFFER[15]	2002 (BASELINE)	2013	2014	2015	2016	2017
Excellent	4	5	5	5	6	6
Good	26	36	36	40	40	41
Fair	0	8	8	6	5	4
Poor	16	3	3	3	2	2
At-Risk	6	3	3	1	2	2

Source: PacifiCorp 2018b

Between 2013 and 2017, conditions generally trended favorably with improvements in buffers increasing from good to excellent and decreases in the number of poor and at-risk parcels. Although a wet 2017 contributed to vegetation growth on the shoreline buffer parcels, some parcels were still impacted by the farming, grazing and other encroachments (PacifiCorp 2018b). In the 2018 monitoring period, three (3) existing buffer sites remained as high priority as identified in Appendix C-3 of the most recent 5-year monitoring report.

6.2.3 Bank Stabilization Monitoring

The Cutler license required 3.5 miles of bank stabilization using both ‘hard’ (rock) and ‘soft’ (vegetation) techniques. Most sites were planted with a combination of both materials, and covered approximately 4.42 miles as of 2018. An additional 1.1 miles of bank stabilization was

[15] Explanation of rankings from excellent to at-risk can be found in PacifiCorp (2018b).

completed to construct the RR Loop Trail that is not counted in the 4.42 miles. Below is a table of bank stabilization monitoring results from 2013-2017, with 2002 serving as the baseline year.

TABLE 6-3 SUMMARY OF BANK STABILIZATION PROJECT MONITORING RESULTS (2013-2017)

	2002 (BASELINE)		2013		2014		2015		2016		2017	
CONDITION	Feet/ Miles	% of Total	Feet/ Miles	% of Total	Feet/ Miles	% of Total	Feet/ Miles	% of Total	Feet/ Miles	% of Total	Feet/ Miles	% of Total
Good	16073/3.0	77.0	23426/4.4	100	23426/4.4	100	23426/4.4	21709/4.1	21709/4.1	92.7	23426/4.4	100
Fair	0/0	0	0/0	0	0/0	0	0/0	0	1717/0.33	7.3	0/0	0
Poor	4789/0.9	23.0	0/0	0	0/0	0	0/0	0	0/0	0	0/0	0
Total	20862/3.9	100	23426/4.4	100	23426/4.4	100	23426/4.4	100	23426/4.4	100	23426/4.4	100

Source: PacifiCorp 2018b

As noted in the 2018 monitoring report (PacifiCorp 2018b), the banks that fared best over the years were the ones stabilized using the vegetation and rock method to create breakwater zones. These banks had increased wetland flora and bank shrubs, and therefore have the greatest chance to success at stabilizing the banks. In 2018, no specific future work stabilizing the banks was proposed as all the sites were considered to be in good or improving condition.

6.2.4 Erosion Control Sediment Basin Monitoring

The Cutler license and RMP both require erosion control check dams and sediment basins where needed in the Northern Marsh and Reservoir areas. Thirteen sites were monitored from 2013-2017. With the exception of Basin 3, all sites were considered to be in good condition through the monitoring cycles. Table 6-4 (PacifiCorp 2018b) is a summary of the individual basins and how they fared between 2013 and 2017.

TABLE 6-4 SUMMARY OF CUTLER EROSION CONTROL SEDIMENT BASIN MONITORING RESULTS (2013-2017)

SEDIMENT BASIN ID #	2013	2014	2015	2016	2017
1	Good	Good	Good	Good	Good
2	Good	Good	Good	Good	Good
3	Good	Good	Poor (needs repairs)	Roadway/ dam repaired	Good
4	Good	Good	Good	Good	Good
5	Good	Good	Good	Good	Good
6	Good	Good	Good	Good	Good
7	Good	Good	Fair (needs repairs)	Washout repaired	Good
8	Good	Good	Good	Good	Good
9	Good	Good	Good	Good	Good
10	Good	Good	Good	Good	Good
11	Good	Good	Fair (needs repairs)	Washout repaired	Good
12	Good	Good	Good	Good	Good
13	Good	Good	Good	Good	Good

Source: PacifiCorp 2018b

The good conditions of the existing basins have allowed for the creation of quality waterfowl habitat and for a variety of breeding amphibians, songbirds and grebes. These habitats are also monitored for use by sensitive/unique wildlife. The intent is to continue monitoring as present.

6.3 Water Resources

6.3.1 Drainage Area

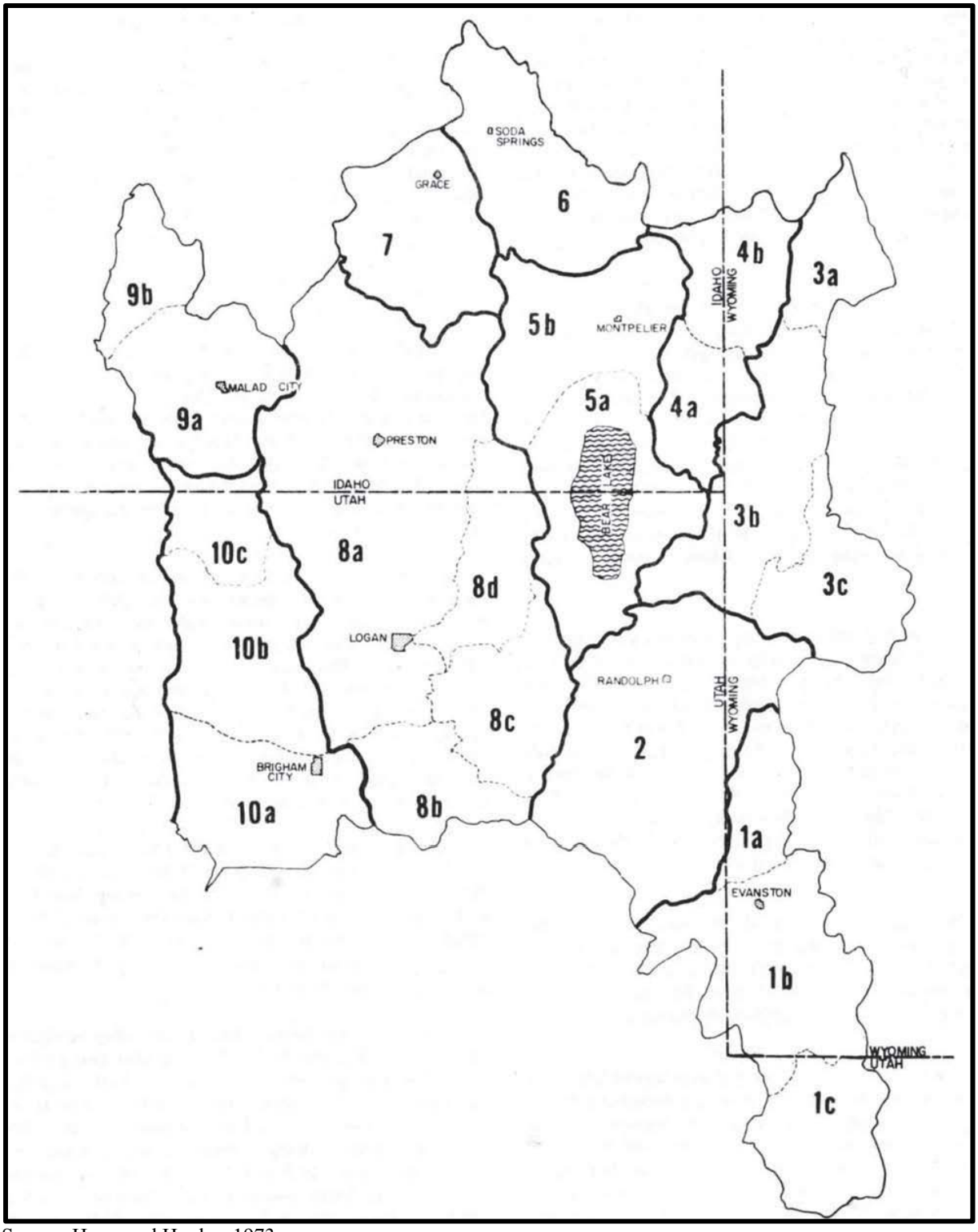
The Cutler Reservoir watershed encompasses 2,201 square miles and lies within the larger Bear River basin of 6,271 square miles (USGS 2019). The Bear River basin drains portions of northeastern Utah, southwestern Wyoming, and southeastern Idaho (Figure 4-3). The Cutler Reservoir watershed consists of a stream network that extends 2,022 linear miles, 16 percent of which consist of ditches or canals. Steep terrain (with slopes as high as 85 degrees) characterize the mountains surrounding the relatively flat Cache Valley, where soils consist of alluvium and ancient Lake Bonneville lacustrine sediments. The dominant land uses in the Cutler Reservoir area are forest and shrubland in the mountains, and agricultural land (grazing and crop production) in Cache Valley. The most common crops include irrigated pasture, hay, alfalfa and

corn; all are used locally to feed beef cattle and dairy cows. As noted in Section 4.2, developed land uses occupy a large portion of Cache Valley (PacifiCorp 2008).

6.3.2 Streamflow, Gage Data and Flow Statistics

The Bear River drainage is divided into ten (10) hydrologic sub-basins (Haws and Hughes 1973) (Figure 6-3). Cutler Reservoir lies within sub-basin No. 8, which begins at the Oneida Narrows USGS gaging station located downstream of the Oneida Development of the Bear River Hydroelectric Project (P-20) (USGS Gage No. 10086000) and ends at Cutler Dam. Sub-basin No. 8 is approximately twice the size and produces more than twice the runoff of any of the other sub-basins (PacifiCorp 1991). Several major tributaries such as the Little Bear River, Cub River, Logan River and Blacksmith Fork River contribute significant amounts of water during runoff. The Bear River and all the tributaries are of key importance to Cutler Reservoir in terms of water quantity and quality. There are no minimum flow requirements downstream of Cutler Dam because of the irrigation flow requirements in the Hammond/East and West Canals, which originate at the dam. The critical streamflow for the Project is 33 cfs which is essentially leakage from the dam. Although the Project is frequently offline in July and August due to irrigation withdrawals, the dependable capacity of Cutler is 30 MW.[16]

[16] PacifiCorp does not depend on flows to generate power at Cutler during the months of July, August, and September, especially in drier years, when most or all of the Bear River flows are diverted for irrigation purposes just above Cutler Dam. During these months, the critical flow is only 33 cfs, which is essentially leakage through the dam. The previous License Exhibits considered the hydrologic availability and discounted reliance on the Project during low-flow periods and concluded the dependable capacity was 30 MW. Due to a lack of FERC definition of dependable capacity, we are using the following methodology to determine dependable capacity: The Project's ability to meet a defined load requirement with consideration of adverse conditions. The critical month method, which is more reserved for base-load plants, is more of a firm energy approach, and does not apply to this Project.



Source: Haws and Hughes 1973

FIGURE 6-3 HYDROLOGIC SUB-BASINS OF THE BEAR RIVER DRAINAGE AREA

6.3.3 Monthly Minimum, Mean and Maximum Flows

Monthly minimum, mean and maximum flows were calculated from the data provided in Table 6-5 and displayed in Figure 6-4.

TABLE 6-5 FLOW STATISTICS (CFS) FOR THE CUTLER HYDROELECTRIC PROJECT FOR FLOWS MEASURED AT THE USGS COLLINSTON GAGE NO. 10118000 OVER THE 30-YEAR RECORD-OF-FLOW 1987-2017

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MINIMUM	45	47	18	18	23	22	18	9	3	22	26	33
MEAN	1,083	1,217	1,760	2,052	1,885	1,377	262	197	355	669	952	1,009
MAXIMUM	4,022	8,280	7,389	7,615	8,046	6,100	4,000	2,740	2,590	2,817	2,951	3,301

Source: PacifiCorp 2019 Personal communication with Connelly Baldwin, PacifiCorp 2019

6.3.4 Monthly Flow Duration Curves

The following are monthly flow duration curves for the Project (Figure 6-4). The period of record for these graphs is October 1, 1987 to September 30, 2017 and the data were extracted from the Bear River near Collinston, Utah (USGS Gage No.10118000). This gage is reviewed and published by USGS but managed by PacifiCorp.

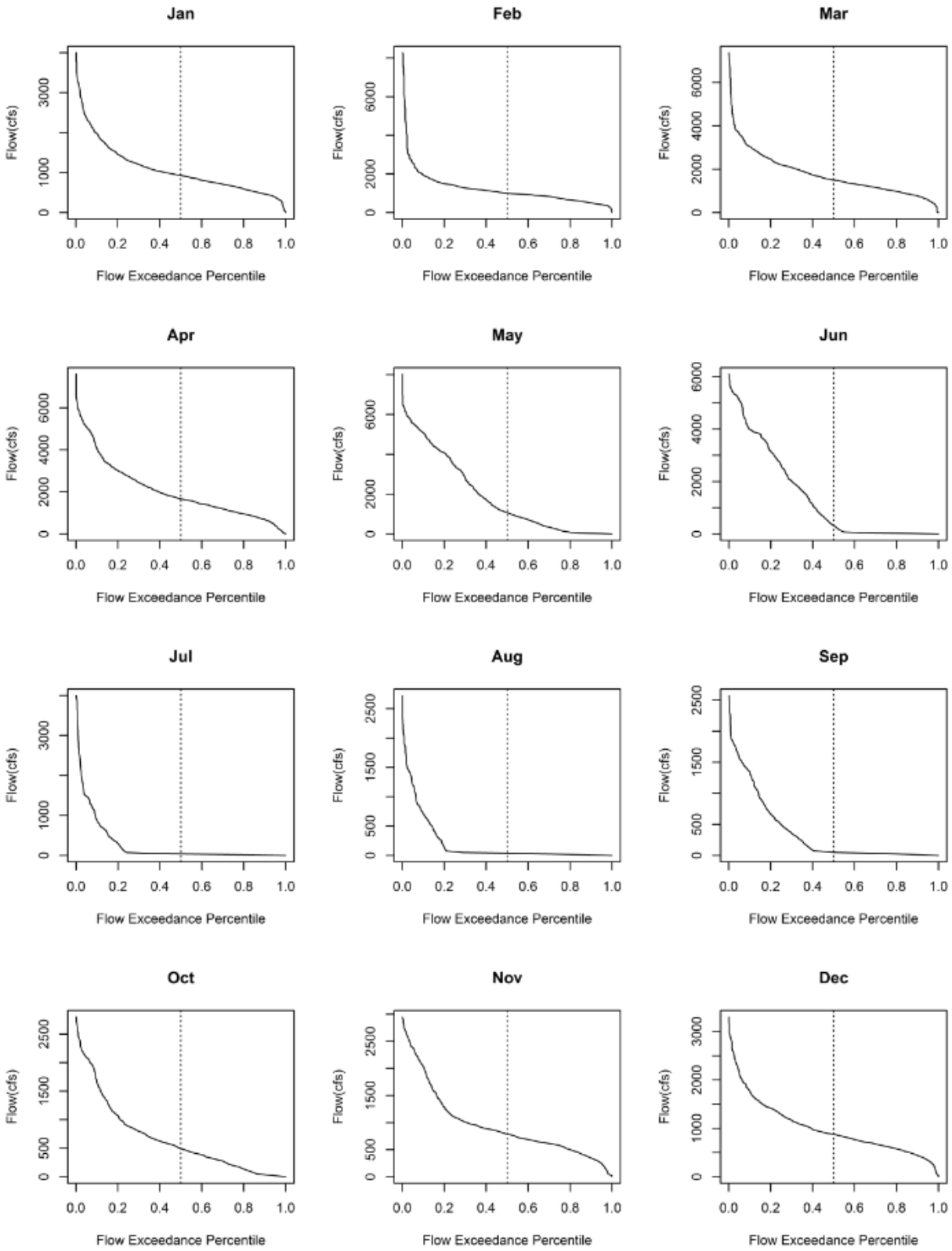


FIGURE 6-4 MONTHLY FLOW DURATION CURVES FOR THE CUTLER HYDROELECTRIC PROJECT FROM THE PERIOD 1987-2017

As noted previously, due to lack of water during the hotter, drier portions of the irrigation season, the Cutler Powerhouse is generally not operated in the months of July and August but is operated for infrequent spinning reserves in case of grid disturbances. Note that the 50th percentile exceedance flow in these months combined is 33 cfs.

6.3.5 Existing and Proposed Uses of Water

The Project is the furthest downstream of five (5) hydroelectric plants on the Bear River system. The Bear River system is a coordinated operation of storage reservoirs, diversion dams, canals and hydroelectric plants located within the 3,500-square-mile area of the lower Bear River basin in Idaho and Utah. Water is diverted from the Bear River into Bear Lake and stored for future use. Water is scheduled for release back into the Bear River (through the Lifton Pump Station and via the Outlet Canal) to supply supplemental irrigation water for over 150,000 acres of farmland in Idaho and Utah (PacifiCorp 1991). The water released from Bear Lake is used for power generation as it passes downstream through PacifiCorp's five (5) hydroelectric plants in Idaho and Utah.

Water levels in Cutler Reservoir fluctuate relatively little throughout the year. During spring runoff, inflow from the Bear River and the southern tributaries (Logan, Blacksmith Fork, and Little Bear rivers) may cause the reservoir water surface at Benson Marina to exceed the normal maximum pool elevation of 4,407.5 feet msl; however, the reservoir elevation as measured at the dam may be under the lower elevation compliance target due to the operational slope on the reservoir during high water conditions. During the summer irrigation season, withdrawals from the reservoir can exceed inflow causing the reservoir surface elevation to drop; alternatively, unexpected precipitation, which may also trigger less-than-expected irrigation diversions, can cause the reservoir elevation to rise. PacifiCorp responds to drops in summer reservoir elevations by scheduling releases from Bear Lake, although there is an approximately 5-day lag in flows resulting from changes made at Bear Lake. Fluctuating inflows and irrigation withdrawals coupled with the small storage capacity of the reservoir have occasionally resulted in relatively large changes in Cutler Reservoir elevation. However, during all but the winter season, PacifiCorp is required to maintain the reservoir water surface elevation within a 1-foot operating band

under the Cutler Reservoir Operating Plan/Final Report (Article 401 of the 1994 FERC license, as modified by FERC Order on April 30, 2002); from December to March, the operating band is increased by 6 inches.

6.3.6 Existing Instream Flow Uses

The Bear River is regulated according to the multiple use needs within the basin. These needs include irrigation, power generation, recreation, fish and wildlife enhancement, and flood control. The five (5) hydroelectric projects, including Cutler, are operated as a coordinated system to accommodate the many competing uses for the water and the regulation required to satisfy those uses. Operation of the Bear River system is governed by two court decrees in Idaho and Utah; an interstate compact between Wyoming, Idaho, and Utah; state water right laws; and long-standing irrigation contracts in Idaho and Utah.

6.3.7 Existing Water Rights

The following is a general description of the Bear River water rights:

> *The total accumulative consumptive use rights for irrigation on the Bear River below Bear Lake to the Great Salt Lake is 1,962 cfs. Of this total, the rights with a priority earlier than the U.S. Fish and Wildlife Service's 1928 right is 1,845 cfs. With the exception of early spring runoff period, virtually all available natural flow in the Bear River is diverted for irrigation purposes. This condition occurs generally from mid-June to mid-October during average water years. Bear Lake storage water provides a supplemental supply to contracted irrigators after spring runoff subsides. Most of this Bear Lake storage water is delivered into two irrigation canals located at Cutler Dam. During these summer periods there is no surplus Bear Lake storage water available for power generation or other uses in the Bear River downstream of Cutler Dam.* (PacifiCorp 1991).

Water rights held by PacifiCorp for the Project are provided in Table 6-6.

TABLE 6-6 WATER RIGHTS HELD BY PACIFICORP

WATER RIGHT NUMBER	FLOW (CFS)	STORAGE (AC-FT)	PRIORITY DATE	TYPE OF RIGHT
29-1855	270		12/1/1903	Decreed
29-2146	135		12/1/1906	Decreed
29-2147	135		12/1/1908	Decreed
29-2148	500		12/1/1912	Decreed
29-1506	2,500	23,800	12/19/1923	Certificate
29-4364	420		4/3/2008	Certificate
TOTAL:	**3,960**	**23,800**		

Source: Personal Communication B. Morris 2018; Utah Division of Water Rights 2018

6.3.8 Gradient of Downstream Reaches

The Bear River gradient from Cutler Dam to Malad River averages 4 percent as calculated using LIDAR data from the Utah Automated Geographic Reference Center (https://gis.utah.gov/).

6.3.9 Federally-Approved Water Quality Standards

Table 6-7 lists the water quality standards and designated beneficial uses as stated in Utah Administrative Code Rule R317-2 (Utah OAR 2018) effective September 1, 2018.

TABLE 6-7 CUTLER RESERVOIR DESIGNATED BENEFICIAL USES AND NUMERIC CRITERIA

PARAMETER NAME	PARAMETER GROUP	DESIGNATED BENEFICIAL USE			
		2B[17]	3B	3D	4
Temperature (maximum)	Physical		27°C		
pH	Physical	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
Dissolved Oxygen (minimum)	Physical		**30-day average** 5.5 mg/L (all life stages) **7-day average** 6.0 mg/L; (early life stages) 4.0 mg/L; (all life stages) **Minimum** 5.0 mg/L; (early life stages) 3.0 mg/L; (all life stages)		
Specific Conductivity	Physical				
TDS (maximum)	Physical				1200 mg/L
TSS	Physical				
Turbidity (NTE)	Physical	10 NTU	10 NTU	15 NTU	10 NTU
Total Coliform	Bacteria				
Escherichia coli (*E. coli*)	Bacteria	**30-day Geometric Mean** 206 MPN/100ml **Maximum** 668 MPN/100 ml			
Chlorophyll a (chl a)	Nutrients				
Ammonia, as N	Nutrients		**30-day Average** *See below* **1-hour Average** *See below*	**30-day Average** *See below*	

[17] 2B = Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing; 3B = Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain; 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; 4 = Protected for agricultural uses including irrigation of crops and stock watering.

PARAMETER NAME	PARAMETER GROUP	DESIGNATED BENEFICIAL USE			
		2B[17]	3B	3D	4
				1-hour Average *See below*	
Total Kjeldahl Nitrogen (TKN)	Nutrients				
Nitrate, total (maximum)	Nutrients		4 mg/L		
Nitrite, total	Nutrients				
Total Phosphorous [1]	Nutrients		**River/Stream** 0.05 mg/L **Lake/Reservoir** 0.025 mg/L		
Orthophosphate (dissolved)	Nutrients				
Narrative Standard	All uses	"It shall be unlawful, and a violation of these rules, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures; or determined by biological assessments in Subsection R317-2-7.3." (UAC R317-2)			
Key: TDS = total dissolved solids; TSS = total suspended solids; mg/L = milligrams per liter; MPN = most probable number; ml = milliliter; NTE=not to exceed background level					

Source: Utah OAR 2018

[1] Pollution indicator

The following equations were used to calculate ammonia criteria concentrations (Utah OAR 2018):

30-day Average

The 30-day average concentration of total ammonia nitrogen (in mg/l as N) does not exceed, more than once every 3 years on the average, the chronic criterion calculated using the following equations.

Fish Early Life Stages are Present:

$$mg/l\ as\ N\ (Chronic) = \left(\frac{0.0577}{1+10^{7.688-pH}}\right) + \left(\frac{2.487}{1+10^{pH-7.688}}\right) * MIN(2.85, 1.45 * 10^{0.028*(25-T)})$$

Fish Early Life Stages are Absent:

$$mg/1\ as\ N\ (Chronic) = \left(\frac{0.0577}{1+10^{7.688-pH}}\right) + \left(\frac{2.487}{1+10^{pH-7.688}}\right) * 1.45 * 10^{0.028*(25-MAX(T,7))}$$

1-hour Average

The 1-hour average concentration of total ammonia nitrogen (in mg/l as N) does not exceed, more than once every 3 years on the average the acute criterion calculated using the following equation:

Class 3B, 3C, 3D:

$$mg/l\ as\ N\ (Acute) = \left(\frac{0.411}{1+10^{7.204-pH}}\right) + \left(\frac{58.4}{1+10^{pH-7.204}}\right)$$

In addition, the highest 4-day average within the 30-day period should not exceed 2.5 times the chronic criterion. The 'Fish Early Life Stages are Present' 30-day average total ammonia criterion will be applied by default unless it is determined by the director, on a site-specific basis, that it is appropriate to apply the 'Fish Early Life Stages are Absent' 30-day average criterion for all or some portion of the year. At a minimum, the 'Fish Early Life Stages are Present' criterion will apply from the beginning of spawning through the end of the early life stages. Early life stages include the pre-hatch embryonic stage, the post-hatch free embryo or yolk-sac fry stage, and the larval stage for the species of fish expected to occur at the site. The director will consult with the Division of Wildlife Resources in making such determinations. The Division of Wildlife Resources will maintain information regarding the waterbodies and time periods where application of the 'Early Life Stages are Absent' criterion is determined to be appropriate (Utah OAR 2018).

6.3.10 Water Quality Monitoring

Section 303(d) of the Clean Water Act requires states to identify waters failing to meet water quality standards and report these waters to U.S. Environmental Protection Agency (USEPA) on a biennial basis. Waters identified in the 303(d) list are known as impaired waters and are subsequently targeted for total maximum daily loads (TMDL) development. In 2004 Cutler Reservoir was found to be unsupportive of the warm-water aquatic life beneficial use (3B) attributed to low dissolved oxygen levels from excess phosphorus loading to the rivers and reservoir from the surrounding watershed. A TMDL for Cutler Reservoir was developed by the Utah Division of Water Quality (UDWQ) and approved by USEPA in 2010 with nutrient reduction targets identified for point and non-point sources to the Cutler Reservoir (UDWQ 2010).

The 2010 Cutler Reservoir TMDL identified many sources of nonpoint and point source pollution contributing to excess phosphorus in the reservoir, including animal feeding operations and concentrated animal feeding operations (AFOs and CAFOs). Both AFOs and CAFOs are usually found adjacent to waterways, in the valleys of the basin (Budy and Thiede 2006), and CAFOs are additionally regulated. In fact, over 200 CAFOs, averaging approximately 65 animals per operation, were identified upstream of Cutler Dam up to the Utah/Idaho border in 2006 (Budy and Thiede 2006).

The designated beneficial uses determined by the State of Utah for Cutler Reservoir are secondary contact recreation (2B); warm-water game fish and their associated food chain (3B); waterfowl and shorebirds and their associated food chains (3D); and agricultural water supply (4). Secondary contact recreation (2B) and agricultural water supply (4) beneficial uses were deemed to be fully supported in Cutler Reservoir in 2008. However, the Middle Bear River and Cutler Reservoir TMDLs identified that nuisance algal growth may also be impairing the recreational (2B) and the waterfowl and shorebirds (3D) beneficial uses in Cutler Reservoir through the application of the narrative standard which states that human-caused actions may not cause offensive conditions such as "…unnatural deposits, floating debris, oil, scum, or other nuisances such as color, odor, or taste…" (Utah OAR 2018).

Since issuance of the FERC license in April 1994, PacifiCorp has performed quarterly water quality monitoring on an annual basis and reported results to FERC every 5 years. The first report (PacifiCorp 2002) covered November 1995 to May 2002 with summarized results of the 5-year monitoring effort below:

> *The Bear River, Little Bear River, and Spring Creek entering the Cutler Marsh complex are considered impaired relative to its potential beneficial uses. High total suspended solids and excessive nutrients such as nitrogen and phosphorus are indications of this impairment. Historical investigations have indicated that these tributaries are a major cause of the degraded water quality conditions observed in Cutler Reservoir. In the case of total suspended solids (TSS), the influence of the mainstem Bear River on water quality conditions within the reservoir (Benson Marina site) is apparent. Although the average concentrations of TSS decreased at the Benson Marina site over the study period, the average concentrations of TSS also decreased dramatically in the inflowing Bear River water. It is interesting to note that while the Benson Marina TSS concentrations were dropping, the two tributaries (Little Bear River and Spring Creek) were increasing in TSS Concentrations through the study period. The opposite trend was noted for the nutrient concentrations. In this case, the average Bear River concentrations were lower than the Benson Marina site which was lower than the Little Bear River and Spring Creek inflowing concentrations.*

The second 5-year report in 2007 (PacifiCorp 2008) observed that the first 5-year period experienced differing hydrologic conditions between 1996-1998, which was characterized by wet conditions and high flows, and 2000-2003, which was characterized by dry conditions and low flows. Differences in water quality parameters between those two monitoring periods were most likely related to the markedly different hydrologic conditions. The parameters where these differences were easily observed were temperature, coliform bacteria, turbidity and phosphorus.

The ensuing 5-year report submitted in 2013, reviewed water quality trends from 1996 to 2012 and noted that the southern tributaries (Little Bear River, Spring Creek, and Swift Slough) exert dramatic impacts on the water quality throughout Cutler Reservoir. Spring Creek continued to exhibit significantly higher nutrient concentrations than the other sampling locations within the watershed. Water quality in the southern (south of Benson Marina) and the northern (north of Benson Marina, and nearer to the confluence with the

much larger Bear River inflow) reservoir areas remained markedly different with the south characterized by higher nutrient concentrations, higher turbidity, and lower dissolved oxygen. High nutrient loads in the southern reservoir area are partly from point source discharges in Spring Creek (from a meat packing plant) and Swift Slough (Logan wastewater discharge). Due to the slow-moving water, lower inflows, and the shallow nature of the southern reservoir area (1.8 feet mean depth), reservoir sediments are likely to exert a greater influence on water quality than in the faster-flowing, higher-volume, and deeper northern reservoir (3.6 feet mean depth).

Monitoring results determined that, due to the significant influence of tributary water quality, the effect of water quality improvement measures (such as installation of erosion control features and improvements in land use practices) was overwhelmed by the significant influence of tributary water quality and quantity. Therefore, further basin-wide efforts to address land uses that may degrade water quality will likely be required to improve water quality in Cutler Reservoir.

PacifiCorp is currently working to complete the next 5-year water quality report which is due in 2023 and will cover the most-recent 2018 sampling period. Following is a summary of the monitoring that took place in 2018.

In 2018, and per the license requirements and previously-approved water quality monitoring methodology, PacifiCorp collected water quality measurements and samples at eight (8) monitoring locations on seven (7) different occasions throughout the year. The timing of sampling trips was based on hydrologic conditions to capture the range of hydrologic conditions that exist throughout the year. During each sampling event field parameters (dissolved oxygen, temperature, conductivity, pH and turbidity) were measured *in situ* and water samples were collected for laboratory analysis of nitrogen (ammonia, nitrite, nitrate, total Kjeldahl), phosphorus (total phosphate and total orthophosphate), TDS, TSS, total coliforms, *E. coli*, and Chlorophyll a. Results from the 2018 monitoring indicated that water quality conditions in 2018 were comparable to the conditions that have been sampled since 2000. 2013 conditions showed major deviations

from previous reports, however, 2018 reports showed a return to phosphorus levels similar to water quality monitoring results in the years prior to 2013.

The water quality monitoring dataset collected by PacifiCorp around Cutler Reservoir covers a wide range of tributaries and reservoir locations and a variety of physical and chemical water quality constituents. Sample locations include Little Bear River, Spring Creek, Logan River, Bear River, Cutler Reservoir at Benson Marina, Cutler Reservoir east of Highway 23, Cutler Reservoir south of Swift Slough, and Bear River below Cutler Dam (see Figure 2, Appendix G – PacifiCorp 2013). Chemical parameters include nutrient concentrations of phosphorus (total and orthophosphate), nitrogen as NO^3, NO^2, and NH^3, and physical parameters including temperature, TSS, and dissolved oxygen values. The samples were collected quarterly during five (5) monitoring periods (1996–1998, 2000–2003, 2008, 2013, and 2018; initially annually, and subsequently at 5-year intervals). These monitoring periods are characterized by varied hydrologic conditions, based on water entering Cutler Reservoir from the Bear River (primarily) and other tributaries (Logan River, Little Bear River, and Spring Creek) during these time periods. The monitoring period between 1996 and 1998 was characterized by wet conditions and high flows, while 2000 to 2003, 2008, 2013, and 2018 were characterized by dry conditions and/or low flows.

Differences in water quality parameters between the monitoring periods are most likely related to the difference in hydrologic conditions rather than from changes in the amount and nature of inputs into the system. Data collected in 2008 and 2013 generally indicate increased temperature, decreased flows, decreased pH, increased coliform bacteria, and decreased concentrations of phosphorus throughout the Cutler Reservoir system compared to the earlier (1996-2003) monitoring periods. Only small differences in nitrate nitrogen and total nitrogen and dissolved oxygen were noted between the monitoring periods; turbidity was not measured until 2008, and differences in turbidity are notably greater when compared seasonally than compared across years.

Water quality varied by season and hydroperiod for most parameters analyzed across monitoring periods; however, this variation appears to be site-specific, with different patterns emerging in the Bear River and Cutler Reservoir system compared to the

southern tributaries (Logan and Little Bear Rivers and Spring Creek). Turbidity is generally highest during the spring season while nutrient concentrations at most sites, including the Cutler Reservoir sites, are generally highest in the summer season.

Because a variety of other agencies, NGOs, Logan City, private companies, and other stakeholders (primarily municipal, agricultural, and animal processing interests) focused on the development and implementation of a TMDL for the Bear River upstream to the state line and Cutler Reservoir proper, greater efforts through collaboration and cooperation should continue to result in increased, measurable benefits to water quality, primarily through the completion and utilization of a new tertiary water treatment system that Logan City has been required to implement. Future 5-year monitoring reports will continue to track and document water quality parameters, and resultant improvements.

Note that the previous 2013 5-year report discussed the Logan City 2017 compliance schedule to meet new TMDL limit targets, which, along with other TMDL plan implementation, was proposed to start to reduce the high internal nutrient loading of Cutler Reservoir. That compliance schedule has been delayed to 2020 but is anticipated to help reduce the overall nutrient loading in the project reservoir (City of Logan 2015).

In addition to PacifiCorp's monitoring efforts, a report from a Utah State University (USU) practicum class provided additional water quality observations (Abbott et al. 2008) and a paper by Budy et al. (2011) described water quality conditions and the response of three (3) sport fishes in Cutler Reservoir.

The USU practicum student report made limnological comparisons between Cutler Reservoir and the Dingle Marsh (Mud Lake), adjacent to Bear Lake (Abbott et al. 2008). Results of their work revealed a mean chlorophyll *a* level of 19 micrograms per liter (µg/l), mean total phosphorus of 665 µg/l, mean biochemical oxygen demand of 4.39 µg/l, and a mean secchi depth of 0.95 feet. These levels are very indicative of a eutrophic level waterbody. The authors also noted high phosphate loading in the Cutler Reservoir sediments that, if disturbed and released to the water column, could cause anoxic conditions.

Budy et al. (2011) observed that Cutler Reservoir was eutrophic in the summertime with chlorophyll *a* concentration exceeding 50 µg/l. The authors observed summertime fish kills during low runoff years and anoxic conditions overnight indicating dissolved oxygen depletion could occur periodically at concentrations below water quality thresholds for survival of larval or juvenile fishes during the warm summer months. This condition is one of the primary arguments for the TMDL study and the impaired status of Cutler Reservoir. The authors provided water quality results that are summarized in Table 6-8. Chlorophyll *a* concentrations in 2010 were much greater than observations in 2018 which did not exceed 35.9 µg/l (i.e., highest observed sample). It is difficult to compare chlorophyll *a* between years because so many variables factor into phytoplankton production. Unlike 2010 though, no fish kills were observed.

TABLE 6-8 MEAN SPRING, SUMMER AND FALL WATER QUALITY OBSERVATIONS

SEASON	CONDUCTIVITY (µS/cm)	NO_3-NO_2 (ppb)	TOTAL P (ppb)	Chl *a* (µg/l)	WATER TEMP. (°C)	WATER RETENTION TIME (DAYS)	MINIMUM DO (mg/l)
Spring	286.2	160.4	135.4	8.091	16.26	1.36	7.24
Summer	527.4	385.4	227.8	49.28	24.7	32.31	5.39
Fall	470.8	872.8	155.2	13.96	10.34	3.31	9.98

Source: Budy et al. 2011

The authors summarized their finding reiterating that Cutler Reservoir was in a high state of eutrophy. They observed that some game fishes appeared to suffer from a combination of excessive cultural (i.e., human activity) eutrophication in the context of elevated temperatures while other fish species appeared to be largely unaffected (e.g. channel catfish (*Ictalurus punctatus*) and black crappie (*Pomoxis nigromaculatus*).

6.4 Fish and Aquatic Resources

6.4.1 Aquatic Resources and Habitats

Cutler Reservoir is a large, shallow impoundment which covers approximately 5,500 acres; only approximately 1,200 acres have a depth greater than 3 feet. The average depth of the southern half of the reservoir (including the North and South Marsh units) is less than 2 feet; the average depth of the entire reservoir is less than 4 feet. The reservoir has a storage capacity of approximately 13,000 acre-feet (PacifiCorp 2013). Fish habitat is considered very limited.

6.4.2 Fish Species and Habitats

Fish species present in the reservoir include game fish and non-game fish, including: common carp (*Cyprinus carpio*), fathead minnow (*Pimephales tenellus*), spottail shiner (*Notropis hudsonius*), Utah sucker (*Catostomus ardens*), black bullhead (*Ameirus melas*) or brown bullhead (*Ameirus nebulosus*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), bluegill sunfish (*Lepomis macrochirus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), and walleye (*Sander vitreus*) (Sigler and Sigler 1996; UDWR 2018c).

6.4.2.1 Common Carp

Common carp are one of the more prevalent non-game fish in Cutler Reservoir. Carp are non-native, having been widely introduced across the western United States by railroad companies to feed the primarily foreign workers responsible for building the trans-continental rail system in the late 1800s and early 1900s. Carp cause problems in many areas of Utah, where they compete with native fish species and/or destroy habitat used by native fishes and waterfowl. Common carp are opportunistic feeders, eating mostly insects and other invertebrates. It is not unusual, however, for carp to consume plant matter. Young carp eat zooplankton and phytoplankton. Carp spawn during the spring and summer, usually in shallow water. Large numbers of eggs (large females can produce well over 1 million eggs) are released into the water and hatch in 1 to 2 weeks. Carp often inhabit areas with slow-moving water, and they are very tolerant of poor water conditions.

6.4.2.2 Fathead Minnow

The fathead minnow is native to much of North America but is not native to Utah. In Utah, the species is established in the Colorado River system, and it may also occur in Utah Lake. Based on surveys over the past 9 years, the fathead minnow is doing very well in Cutler Reservoir. The fathead minnow is an opportunistic feeder that eats plant matter, small animals and detritus. The species spawns throughout the spring and summer; males build nests and guard the eggs until they hatch, which usually takes approximately 5 days. Many adults die once spawning is complete. The fathead minnow is an excellent forage fish (i.e., prey) but may do a great deal of harm in Utah because it competes with many rare fish species native to the Colorado and Bear River systems. Fathead minnows were introduced primarily as bait and prey fish.

6.4.2.3 Spottail Shiner

The spottail shiner is part of the minnow family that is native to parts of Canada and much of the United States east of the Rocky Mountains. Although the species is not native to Utah, it was introduced as a bait fish to Willard Bay Reservoir and Oneida Reservoir, where it serves as a prey for wiper (hybrid white bass and striped bass), walleye, and other sport fish. The spottail is now prevalent in Cutler Reservoir (USU 2018). The spottail shiner eats algae and small invertebrates. Spawning occurs in the spring, over areas with sand and gravel substrate, however spawning of the spottail shiner has yet to be observed in Cutler Reservoir. The spottail shiner is average size for a minnow, with adults usually attaining 4 to 5 inches in length.

6.4.2.4 Utah Sucker

The Utah sucker is native to the Bonneville basin of Utah, Idaho, Nevada, and Wyoming. In addition to its native range, the Utah sucker has been introduced to, and has become established in, the Colorado River system. Utah suckers are relatively abundant in Utah, especially in Bear Lake. In historic times, Utah suckers were an important food source for the native people of Utah. Currently however, Utah suckers are rarely eaten by humans, and serve mainly as forage for other fish species.

Utah suckers are benthic (bottom dwelling) fish capable of adapting to many different types of environmental conditions in both lakes and streams. Utah suckers consume plant and animal

matter, with algae being a common food item. The species spawns during the late spring either in streams or along lake shores. Males and females gather into a frenzied school. Eggs are broadcast into the water, where fertilization occurs. No parental care is given to eggs or young.

6.4.2.5 Black Bullhead

The black bullhead is one of two (2) species of bullhead catfishes in Utah with the other being the brown bullhead. The black bullhead is native to areas east of the Rocky Mountains in the United States, southern Canada, and northern Mexico but is not native to Utah. It has become established, however, in many of Utah's warm waters, where it is now a popular sport fish. The black bullhead is especially common in Utah Lake and Cutler Reservoir.

The black bullhead is an opportunistic bottom-feeder, eating fishes, many types of invertebrates, plant matter and detritus. The species spawns from late spring to early summer; nests and young are guarded by parents. The black bullhead prefers the warm, slow-moving, turbid habitat provided by small water bodies and backwaters.

6.4.2.6 Channel Catfish

The channel catfish is a popular sport fish that is currently found in many of Utah's warmer waters, such as Utah Lake and Cutler Reservoir, but is not native to the state. The channel catfish is native to many areas of North America east of the Rocky Mountains. Several large individuals are channel catfish have been caught in Cutler Reservoir. Channel catfish eat many types of foods, including plant matter, detritus and a large variety of invertebrates, although adult fish are primarily piscivorous (i.e., they eat fish). The species spawns in late spring and summer, with eggs hatching in about one week. Eggs and fingerlings are guarded by the males.

6.4.2.7 Green Sunfish

The green sunfish is established in many of Utah's warmer waters, although it is not native to the state, but rather to much of central and eastern North America. The green sunfish is a sport fish, but it is not as popular with Utah anglers as is the closely related bluegill. Adult green sunfish eat large invertebrates and small fishes, whereas young green sunfish eat zooplankton and other small invertebrates. The species spawns in the spring and summer, and eggs hatch in

approximately 2 days. Males build nests prior to spawning and defend both eggs and young after spawning is complete. Green sunfish inhabit shallow, warm areas of lakes, ponds, and streams.

6.4.2.8 Bluegill Sunfish

The bluegill is a popular sport fish that is not native to Utah but is now found throughout the state in warm water habitat. The native range of the species includes much of central and eastern North America. The bluegill is an opportunistic feeder that eats small fishes, zooplankton, insects, insect larvae and other invertebrates. The species spawns in the spring and summer, with eggs hatching in approximately 2 days. Males build nests prior to spawning, and later guard eggs and newly emerged fry. Bluegill are found in warm shallow areas that offer sufficient cover, usually in the form of submerged vegetation.

6.4.2.9 Smallmouth Bass

The smallmouth bass is a popular sport fish that can tolerate cooler water temperatures than largemouth bass. Consequently, it has been introduced throughout Utah, and in addition to Cutler Reservoir, is now established in Flaming Gorge Reservoir, Mantua Reservoir, Newton Reservoir, Hyrum Reservoir, Starvation Reservoir, Lake Powell, and many other areas of the state. The smallmouth bass is not native to Utah, but rather to much of central and eastern North America. Smallmouth bass primarily eat fish, but amphibians and a variety of invertebrates, including crayfish and insects, are also consumed. The species spawns in late spring and early summer over nests dug by males in gravel or sand substrate. Males guard the eggs, which hatch in 3 to 10 days. After hatching, fry may be guarded by males for up to 1 month. The smallmouth bass prefers clear, cool (not cold), rocky areas of lakes, reservoirs, and rivers.

6.4.2.10 Largemouth Bass

The largemouth bass is a popular sport fish native to eastern North America. The species was introduced to Utah and is now established in many of Utah's warmer waters. Lake Powell, for example, is one of Utah's best largemouth bass fisheries. Adult largemouth bass are primarily piscivorous, but amphibians, rodents, and large invertebrates may also be consumed. The species spawns in the late spring and early summer over nests dug by males in the substrate. Males usually guard the eggs, which hatch in 2 to 5 days. The largemouth bass requires warmer water

than does the smallmouth bass. Consequently, the distribution of the largemouth bass in Utah is not as large as that of the smallmouth bass.

6.4.2.11 Black Crappie

The black crappie is a popular sport fish that is currently found in many of Utah's warmer waters. The species is not native to Utah, but rather to much of central and eastern North America. The black crappie is much more abundant in Utah than the closely related white crappie. The two (2) species can be distinguished by several characteristics, including dorsal fin position; the dorsal fin of the black crappie is closer to the head, whereas the dorsal fin of the white crappie is further back on the body. Adult black crappie consume small fishes and many types of invertebrates, including zooplankton and insects. The diet of juvenile black crappie is composed primarily of zooplankton. The species spawns in the spring and early summer over nests dug by the male in the substrate. After spawning, males guard the eggs, which hatch in 2 to 5 days. The black crappie prefers slow-moving, clear areas of warm creeks, streams, lakes, and reservoirs.

6.4.2.12 Yellow Perch

The yellow perch is a sport fish native to much of North America east of the Rocky Mountains. Although the species is not native to Utah, it has been introduced to many Utah waters, and is now commonly found in the state. Young yellow perch eat zooplankton, whereas adult yellow perch eat larger invertebrates, such as insects and snails, and small fishes. The species spawns in the spring, usually over shallow areas with submerged vegetation; eggs hatch in 10 to 20 days. Yellow perch populations grow quickly, and the fish will often stunt (remain small throughout life) due to over-crowding unless a significant number of perch are removed from the system through predation or angling.

6.4.2.13 Walleye

The walleye is a large member of the perch family and a popular sport fish in Utah. The walleye is native to much of central and eastern North America, but the species is not native to Utah. In Utah, the walleye has become established in many areas, including Utah Lake, Yuba Lake, Starvation Reservoir, Deer Creek Reservoir, and Willard Bay Reservoir.

Adult walleye eat primarily fish (especially yellow perch in Utah), but invertebrates are also consumed when they are available. The species spawns in streams or in shallow water along shorelines during the spring, and eggs hatch in about one month. Walleye prefer large lakes or streams, where they are often found near the bottom in beds of aquatic vegetation.

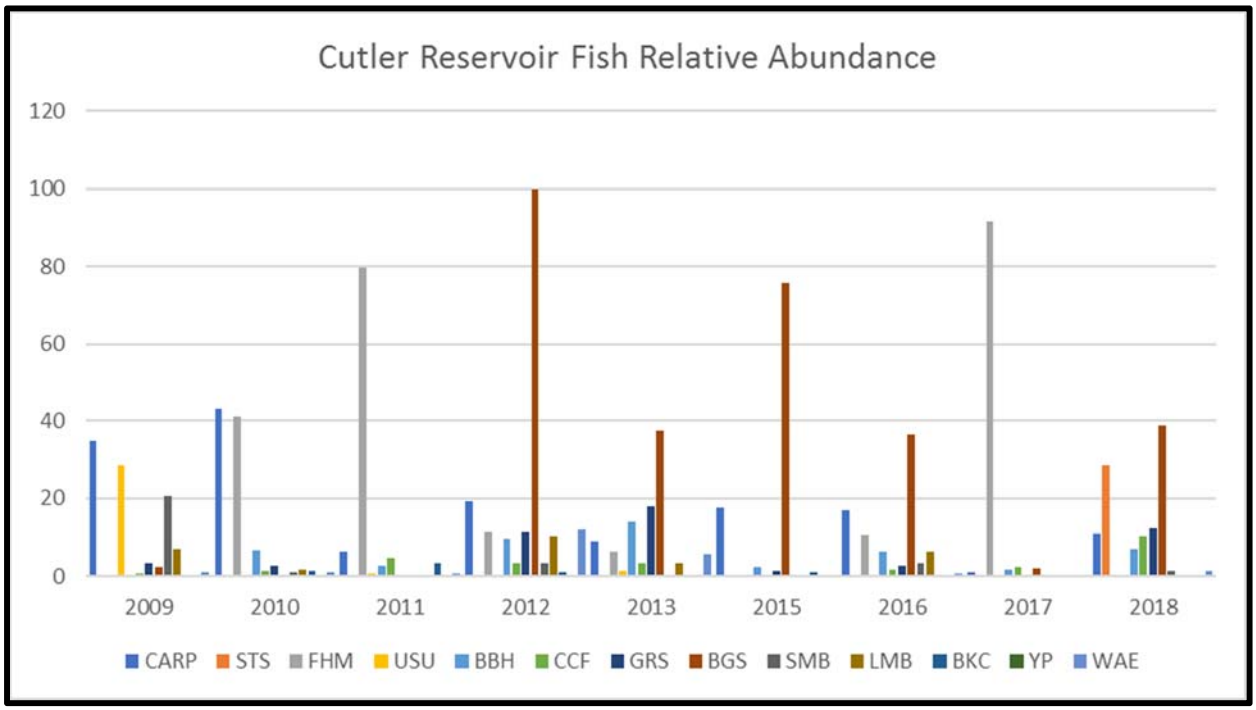
Cutler Reservoir would not normally be considered suitable for walleye because it is shallow, although a walleye population is known to exist in the Bear River downstream of Cutler Dam. Walleye are sensitive to light, so they prefer deep water where light does not penetrate strongly. Because of the turbid conditions in the Cutler Reservoir, the walleye seem to do well enough to be potentially self-sustaining. It is also possible that walleye are recruiting from areas upstream of Cutler Reservoir.

6.4.2.14 Other Fish

Other fish species that have either been present in the Bear River upstream of Cutler Reservoir or downstream of Cutler Dam but are not currently known to occur in the Project Area are Bonneville cutthroat trout (*Oncorhynchus clarki utah*), bluehead sucker (*Catostomous discobolus*), and northern leatherside chub (*Lepidomeda copei*). Bonneville cutthroat trout are known to occur in the Logan River and Blacksmith Fork River. They also occur in the Bear River at the Cub River and upstream (USFWS 2001) but have not been documented in Cutler Reservoir or mainstem Bear River downstream of Cutler Dam in recent years (last known observation was 2008). Bluehead suckers were historically found in the Bear River drainage but currently they are not known to be present in Cutler Reservoir or downstream of the dam (UDWR 2016). Northern leatherside chub are native to the Bear River but their numbers are greatly reduced and threatened in much of their native habitat (Sigler and Sigler 1996; UDWR 2009). The Northern Leatherside chub prefers cool riverine habitat so they have not been documented and are not likely to be found in Cutler Reservoir.

Nearly every year since 2009, the USU class, Watershed Sciences 3110: Fish Diversity Laboratory, participates in a fisheries assessment activity in Cutler Reservoir. The class has shared their data, which has led to the development of relative abundance estimates for each species. Relative abundance estimates provide a snapshot in time for each year over the past

9 years, illustrating which species are present and which of those are the dominant species (Figure 6-5).



Source: USU 2018

Key: CARP = common carp, STS = spottail shiner, FHM = fathead minnow, USU = Utah sucker, BBH = black bullhead, CCF = channel catfish, GRS = green sunfish, BGS = bluegill sunfish, SMB = smallmouth bass, LMB = largemouth bass, BKC = black crappie, YP = yellow perch, WAE = walleye.

FIGURE 6-5 RELATIVE ABUNDANCE OF THE FISH SPECIES SAMPLED IN CUTLER RESERVOIR FROM 2009-2018

This data indicates that the three (3) most dominant species are bluegill sunfish, fathead minnow and common carp. Spottail shiners appeared for the first time in 2018 and were noted as the second-most prevalent species that year. Spottail shiners were stocked in Oneida Reservoir in 1986, but were not collected until 2018 by the USU class. The dominant species varies from year to year, which may reflect actual high and low age-class survival trends; however, there could be an artificial factor created by having different students with differing skill levels collecting this data each year. Nonetheless, the data are valuable pieces of information to assist managers with assessing the health of the Cutler Reservoir fish community.

Other reports indicated that water depth, poor water quality, and lack of cover, in addition to large-magnitude reservoir water level fluctuations resulting from major maintenance drawdowns

that occurred in several of the years sampled (but which otherwise occur infrequently), were said to collectively reduce the potential for a viable warm-water fishery in the initial 5-year monitoring report (PacifiCorp 2002). In more recent studies, Budy, et al. (2011) related water conditions in Cutler Reservoir to the viability of three (3) popular sport fish: walleye, channel catfish, and black crappie. According to Budy, et al. (2011) no fishes have been stocked in Cutler Reservoir since 1990, so the resident fish reproduce naturally. Walleye, crappie and channel catfish displayed growth rates at the upper range of reported values for these species. Budy et al. (2011) also noted that fish diversity is relatively high for a western reservoir. The authors, based on their modeling results, rated the reservoir at a mid-level degree of biological condition and degree of stress compared to a purported state of high stress and severe degradation. While walleye experience the eutrophic conditions with high temperatures and demonstrate negative growth during the warm summer months, more tolerant species like black crappie and channel catfish appear to be largely unaffected.

6.4.3 Benthic Macroinvertebrates

There was very little data on benthic macroinvertebrates until the 5-year monitoring report of 2003 to 2007 (PacifiCorp 2008). In that report, it was noted that an assessment of stream benthic macroinvertebrates conducted by UDWQ determined that the sections of the Little Bear River and Spring Creek near Cutler Reservoir were impaired based on biological criteria. The impairment is related to the absence of 48 percent and 41 percent of the species (for Little Bear River and Spring Creek, respectively) expected to occur at that site based on the streams' natural, geomorphic, and watershed characteristics (UDWQ 2008).

Data were collected by USU students in the past under the supervision of Dr. Wayne Wurtsbaugh. Benthic invertebrate biomasses in the open sediments of Cutler Reservoir were observed to be very low (Stoller 2007; Dees 2007). Total macroinvertebrate biomass and density in Swift Slough was 42 percent and 50 percent, respectively, compared to the Logan River station. The Logan River site is the least impaired station in the Cutler Reservoir system. Samples collected in Swift Slough (the location where effluent from Logan City is returned to the watershed) exhibited very low biomass of benthic invertebrates compared to other systems (Stoller 2007; Dees 2007). Macroinvertebrate populations in Cutler Reservoir were determined

to be dominated by oligochaetes (worms) and chironomids (midge flies) (Stoller 2007; Dees 2007). Both taxa are relatively tolerant of eutrophic conditions although oligochaetes are substantially more tolerant. As eutrophication becomes more severe, the chironomid community tends to decrease in numbers with corresponding increases in oligochaetes (Wetzel 2001). The dominance of oligochaetes in Swift Slough indicates advanced eutrophic conditions with low dissolved oxygen.

Based on the available macroinvertebrate data, bird and fish foraging on benthic invertebrates in the open water sections of the reservoir could be limited by low prey density (Wurtsbaugh 2007). Wurtsbaugh (2007) suggests that additional macroinvertebrate data are required to determine if this condition extends to other parts of Cutler Reservoir and to look for the presence of populations of macroinvertebrates such as Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (i.e., EPT taxa[18]). EPT taxa are generally the least tolerant of eutrophic conditions (Wang, et al. 2007). Budy and Thiede (2006) reported finding EPT taxa in several fish diet samples so there is at least a presence in the reservoir.

A review of the diet requirements of bird species found around Cutler Reservoir (Kaufman 1996; Cornell 2008) indicates numerous species that depend on chironomids as part of their diet. Eutrophication and associated low dissolved oxygen are known to affect the quality and quantity of macroinvertebrates, a key food resource for many birds and fishes.

6.4.4 Fish Habitat Enhancement Monitoring Program

Fish habitat structures, in the form of cabled and weighted tires, were placed in several areas of Cutler Reservoir in 1995 by Utah Division of Wildlife Resources (UDWR). In addition, PacifiCorp constructed structures from wood lath and wire and placed these in the reservoir at selected locations. Monitoring of those structures began shortly after they were installed. Cooperative electrofishing monitoring activities with UDWR and PacifiCorp recorded a few game fish near the structures in 1996. Species found in proximity to the habitat structures included black bullhead, largemouth bass, black crappie, green sunfish and bluegill sunfish. As stated in the monitoring report (PacifiCorp 2002), monitoring efforts using electrofishing

[18] E= Ephemeroptera, P= Plecoptera, T= Tricoptera

produced very few fish per unit of effort expended. Similar monitoring activities in 1998 also resulted in few game fish; however, in 2000, high numbers of carp and non-game fish were captured near the structures (PacifiCorp 2002). Subsequently, UDWR determined that due to the high effort per catch unit, monitoring would be discontinued until the next major reservoir drawdown. In 2008, the reservoir was drawn down to inspect the spill gates at Cutler Dam. PacifiCorp and UDWR attempted to locate the fish habitat structures without success. This resulted in a temporary agreement to suspend the fish structure monitoring.

A subsequent agreement resulted to permanently suspend the fish structure monitoring as a part of the 2013 monitoring report effort. Regardless, PacifiCorp staff again looked for the fish structures during major reservoir drawdowns in 2013 and 2014, again unsuccessfully. Conclusions from the aquatic biologists involved were that game fish habitat, species diversity, and population numbers would likely continue to be limited by poor water quality and low numbers of forage fish, as described in the 1996 agreement with UDWR (refer to PacifiCorp 2002 for additional detail). This outcome supports the agreement to suspend this monitoring element due to ineffectiveness. There are currently no plans for a major maintenance-related reservoir drawdown during the next (2018 to 2022) monitoring period. However, PacifiCorp is proposing to conduct a drawdown in October 2019 to capture LiDAR[19] data for the purpose of mapping the bottom of the reservoir.

Fishery monitoring efforts between 2007 and 2012 reflected a greater level of species diversity than expected by PacifiCorp and UDWR based on the 1998 to 2002 reporting period, but also described a very eutrophic and potentially deteriorating system due to human impacts on water quality and ecology of Cutler Reservoir. Summaries of the 2007 to 2012 fisheries and limnology data are included in Appendix F of the 2013 5-year report (PacifiCorp 2013).

6.4.4.1 Fish Passage

Fish passage is not a requirement of the current FERC license, as there are no migratory species residing in the reservoir, nor are any threatened or endangered fish species present. Further, with

[19] **LIDAR**, which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. https://oceanservice.noaa.gov/facts/lidar.html. Accessed February 22, 2019.

the exception of Utah suckers, there are almost no native fish present in the reservoir, and similarly very few known in the Project Area of the Bear River; therefore, fish passage is not warranted at the Cutler Project.

6.4.4.2 Resident Fish and Fisheries Management

Currently, the reservoir fishery is not actively managed by UDWR. As indicated in the USU class efforts, there appear to be a high number of fish species and a relatively high fish biomass present in Cutler Reservoir.

6.4.4.3 Essential Fish Habitat

Essential Fish Habitat does not exist in the Bear River because there are no anadromous fish present.

6.4.4.4 Freshwater Mussels

Freshwater mussels are present in Cutler Reservoir. One specimen of *Anodonta* sp. was found in Cutler Reservoir during a drawdown period in 2013. [20] Also, the species *Margaritifera falcatais* is known to exist in the Bear River and may be present in the Cutler Reservoir (Hovingh 2004). More recent work made use of a new survey tool called Environmental DNA (eDNA). The USU Molecular Ecology Lab conducted eDNA analysis for mussels in 2016 and detected individual species in the Bear River Drainage. However, their field sampling failed to detect eDNA of California floater in Cutler Reservoir in 2016 and 2017 (Rogers 2017).

Cutler Reservoir is also monitored regularly by UDWR for invasive shellfish like the *Quagga* sp. and zebra mussels. As of November 2018, some samples are pending analysis, but the current status is 'undetected' for invasive mussels.[21]

[20] See https://ask.extension.org/questions/159155.
[21] See http://www.utahfishinginfo.com/dwr/mussel_status.php

6.5 Upland Wildlife and Botanical Resources

6.5.1 Wildlife Habitats in the Project Area and Vicinity

The Project is located in the Central Basin and Range sub-region of the Wasatch and Uinta Mountain ecoregion (USEPA 2017). This sub-region is characterized by mountains, foothills, dry basins, valleys, mountain slopes, alluvial fans, shrubland, grassland, and forests (USEPA 2017). In the Project Vicinity, a variety of diverse upland habitats are available due to varying topographic elevations. The Project Vicinity for upland wildlife habitats is defined as the Bear River watershed.

The Bear River watershed provides food and cover for wildlife, is an important migration corridor linking ecosystems in the northern and southern Rocky Mountains and is used by migratory birds traveling the Pacific and Central flyways (USFWS 2013; SWCA 2017). The close proximity of diverse habitats in the Project Vicinity is essential for many wildlife species to complete their life cycle (USFWS 2013). The Bear River watershed therefore supports habitat for more than 300 species of birds, 100 mammal species, approximately 20 reptile species and 12 amphibian species (USFWS 2013).

Lower elevations in the Project Vicinity contain grassland, shrubland, pasture, meadows, forest, and agricultural land (Sleeter et al. 2012; USFWS 2013). Shrubland habitats contain a variety of species of sagebrush (*Artemesia* spp.) including basin big sagebrush (*A. tridentata* ssp. *tridentata*), Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*), black sagebrush (*A. nova*), and low sagebrush (*A. arbuscula*) (USFWS 2013). Shrubs are also common, including greasewood (*Sarcobatus vermiculatus)*, rabbitbrush (*Chrysothamnus* spp.), shadscale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), serviceberry (*Amelanchier alnifolia*), and bitterbrush (*Purshia tridentata*). Common perennial grasses and forbs in the Project Vicinity include bluebunch wheatgrass (*Pseudoroegneria spicata*), sand dropseed (*Sporobolus cryptandrus*), Indian ricegrass (*Achnatherum hymenoides*), Sandberg bluegrass (*Poa secunda*), wildrye (*Elymus* spp.), alkali sacaton (*Sporobolus airoides*), inland saltgrass (*Distichlis spicata*), carpet phlox (*Phlox hoodii*), arrowleaf balsamroot (*Balsamorhiza sagittata*), Richardson's geranium (*Geranium richardsonii*), yarrow (*Achillea millefolium*), and mildvetch (*Astragalus* spp.) (USFWS 2013).

Pinyon-juniper and pine forests are common at middle to higher elevations and may contain bigtooth maple (*Acer grandidentatum*), gambel oak (*Quercus gambelii*), singleleaf pinyon (*Pinus monophyla*), two-needle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), Rocky Mountain juniper (*Juniperus scopulorm*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), quaking aspen (*Populus tremuloides*), Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), mixed forbs, perennial grasses, sedges, and rushes (Sleeter et al. 2012; USFWS 2013). The higher elevation mountain and forest habitats support wildlife such as moose (*Alces alces*), black bear (*Ursus americanus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), Canada lynx (*Lynx canadensis*), wolverine (*Gulo gulo*), gray wolf (*Canis lupus*), American pika (*Ochotona princeps*), groundhogs, and marmots (*Marmota* spp.) (USFWS 2013). Montane shrubland and grassland support mule deer (*Odocoileus hemionus*), Rocky Mountain elk, pronghorn (*Antilocapra Americana*), greater sage-grouse (*Centrocercus urophasianus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), bald eagle (*Haliaeetus leucocephalus*), rabbits (*Leporidae* spp.), bobcat (*Lynx rufus*), and black bears (USFWS 2013).

Cutler Dam resides in a narrow, steep-sided canyon. The mountain slopes within and around the canyon contain xeric uplands with juniper woodland, sagebrush and grasses (PacifiCorp 1991). The Cutler Reservoir spreads out from the canyon into flat land consisting of pasture, meadows, meandering river channels, marshes, wetland, agricultural land, and forest.

Upland habitats within the Project Boundary are listed in Table 6-9. The most abundant type of upland habitat is agricultural land (2,035 acres, 83 percent) followed by Inter-Mountain Basin Semi-Desert Grassland (103 acres, 4 percent), Inter-Mountain Basin Big Sagebrush Shrubland (91 acres, 4 percent) and Great Basin Pinyon-Juniper Woodland (84 acres, 3 percent) (NatureServe 2009). With the exception of agricultural land, which is dispersed around the south and north marsh, and reservoir units, the upland habitat is adjacent to the Cutler Canyon unit and near Cutler Dam.

TABLE 6-9 UPLAND HABITAT TYPES WITHIN THE PROJECT BOUNDARY

HABITAT TYPE	PACIFICORP UNIT LOCATION	DESCRIPTION	APPROXIMATE ACREAGE IN PROJECT BOUNDARY
Inter-Mountain Basins Big Sagebrush Shrubland	Canyon	Lower elevations between mountains and foothills in Cutler Canyon and near Cutler Dam	91
Rocky Mountain Bigtooth Maple Ravine Woodland	Canyon	Cool ravines, hills, slopes forests, woodlands	12
Great Basin Pinyon-Juniper Woodland	Canyon	Dry mountain ranges and foothills at lower elevations	84
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	Canyon	Lower elevation montane zone, variable depending on temperature and moisture	4
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland	Canyon	Lower elevation cool ravines and north-facing slopes	7
Inter-Mountain Basins Semi-Desert Shrub-Steppe	Canyon	Lower elevation alluvial fans and flats; graminoids, shrubs, woody plants	6
Inter-Mountain Basins Semi-Desert Grassland	Canyon	Dry, low elevation grasslands, swales, playas, alluvial flats, plains	103
Introduced Upland Vegetation - Annual Grassland	Canyon, North Marsh, South Marsh	Invasive species, weeds	70
Introduced Upland Vegetation - Perennial Grassland and Forbland	Canyon	Invasive species, weeds	2
Developed-Open Space	North Marsh	Manicured lawns, ornamental shrubs and trees with occasional native vegetation	29
Developed-Low Intensity	North Marsh	Manicured lawns, ornamental shrubs and trees with occasional native vegetation	5
Agriculture - General	Canyon, North Marsh, South Marsh	Cultivated crops, hay, pastures	2,035

Source: NatureServe 2009

6.5.2 Botanical Resources in the Project Vicinity

Project Vicinity for upland botanical resources is defined as the Bear River watershed. Common vegetation that may occur in the Project Vicinity is provided in Table 6-10 (PacifiCorp 1991; NatureServe 2009; USFWS 2013; SWCA 2017).

TABLE 6-10 UPLAND BOTANICAL RESOURCES IN THE PROJECT VICINITY

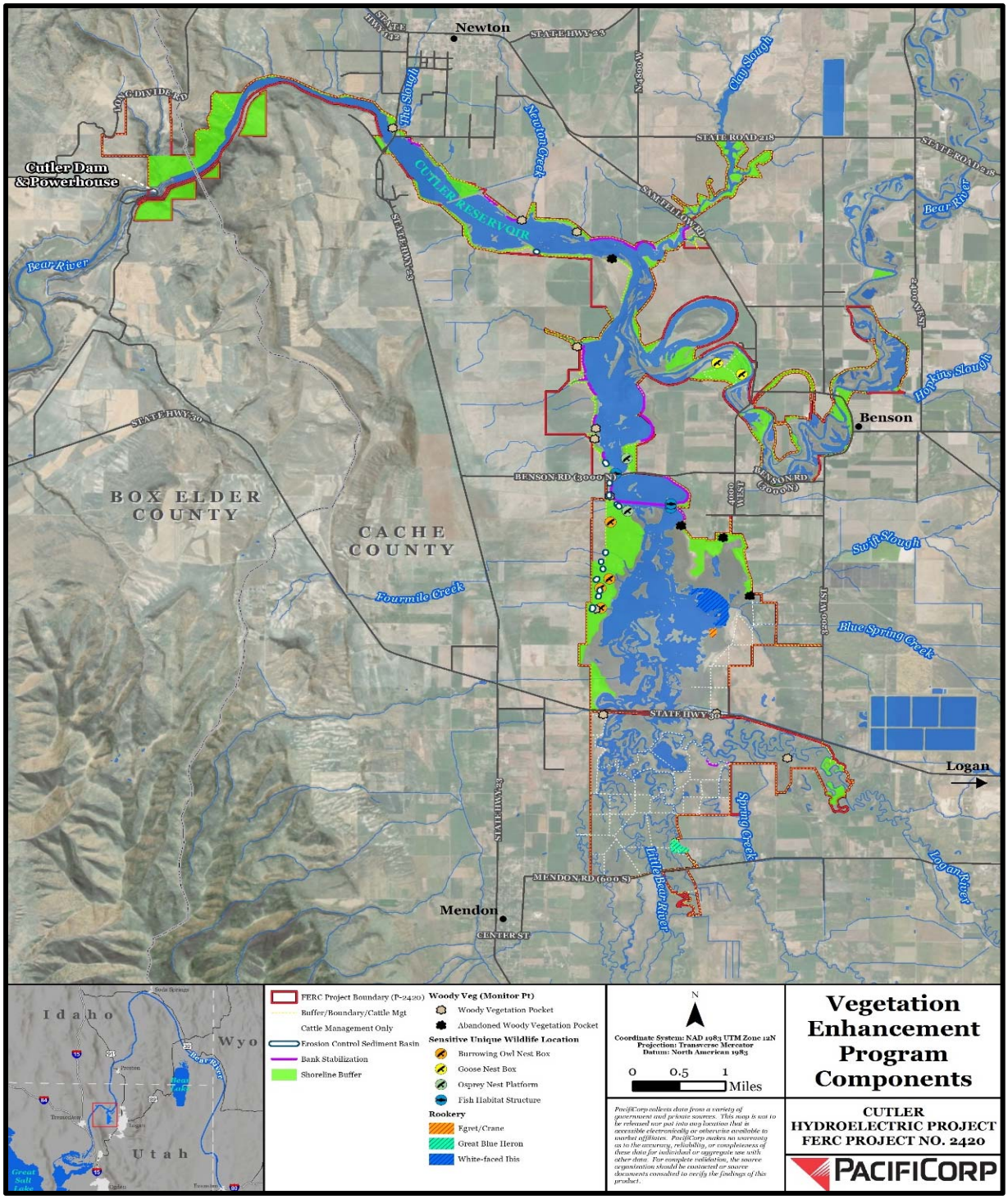
COMMON NAME	SCIENTIFIC NAME
Trees and Shrubs	
Antelope bitterbrush	*Purshia tridentata*
Big sagebrush	*Artemesia tridentata* spp.
Bigtooth maple	*Acer grandidentatum*
Black sagebrush	*Artemisia nova*
Boxelder	*Acer negundo*
Broom snakeweed	*Gutierrezia sarothrae*
Chokecherry	*Prunus virginiana var. melanocarpa*
Common juniper	*Juniperus communis*
Creeping mahonia	*Mahonia repens*
Fremont cottonwood	*Populus fremontii*
Gambel oak	*Quercus gambelii*
Golden currant	*Ribes aureum*
Gray alder	*Alnus incana*
Greasewood	*Sarcobatus vermiculatus*
Greene's rabbitbrush	*Chrysothamnus greenei*
Low sagebrush	*Artemisia arbuscular*
Mountain big sagebrush	*A. tridentata* ssp. *vaseyana*
Mountain mahogany	*Cercocarpus ledifolius* *Cercocarpus montanus* *Cercocarpus intricatus*
Mountain spray	*Holodiscus dumosus*
Narrowleaf cottonwood	*Populus angustifolia*
Oregon boxwood	*Paxistima myrsinites*
Red-osier dogwood	*Cornus sericea*
Rocky Mountain juniper	*Juniperus scopulorum*
Rocky Mountain maple	*Acer glabrum*
Rubber rabbitbrush	*Ericameria nauseosa*
Saltbush	*Atriplex* spp
Skunkbush sumac	*Rhus trilobata*
Subalpine fir	*Abies lasiocarpa*
Two-needle pinyon pine	*Pinus edulis*
Utah juniper	*Juniperus osteosperma*
Water birch	*Betula occidentalis*
Winterfat	*Krascheninnikovia lanata*
Wood's rose	*Rosa woodsii*
Yellow rabbitbrush	*C. Viscidiflorus*

COMMON NAME	SCIENTIFIC NAME
Grasses	
Alkali sacaton	*Sporobolus airoides*
Arizona fescue	*Festuca arizonica*
Basin wildrye	*Leymus cinereus*
Blue grama	*Bouteloua gracilis*
Bluebunch wheatgrass	*Pseudoroegneria spicata*
Bulrushes	*Schoenoplectus acutus* *S. americanus* *S. pungens*
Cheatgrass	*Bromus tectorum*
Crested wheatgrass	*Agropyron cristatum*
Indian ricegrass	*Achnatherum hymenoides*
Inland saltgrass	*Distichlis spicata*
James' galleta	*Pleuraphis jamesii*
Idaho fescue	*Festuca idahoensis*
Kentucky bluegrass	*Poa pratensis*
Muhly	*Muhlenbergia* spp
Muttongrass	*Poa fendleriana*
Orchardgrass	*Dactylis glomerata*
Needle-and-thread grass	*Hesperostipa comata*
Saline wildrye	*Leymus salinus*
Sandberg bluegrass	*Poa secunda*
Scratchgrass	*Muhlengertia asperifolia*
Sedges	*Carex* spp.
Thickspike wheatgrass	*Elymus lanceolatus*
Western fescue	*Festuca occidentalis*
Western wheatgrass	*Agropyron smithii*
Forbs/Herbaceous	
Alfalfa	*Medicago sativa*
Black medic	*Medicago lupulina*
Bull thistle	*Cirsium vulgare*
Clasping pepperweed	*Lepidium perfoliatum*
Clover	*Trifolium* spp
Common mallow	*Malva neglecta*
Field bindweed	*Convolvulus arvensis*
Fuller's teasel	*Dipsacus fullonum*
Showy milkweed	*Asclepias speciosa*
Yarrow	*Achillea millefolium*

Source: PacifiCorp 1991; Sleeter et al. 2012; USFWS 2013; SWCA 2017

6.5.3 Vegetation Enhancement Program

PacifiCorp implements a Vegetation Enhancement Program (VEP) at the Cutler Project that is used to monitor sensitive and unique wildlife habitats at least annually (PacifiCorp 2018b). Sensitive or unique wildlife habitat areas that are monitored within the Project Boundary include: Cutler Canyon, osprey nest platforms near Benson Marina, erosion control sediment basins, burrowing owl (*Athene cunicularia*) nest boxes, the ibis/gull/tern nesting colony in the North Marsh, pastures around Logan River, and a great blue heron *(Ardea herodias*) nesting colony in the South Marsh (Figure 6-6) (PacifiCorp 2018b). The great blue heron rookery is also used by Canada geese (*Branta canadensis*) and double-crested cormorants (*Phalacrocorax auratus*). The grassland area around the erosion control basins in the North Marsh have become important habitat for long-billed curlew *(Numenius americanus*), American avocet (*Recurvirostra americana*), and black-necked stilt (*Himantopus mexicanus*) breeding pairs (PacifiCorp 2018b). This area has also become upland habitat for breeding birds, large and small mammals, and raptors. There is also an egret/crane rookery in the North Marsh (Figure 6-6).



Source: PacifiCorp 2018a

FIGURE 6-6 VEGETATION ENHANCEMENT PROGRAM COMPONENTS WITHIN THE PROJECT BOUNDARY

6.5.4 Wildlife Resources in the Project Area

The Project Area provides suitable habitat for a large variety of terrestrial wildlife, including mammals, birds, reptiles, and amphibians.

6.5.4.1 Mammals

A variety of habitats are available in the Project Area for small, medium, and large mammals to complete some or all of their life cycle (Table 6-11). Small mammals which may occur in the Project Area include rodents (e.g., mice, rats, shrew, vole), squirrels, and gophers. Medium-sized mammals likely to inhabit the Project Area include beaver, marmots, raccoon, coyote, fox, weasels, bobcat, badgers, mink, rabbits and skunk. Large mammals in the Project Area include moose, mule deer, and elk.

TABLE 6-11 MAMMALS POTENTIALLY OCCURRING IN THE PROJECT AREA

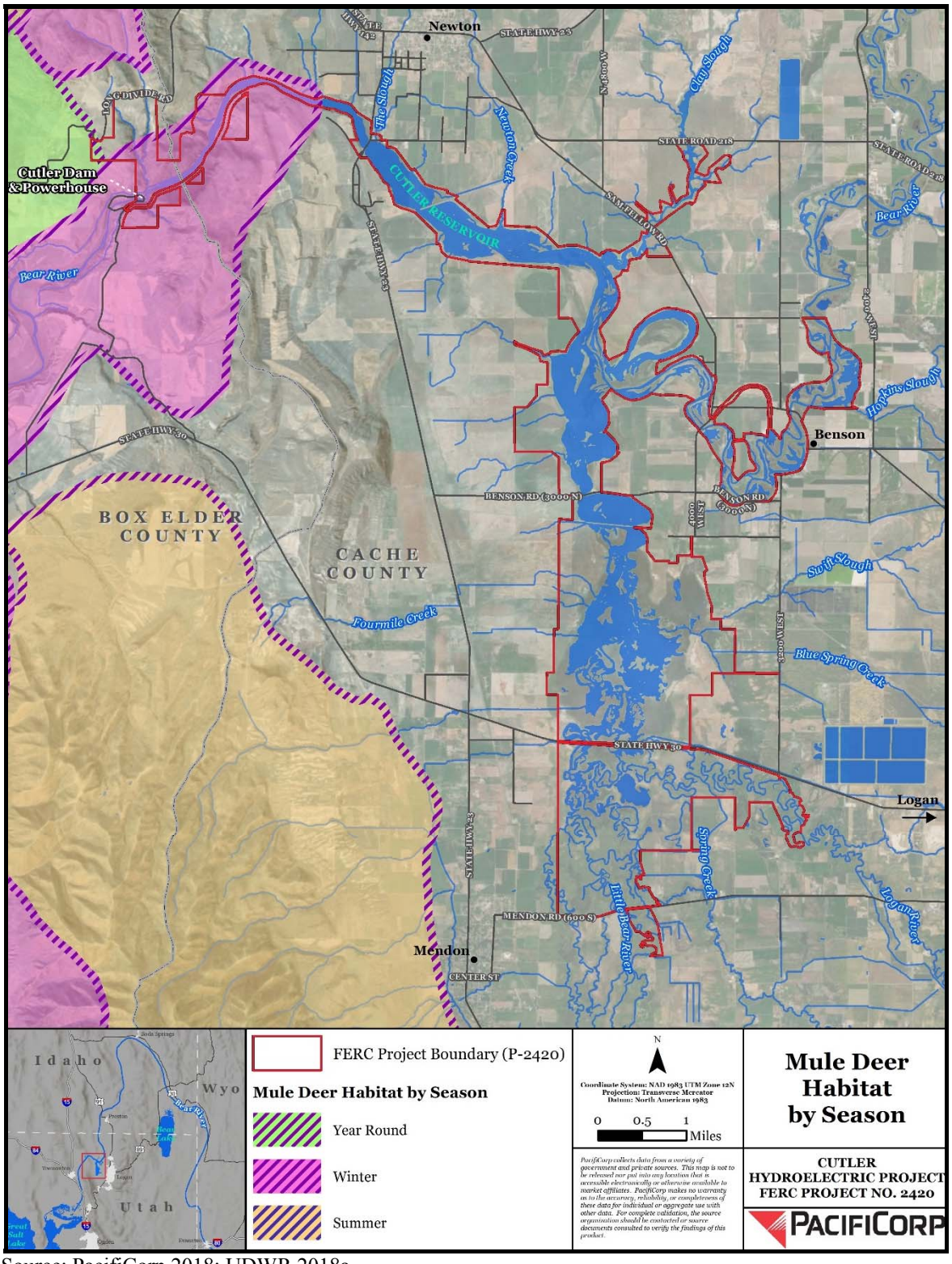
COMMON NAME	SCIENTIFIC	PREFERRED HABITAT
Badger	*Taxidea taxus*	Grassland
Beaver	*Castor canadensis*	Rivers, canals, and reservoir
Big brown bat	*Eptesicus fuscus*	Wetland, grassland, developed, shrubland, riparian, forested
Black rat	*Rattus*	Agriculture, developed
Black-tailed jackrabbit	*Lepus californicus*	Shrubland, agriculture, forested
Bobcat	*Felis rufus*	Forested, riparian
Brush mouse	*Peromyscus boylii*	Agriculture, developed, shrubland
California myotis	*Myotis californicus*	Wetland, grassland, developed, shrubland, riparian, forested
Cliff chipmunk	*Tamias dorsalis*	Grassland, agriculture, developed, shrubland
Coyote	*Canis latrans*	Grassland, agriculture
Deer mouse	*Peromyscus maniculatus*	Agriculture, developed, shrubland
Dusky shrew	*Sorex monticolus*	Grassland, agriculture, shrubland, riparian
Fringed myotis	*Myotis thysanodes*	Wetland, grassland, developed, shrubland, riparian, forested
Gray wolf[a]	*Canis lupus*	Forested, riparian
Hoary bat	*Lasiurus cinereus*	Wetland, grassland, developed, shrubland, riparian, forested
House mouse	*Mus musculus*	Agriculture, developed
Least chipmunk	*Tamias minimus*	Grassland, agriculture, developed, shrubland
Little brown bat[a]	*Myotis lucifugus*	Wetland, grassland, agriculture, developed, shrubland, riparian
Long-eared myotis	*Myotis evotis*	Wetland, riparian

COMMON NAME	SCIENTIFIC	PREFERRED HABITAT
Long-legged myotis	*Myotis volans*	Wetland, grassland, agriculture, developed, shrubland, riparian
Long-tailed vole	*Microtus longicaudus*	Riparian
Long-tailed weasel	*Mustela frenata*	Riparian
Masked shrew	*Sorex cinereus*	Grassland, agriculture, shrubland, riparian
Meadow vole	*Microtus pennsylvanicus*	Agriculture, developed, shrubland
Merriam shrew	*Sorex merriami*	Grassland, agriculture, shrubland, riparian
Mink	*Mustela vison*	Riparian
Montane vole[a]	*Microtus montanus*	Grassland, agriculture, shrubland
Moose	*Alces americanus*	Forested, riparian, wetland
Mountain cottontail	*Sylvilagus nuttail*	Agriculture
Mule deer	*Odocoileus hemionus*	Grassland, agriculture, developed, shrubland, riparian
Muskrat	*Ondatra zibethicus*	Aquatic, wetland
Northern pocket gopher	*Thomomys talpoides*	Grassland, agriculture, developed, shrubland
Northern water shrew	*Sorex palustris*	Riparian
Norway Rat	*Rattus norvegicus*	Wetland, grassland, developed, shrubland, riparian, forested
Porcupine	*Erethizon dorsatum*	Forested, riparian, wetland
Red fox	*Vulpes*	Grassland, agriculture
Rock squirrel	*Otospermophilus variegatus*	Grassland, agriculture, developed, shrubland
Western Spotted skunk	*Spilogale gracilis*	Agriculture, developed, shrubland
Striped skunk	*Mephitis*	Agriculture, developed, shrubland
Townsend ground squirrel	*Spermophilis townsendii*	Grassland, agriculture, developed, shrubland
Townsend's big-eared bat[a]	*Corynorhinus townsendii*	Wetland, riparian
Uintai ground squirrel	*Spermophilis armatus*	Grassland, agriculture, developed, shrubland
Vagrant shrew	*Sorex vagrans*	Grassland, agriculture, shrubland, riparian
Western harvest mouse	*Reithrodontomys megalotis*	Agriculture, developed, shrubland
Western jumping mouse	*Zapus princeps*	Wetland
Western pipistrelle	*Pipistrellus hesperus*	Wetland, grassland, developed, shrubland, riparian, forested
White-tailed jackrabbit	*Lepus townsendii*	Shrubland, agriculture, forested
Yuma myotis	*Myotis vumanensis*	Wetland, grassland, developed, shrubland, riparian, forested

Source: PacifiCorp 1991
[a]Utah Species of Greatest Conservation Need (UDWR 2015a)

Table 6-11 identifies mammals that are listed as species of greatest conservation need (SGCN) by the state of Utah (UDWR 2015a). These species were identified as SCGN based on their likelihood of an ESA listing, the consequence of a listing, and the ability of the UDWR to influence a listing decision (UDWR 2015b). Section 6.7 further describes other rare species potentially found within the Project Vicinity.

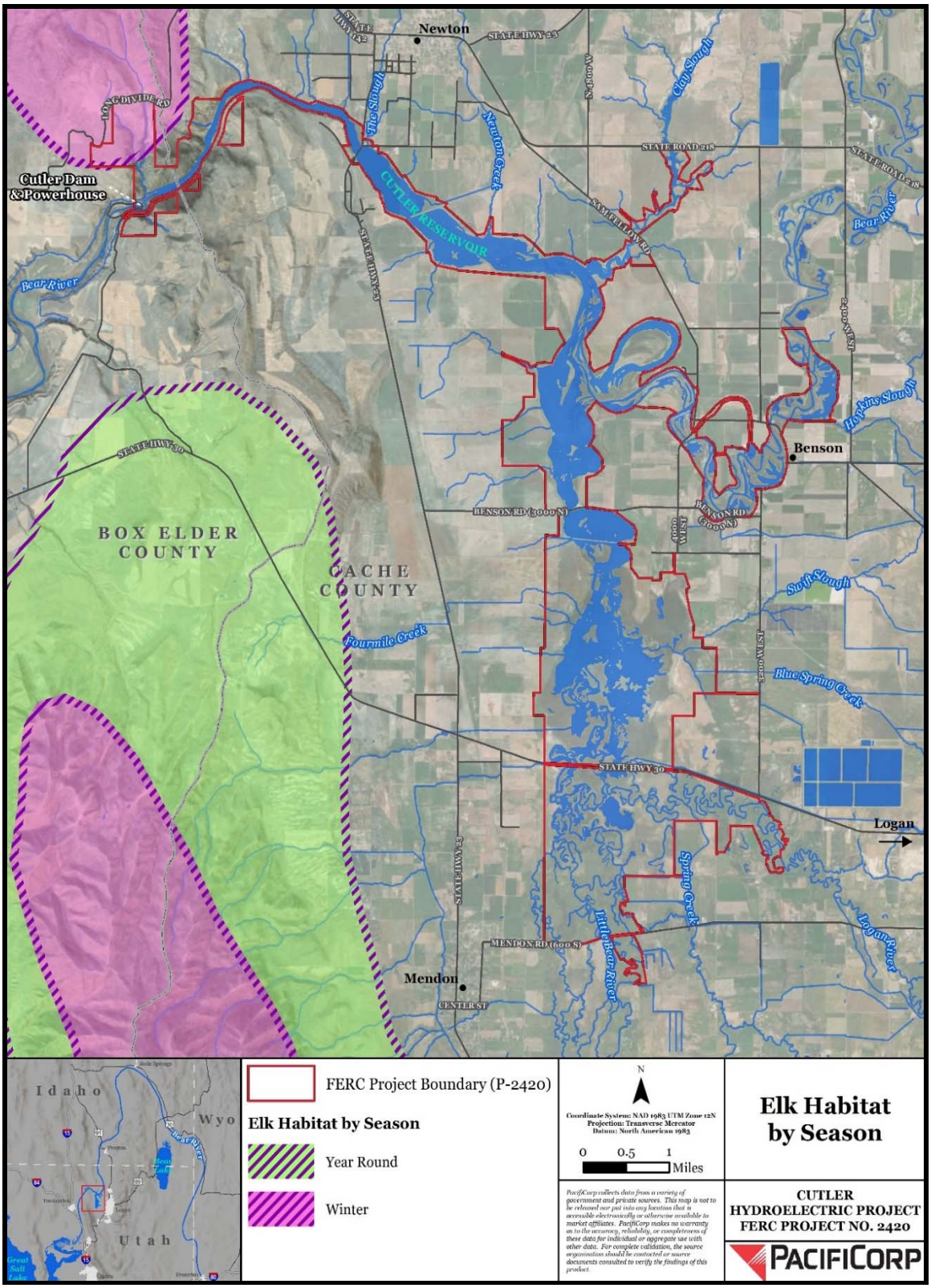
Mule deer are found throughout the state of Utah and are adaptable to a variety of habitats. The preferred type of habitat for mule deer consists of thick brush or trees for cover with small openings that provide access to feeding areas, such as forests, grassland, agricultural land, and riparian areas (UDWR 2014). Mule deer feed on a variety of plants including forbs, grasses and shrubs (UDWR 2014). Because of habitat loss and degradation and to prevent overhunting, the state of Utah developed a Mule Deer Management Plan to maintain the mule deer population (UDWR 2014). According to UDWR data, approximately 610 acres of winter mule deer habitat is located within the Project Boundary near the Cutler Dam and powerhouse, and approximately 19 acres of year-round habitat is located within the Project Boundary (Figure 6-7). Additionally, mule deer are commonly seen throughout all areas of the Project Boundary year-round.



Source: PacifiCorp 2018; UDWR 2018a

FIGURE 6-7 MULE DEER HABITAT BY SEASON AS DEFINED BY UDWR

The UDWR manages elk to maintain a healthy population and prevent overhunting (UDWR 2015a). According to UDWR data, approximately 253 acres of winter elk habitat is located within the Project Boundary north of the Cutler Dam and powerhouse (Figure 6-8). Year-round elk habitat is located southwest of the Project Boundary. Elk are a generalist species with a varied diet, which allows them to live in a variety of habitat types. Elk prefer high elevation aspen-conifer forests in summer for food and cover, and low-to-mid elevation sagebrush and mountain shrub habitats in winter (UDWR 2015a). Elk are rarely seen within the Project Boundary.



Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-8 ELK HABITAT BY SEASON AS DEFINED BY UDWR

6.5.4.2 Birds

A list of birds potentially found in the Project Vicinity is provided in Table 6-12. Project Vicinity for birds is defined as the Bear River Watershed. The list includes approximately 170 migratory birds, raptors, songbirds, waterfowl, and passerine species observed in the Project Vicinity within the past 5 years (2014 to 2018), as reported in the Final Bear River Comprehensive Management Plan (SWCA 2017) and by the Cornell Lab of Ornithology (Cornell 2018). Birds use the Project Vicinity for feeding, breeding, nesting, rearing, staging, and as a migratory stopover. Table 6-12 also identifies birds that are listed as Utah SGCN and as Utah Partners in Flight Priority Species.

The objective of Utah Partners in Flight (PIF) is to conserve bird populations and their habitat through coordinated and cooperative planning and management (Parrish et al. 2002). Utah PIF is a cooperative effort among multiple agencies working to identify the avian species most in need of conservation, evaluate and update population and habitat data, rank each species based on the priority of conservation needs, assess habitat requirements, provide recommendation for conservation efforts, and evaluate available avian resources and information needs.

The Cutler Reservoir and marsh were designated as a Globally Important Bird Area (IBA) by the National Audubon Society in 2009. IBAs are identified for conservation and management because they may provide important migratory, nesting, foraging or wintering habitat. Cutler Marsh was designated as an IBA because of important marsh habitat for the globally-imperiled (IBA status) white-faced ibis and other birds (PacifiCorp 2018b). During the 2013 to 2017 monitoring period, over 5 percent of the global population of white-faced ibis was counted in Cutler Marsh (PacifiCorp 2018b).

Cutler Reservoir provides a diversity of aquatic lowland habitat types including emergent wetlands, wet meadows, open water, and riparian (NAS 2018). These habitats are used by waterfowl, shorebirds, wading birds, and migratory birds (Table 6-12). Nearby pastures and agricultural fields (located on both PacifiCorp Cutler Project lands and other adjoining private lands) surrounding the reservoir provide additional sources of food and cover. Some bird species, such as the great blue heron, white-faced ibis, snowy egrets, Caspian terns, Canada goose, several gull species, and sandhill crane, nest and roost in the marsh and feed in nearby pastures

and agricultural fields. Numerous bird species, including waterfowl, grebes, and an important population of American White Pelicans who feed at Cutler Marsh but lay their eggs and rear their young solely on an island in the Great Salt Lake, rely on Cutler Marsh for their primary foraging areas. Raptors, such as eagles, hawks, owls and falcons, may feed in the marsh and wetland areas but roost in a variety of habitats from the marsh (Northern Harrier and Short-eared Owl) to riparian areas with larger cottonwood trees (Kestrels, Great-horned Owls, and Red-tailed and Swainson's hawks), to the trees and rocky cliffs in the Cutler Canyon (Golden Eagle and Cooper's and Sharp-shinned hawks) (PacifiCorp 1991). In winter, open water areas of Cutler Marsh provide important overwintering habitat for Bald Eagles and Ferruginous Hawks, as well as several of the common summer raptors, including kestrels and Swainson's Hawks.

TABLE 6-12 BIRDS OBSERVED IN THE CUTLER PROJECT VICINITY FROM 2014 TO 2018

COMMON NAME	SCIENTIFIC NAME
American Avocet[b]	*Recurvirostra americana*
American Bittern	*Botaurus lentiginosus*
American Coot	*Fulica americana*
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristis*
American Kestrel	*Falco sparverius*
American Pipit	*Anthus rubescens*
American Robin	*Turdus migratorius*
American Tree Sparrow	*Spizella arborea*
American White Pelican[a,b]	*Pelecanus erythrorhynchos*
American Wigeon	*Mareca americana*
Bald Eagle[a]	*Haliaeetus leucocephalus*
Bank Swallow	*Riparia riparia*
Barn Owl	*Tyto alba*
Barn Swallow	*Hirundo rustica*
Barrow's Goldeneye	*Bucephala islandica*
Belted Kingfisher	*Megaceryle alcyon*
Black-billed Magpie	*Pica hudsonia*
Black-capped Chickadee	*Poecile atricapillus*
Black-chinned Hummingbird	*Archilochus alexandri*
Black-crowned Night-Heron	*Nycticorax*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Black Tern	*Chlidonias niger*
Blue-gray Gnatcatcher	*Polioptila caerulea*

COMMON NAME	SCIENTIFIC NAME
Black-necked Stilt	*Himantopus mexicanus*
Blue-winged Teal	*Anas discors*
Bobolink[b]	*Dolichonyx oryzivorus*
Bonaparte's Gull	*Chroicocephalus philadelphia*
Brewer's Blackbird	*Euphagus cyanocephalus*
Brewer's Sparrow[b]	*Spizella breweri*
Broad-tailed Hummingbird[b]	*Selasphorus platycercus*
Brown-headed Cowbird	*Molothrus ater*
Bufflehead	*Bucephala albeola*
Bullock's Oriole	*Icterus bullockii*
Burrowing Owl	*Athene cunicularia*
Cackling Goose	*Branta hutchinsii*
California Gull	*Larus californicus*
California Quail	*Callipepla californica*
Canada Goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Canyon Wren	*Catherpes mexicanus*
Caspian Tern[a]	*Hydroprogne caspia*
Cattle Egret	*Bubulcus ibis*
Cedar Waxwing	*Bombycilla cedrorum*
Chipping Sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cinnamon Teal	*Anas cyanoptera*
Clark's Grebe	*Aechmophorus clarkii*
Clay-colored Sparrow	*Spizella pallida*
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Goldeneye	*Bucephala clangula*
Common Grackle	*Quiscalus quiscula*
Common Merganser	*Mergus merganser*
Common Nighthawk	*Chordeiles minor*
Common Raven	*Corvus corax*
Common Yellowthroat	*Geothlypis trichas*
Cooper's Hawk	*Accipiter cooperii*
Dark-eyed Junco	*Junco hyemalis*
Double-crested Cormorant	*Phalacrocorax auritus*
Downy Woodpecker	*Picoides pubescens*
Dusky Flycatcher	*Empidonax oberholseri*
Eared Grebe	*Podiceps nigricollis*
Eastern Kingbird	*Tyrannus*

COMMON NAME	SCIENTIFIC NAME
Eurasian Collared-Dove	*Streptopelia decaocto*
Common/European Starling	*Sturnus vulgaris*
Ferruginous Hawk[b]	*Buteo regalis*
Forster's Tern	*Sterna forsteri*
Franklin's Gull	*Leucophaeus pipixcan*
Gadwall	*Anas strepera*
Golden Eagle	*Aquila chrysaetos*
Gray Catbird	*Dumetella carolinensis*
Graylag Goose (domestic type)	*Anser anser*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Great Horned Owl	*Bubo virginianus*
Great-tailed Grackle	*Quiscalus mexicanus*
Greater Yellowlegs	*Tringa melanoleuca*
Green-tailed Towhee	*Pipilo chlorurus*
Green-winged Teal	*Anas carolinensis*
Harris's Sparrow	*Zonotrichia querula*
Hooded Merganser	*Lophodytes cucullatus*
Horned Grebe	*Podiceps auritus*
Horned Lark	*Eremophila alpestris*
House Finch	*Carpodacus mexicanus*
House Sparrow	*Passer domesticus*
Indian Peafowl (domestic type)	*Pavo cristatus*
Killdeer	*Charadrius vociferus*
Lark Sparrow	*Chondestes grammacus*
Lazuli Bunting	*Passerina amoena*
Lesser Goldfinch	*Carduelis psaltria*
Lesser Scaup	*Aythya affinis*
Lesser Yellowlegs	*Tringa flavipes*
Lincoln's Sparrow	*Melospiza lincolnii*
Loggerhead Shrike	*Lanius ludovicianus*
Long-billed Curlew[b]	*Numenius americanus*
Long-eared Owl	*Asio otus*
Mallard	*Anas platyrhynchos*
Marbled Godwit	*Limosa fedoa*
Marsh Wren	*Cistothorus palustris*
Merlin	*Falco columbarius*
Mountain Bluebird	*Sialia currucoides*
Mountain Chickadee	*Poecile gambeli*

COMMON NAME	SCIENTIFIC NAME
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Northern Harrier	*Circus hudsonius*
Northern Mockingbird	*Mimus polyglottos*
Northern Pintail	*Anas acuta*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Northern Shoveler	*Anas clypeata*
Northern Shrike	*Lanius borealis*
Orange-crowned Warbler	*Oreothlypis celata*
Osprey	*Pandion haliaetus*
Pectoral Sandpiper	*Calidris melanotos*
Peregrine Falcon	*Falco peregrinus*
Pied-billed Grebe	*Podilymbus podiceps*
Pine Siskin	*Carduelis pinus*
Prairie Falcon	*Falco mexicanus*
Purple Martin	*Progne subis*
Red-breasted Merganser	*Mergus serrator*
Redhead	*Aythya americana*
Red-tailed Hawk	*Buteo jamaicensis*
Red-winged Blackbird	*Agelaius phoeniceus*
Ring-billed Gull	*Larus delawarensis*
Ring-necked Duck	*Aythya collaris*
Ring-necked Pheasant	*Phasianus colchicus*
Rock Pigeon	*Columba livia*
Rough-legged Hawk	*Buteo lagopus*
Ross's Goose	*Chen rossii*
Ruddy Duck	*Oxyura jamaicensis*
Sage Thrasher	*Oreoscoptes montanus*
Sandhill Crane	*Grus canadensis*
Savannah Sparrow	*Passerculus sandwichensis*
Sharp-shinned Hawk	*Accipiter striatus*
Sharp-tailed Grouse[b]	*Tympanuchus phasianellus*
Short-eared Owl	*Asio flammeus*
Snow Goose	*Chen caerulescens*
Snowy Egret	*Egretta thula*
Song Sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Spotted Sandpiper	*Actitis macularius*
Spotted Towhee	*Pipilo maculatus*

COMMON NAME	SCIENTIFIC NAME
Swainson's Hawk	*Buteo swainsoni*
Townsend's Solitaire	*Myadestes townsendi*
Tree Swallow	*Tachycineta bicolor*
Trumpeter swan	*Cygnus buccinator*
Tundra Swan	*Cygnus columbianus*
Turkey Vulture	*Cathartes aura*
Vesper Sparrow	*Pooecetes gramineus*
Violet-green Swallow	*Tachycineta thalassina*
Virginia Rail	*Rallus limicola*
Western Kingbird	*Tyrannus verticalis*
Warbling Vireo	*Vireo gilvus*
Western Grebe	*Aechmophorus occidentalis*
Western Kingbird	*Tyrannus verticalis*
Western Meadowlark	*Sturnella neglecta*
Western Tanager	*Piranga ludoviciana*
Western Wood-Pewee	*Contopus sordidulus*
White-crowned Sparrow	*Zonotrichia leucophrys*
White-faced Ibis[a]	*Plegadis chihi*
White-throated Sparrow	*Zonotrichia albicollis*
Wild Turkey	*Meleagris gallopavo*
Willet	*Tringa semipalmata*
Willow Flycatcher	*Empidonax traillii*
Wilson's Snipe	*Gallinago delicata*
Wilson's Warbler	*Cardellina pusilla*
Wood Duck	*Aix sponsa*
Woodhouse's Scrub-jay	*Aphelocoma woodhouseii*
Yellow-breasted Chat	*Icteria virens*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*

Source: SWCA 2017; Cornell 2018
[a]Utah Species of Greatest Conservation Need (UDWR 2015a)
[b]Utah Partners in Flight Priority Species (Parrish et al. 2002)

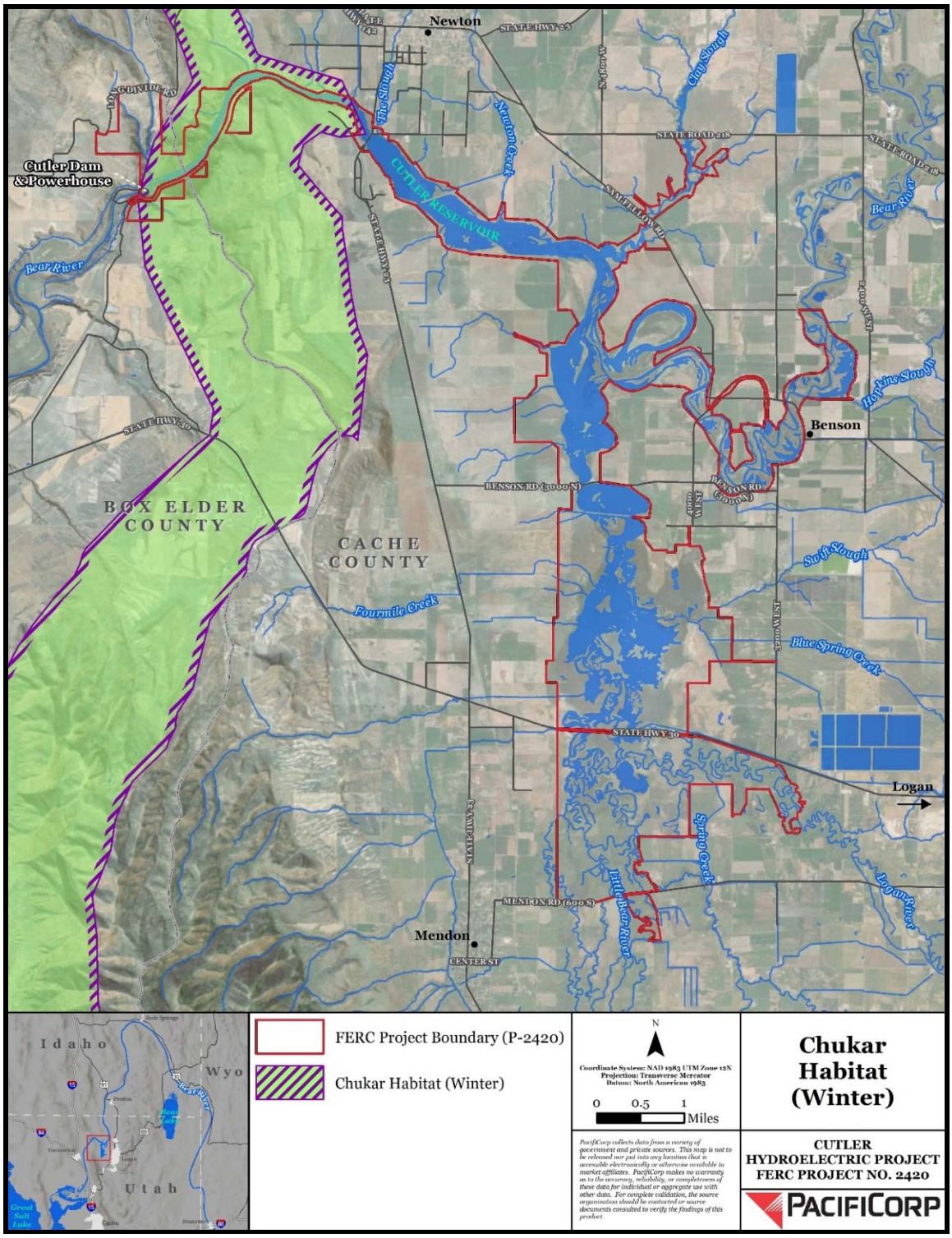
The state of Utah developed a conservation plan for greater sage-grouse which includes 11 Sage-grouse Management Areas (SGMA) (Utah PLPCO 2018). Greater sage-grouse habitat does not occur within the Project Area or the Project Boundary; however, two (2) SGMAs are located in the Project Vicinity. The Box Elder SGMA is located approximately 7 miles northwest and west

of the Project, and the Rich-Morgan-Summit SGMA is located approximately 15 miles east of the Project; a portion of the Rich-Morgan-Summit SGMA is in Cache County (Utah PLPCO 2018). Both of the SGMAs in the Project Vicinity contain wintering, brooding, rearing and nesting habitat for greater sage-grouse (UDWR 2018b). There are no recent observations of sage-grouse within the Project Boundary.

Habitat is found within the Project Boundary for the following game species:

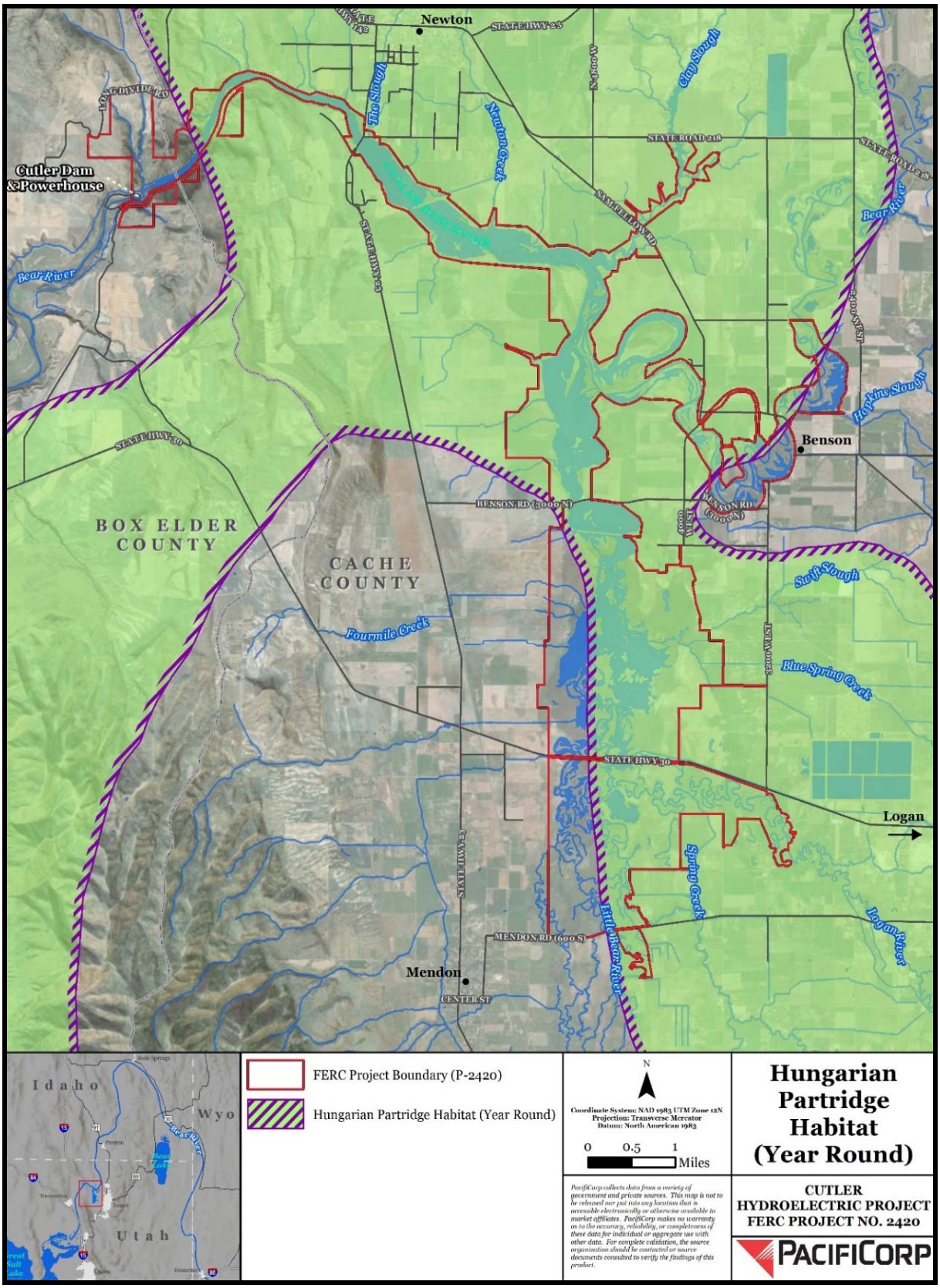
- chukar (*Alectoris chukar*) (552 acres) (Figure 6-9),
- Hungarian (or grey) partridge (*Perdix perdix*) (6,856 acres) (Figure 6-10),
- ring-necked pheasant (*Phasianus colchicus*) (8,538 acres) (Figure 6-11)
- Columbian sharp-tailed grouse (1,119 acres) (Figure 6-12), and
- wild turkey (*Meleagris gallopavo*) (2,516 acres) Figure 6-13).

Habitat for these species is actively managed by UDWR on state land to maintain healthy populations and for hunting. Year-round habitat is available for Hungarian partridge, ring-necked pheasant, Columbian sharp-tailed grouse, and wild turkey, while only winter habitat is available for chukar. Wild turkey, sharp-tailed grouse and chukar habitat in the Project Boundary is primarily located near Cutler Canyon, the dam and the powerhouse. Habitat for ring-necked pheasant and Hungarian partridge in the Project Boundary is distributed throughout the Cutler reservoir and marsh. All of these species are likely or known to occur in the Project Area and Project Boundary.



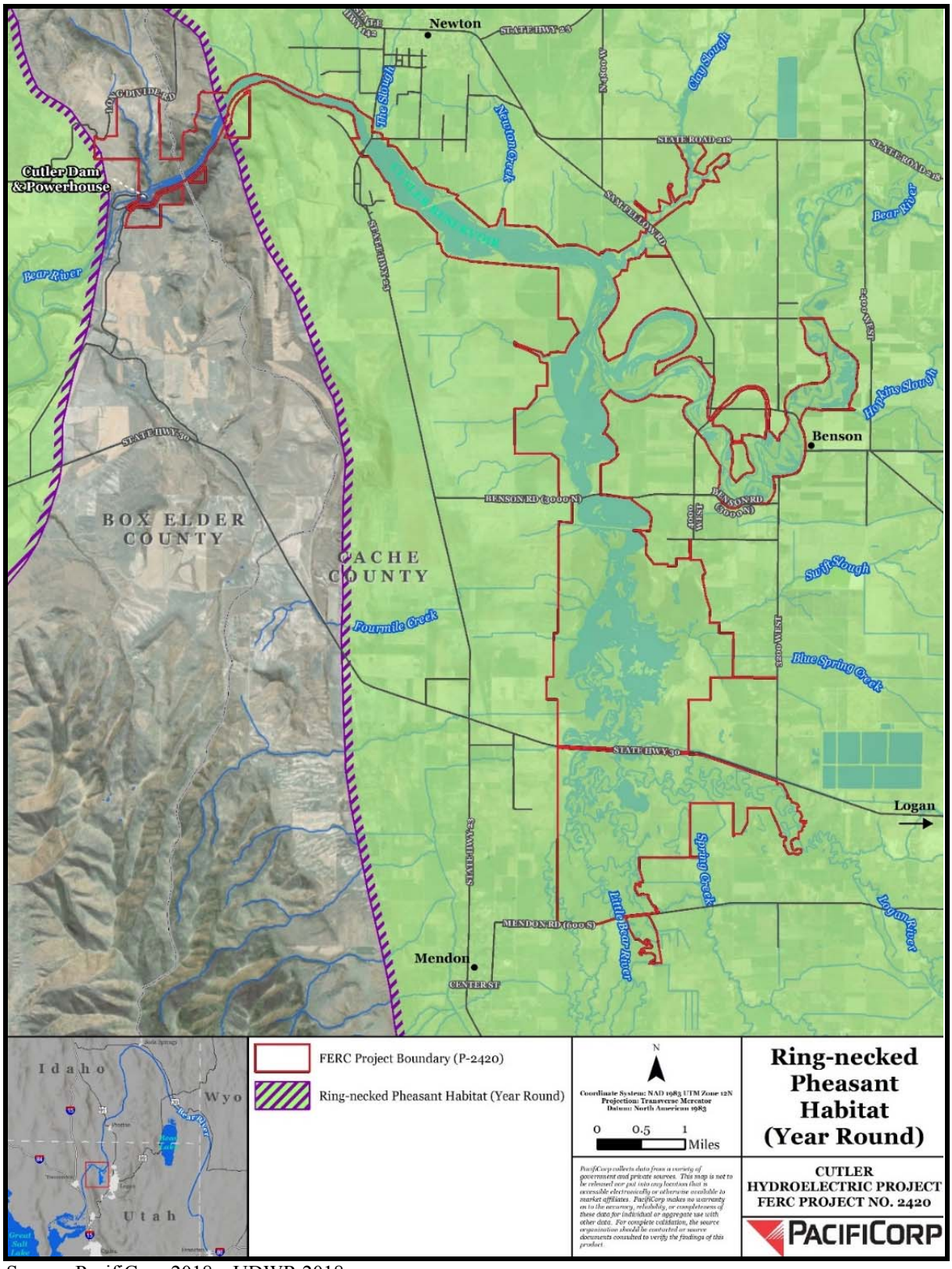
Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-9 CHUKAR WINTER HABITAT AS DEFINED BY UDWR



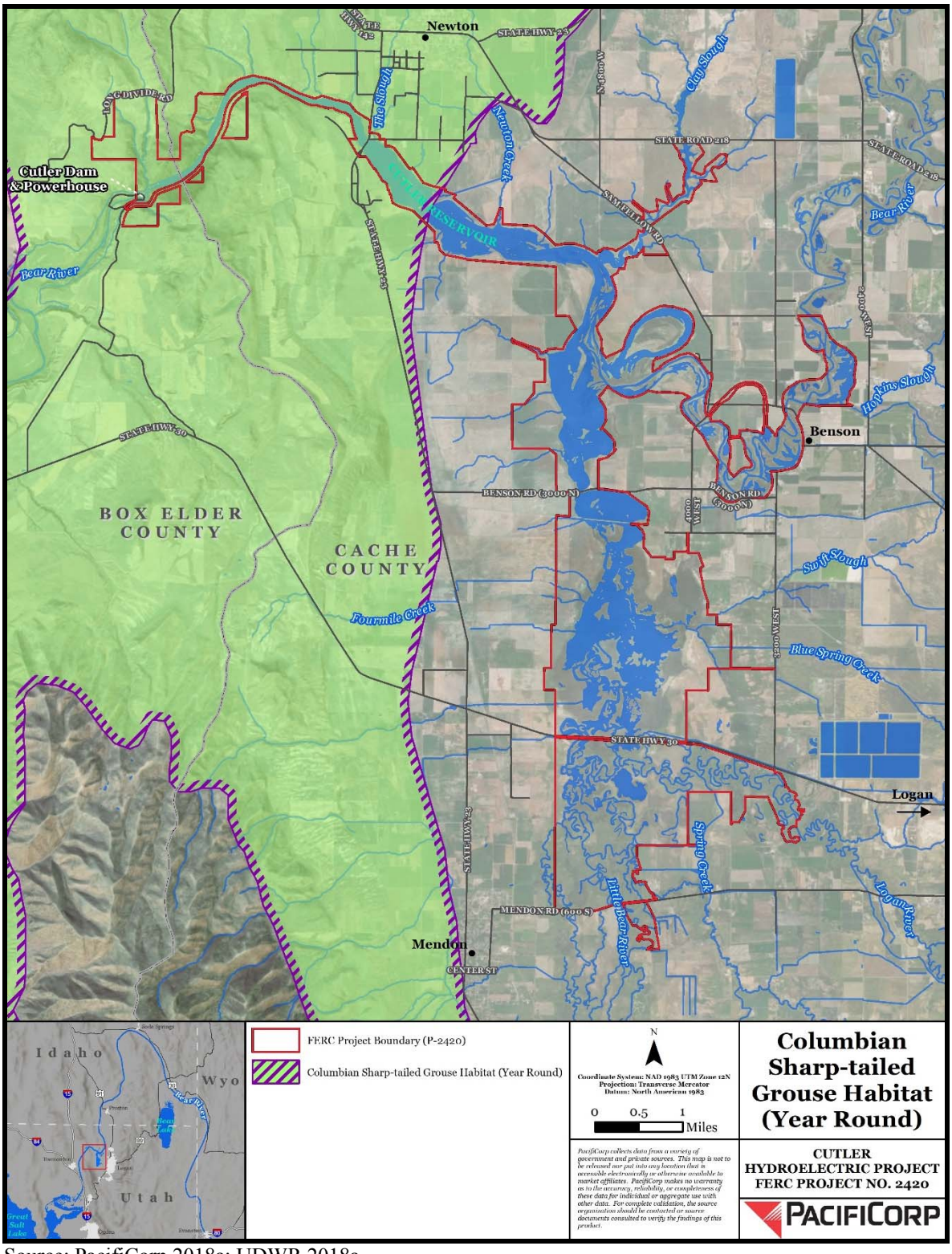
Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-10 HUNGARIAN PARTRIDGE YEAR-ROUND HABITAT AS DEFINED BY UDWR



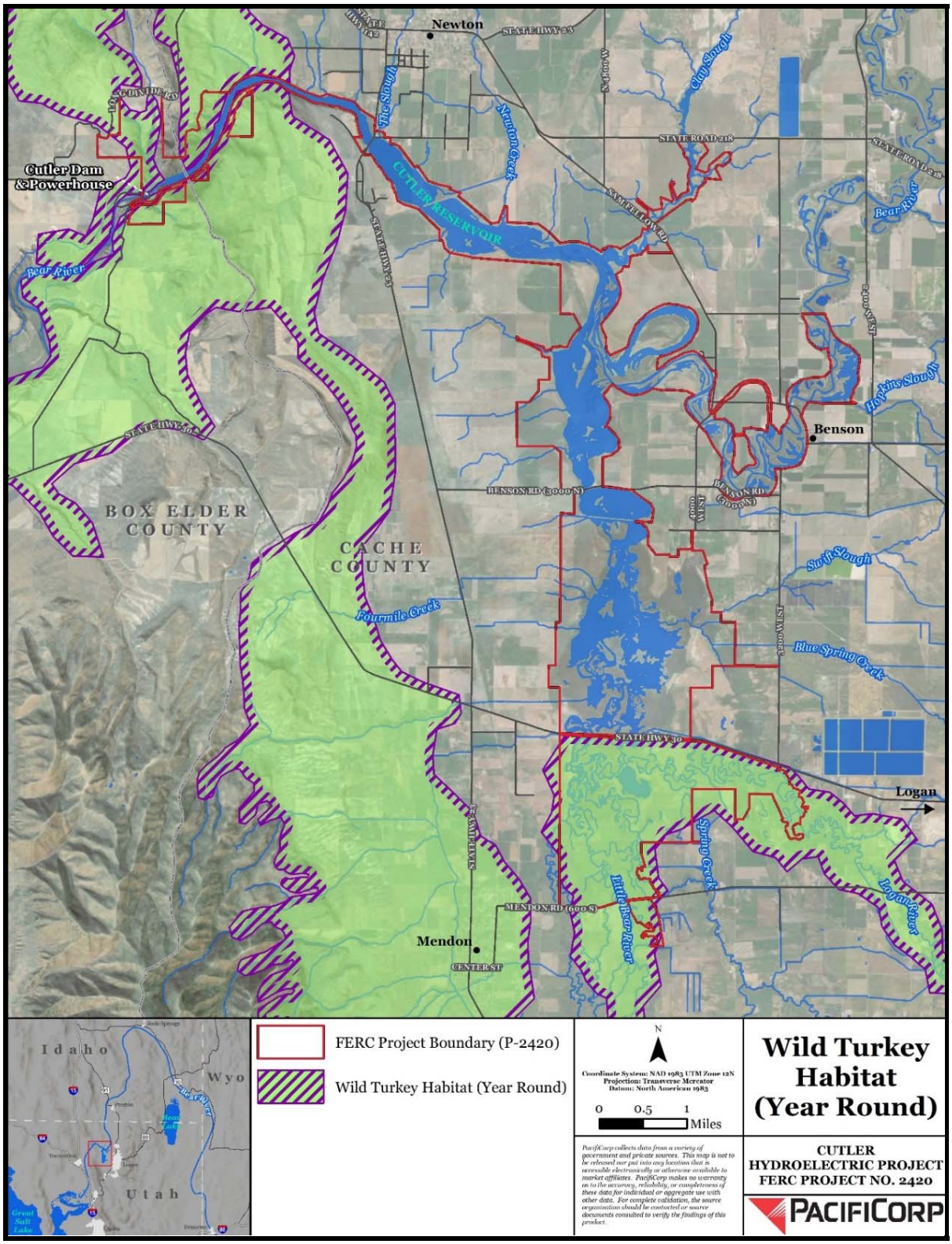
Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-11 RING-NECKED PHEASANT YEAR-ROUND HABITAT AS DEFINED BY UDWR



Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-12 COLUMBIAN SHARP-TAILED GROUSE YEAR-ROUND HABITAT AS DEFINED BY UDWR



Source: PacifiCorp 2018a; UDWR 2018a

FIGURE 6-13 WILD TURKEY YEAR-ROUND HABITAT AS DEFINED BY UDWR

Reptiles and Amphibians

Reptiles and amphibians that may be found in the Project Area use a mix of aquatic, wetland, grassland, shrubland, developed, and agricultural land throughout their life cycles (SWCA 2017). Reptiles and amphibians that have the potential to be found in the Project Area are listed in Table 6-13. Table 6-13 identifies reptiles and amphibians that are listed as Utah SGCN.

TABLE 6-13 REPTILES AND AMPHIBIANS POTENTIALLY OCCURRING IN THE CUTLER HYDROELECTRIC PROJECT AREA

COMMON NAME	SCIENTIFIC NAME
Reptiles	
Desert whipsnake	*Masticophis taeniatus*
Great Basin gopher snake	*Pituophis catenifer deserticola*
Great Basin rattlesnake	*Crotalus viridis lutosus*
Great Basin skink	*Eumeces skiltonianus utahensis*
Sagebursh Lizard	*Sceloporus graciosus*
Short horned lizard	*Phrynosoma douglasii*
Side-blotched lizard	*Uta stansburiana*
Valley gartersnake	*Thamnophis sirtalis fitchi*
Wandering gartersnake	*Thamnophis elegans vagrans*
Western Whiptail	*Onemidophorus tigris*
Western yellow-bellied racer	*Coluber constrictor mormon*
Amphibians	
American bullfrog	*Rana catesbeiana*
Great Basin Spadefoot Toad	*Scaphiopus intermontanus*
Leopard frog[a]	*Lithobates pipiens*
Tiger salamander	*Ambystoma tigrinum*
Western chorus frog	*Pseudacris triseriata*
Woodhouse's toad	*Anaxyrus [syn. Bufo] woodhousii*

Source: PacifiCorp 1991; and recent observations from PacifiCorp subject matter experts.
[a]Utah Species of Greatest Conservation Need (UDWR 2015a)

6.5.4.3 Invasive Species

A list of invasive species in Utah is provided and discussed in Sections 6.6.3 and 6.6.4 Floodplains, Wetlands, Riparian, and Littoral Habitat.

6.6 Floodplains, Wetlands, Riparian and Littoral Habitat

This section describes the floodplain, wetland, riparian, and littoral habitat within the Project Boundary and the surrounding region as well as the resident and invasive wildlife and vegetation species and their preferred habitats within the Project boundary.

6.6.1 Wetland and Littoral Habitat

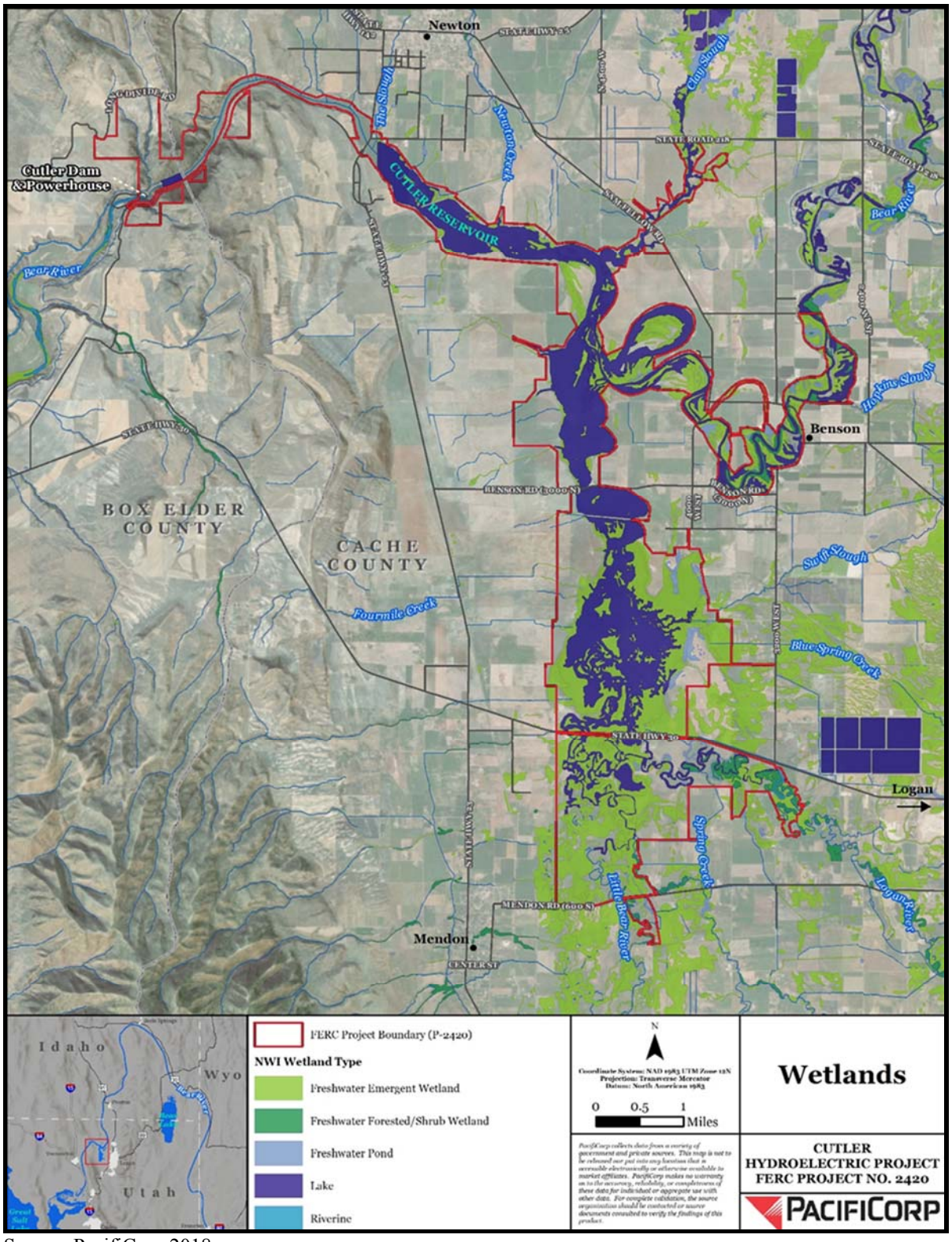
Wetlands within the Project Boundary serve a wide range of functions and services. The diverse combination of marsh and open water habitat provide excellent cover for a wide range of waterfowl and wildlife species. Ample aquatic vegetation provides an excellent source of food and cover for both aquatic and avian wildlife species. Open water habitats provide habitat for several freshwater fish species. The large marshes coupled with dense herbaceous vegetation provide a number of water quality functions, including retention of sediments and nutrients from surrounding agricultural activities as well as shoreline stabilization and flood storage.

Figure 6-14 depicts the locations of wetlands identified by the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) within the Project Boundary (USFWS 2018c). Table 6-14 provides a summary of the NWI-identified wetland habitats located within the Project Boundary.

TABLE 6-14 PERCENT AND ACREAGE OF USFWS NWI WETLANDS WITHIN THE PROJECT BOUNDARY

WETLAND TYPE	PERCENT OF PROJECT	ACRES
Lake	50%	3,053.38
Freshwater Emergent Wetland	43%	2,597.87
Freshwater Pond	3%	186.10
Freshwater Forested/Shrub Wetland	3%	171.08
Riverine	1%	56.61
Total		**6,065.04**

Source: USFWS 2018c



Source: PacifiCorp 2018a

FIGURE 6-14 WETLAND HABITAT IDENTIFIED WITHIN THE PROJECT BOUNDARY BASED ON USFWS DATA

The most commonly occurring NWI type within the Project Boundary is open water habitat (lake, pond, and riverine), which accounts for approximately 3,296 acres of the total wetland acreage (or 54 percent of the wetland habitat). Given that much of the reservoir is shallow, a large portion of this open water habitat constitutes the littoral zone which extends from the shore outwards to a depth of 6.7 feet or to the limits of non-persistent emergent vegetation. The littoral zone provides important habitat for fish and wildlife; waterfowl feed on a variety of submerged aquatic vegetation often found within the littoral zone. The Project Boundary includes large areas of sago pondweed (*Stuckenia pectinata*), which is very beneficial for wildlife (USFWS 2018). Other common submerged or floating aquatic species that may be found within the littoral zone include areas of relatively deep water with floating-leaved plants (*Lemna* spp*., Potamogeton* spp*., and Brasenia* spp.) and submergent and floating plants (*Myriophyllum* spp*., Ceratophyllum* spp., and *Elodea* spp.) (Natureserve 2009).

Freshwater emergent wetlands make up the second most common NWI type within the Project Boundary and account for approximately 2,598 acres or 43 percent of the wetland habitat. Emergent wetlands are located throughout the Project Boundary and create a large and complex wetland system which provides excellent habitat for waterfowl and wildlife. Based on information gathered during the previous relicensing, the marshes consist primarily of cattail (*Typha latifolia*) and hardstem bulrush (*Scirpus acutus*). Species occupying less inundated wet meadow habitat may include common reed (*Phragmites australis*), reed canary grass (*Phalaris arunidinacea*), sedges (*Carex* spp.), rushes (*Juncus* spp.), pale spike rush (*Elocharis macrostachya*), Kentucky bluegrass (*Poa pratensis*), foxtail barley (*Hordeum jubatum*), cocklebur (*Xanthium strumarium*), sneezeweed (*Helenium autumnale*), and curly dock (*Rumex crispus*) (PacifiCorp 1991; USDA 2019).

Riverine habitats account for the smallest NWI wetland type, these habitats consist of open water aquatic habitat with unconsolidated bottoms within a channel. The system is bounded on the landward side by uplands or wetlands. Substrates are variable and range from coarse to fine. Forested and shrub-dominated wetlands account for the smallest portion of terrestrial wetlands, approximately 171 acres or 3 percent, of NWI mapped wetland habitat within the Project Boundary, and are primarily located along riverine portions of the Bear River. Forested wetlands include areas of riparian and floodplain forest, often characterized by the presence of narrow-leaf

cottonwood (*Populus angustifolia*), Fremont cottonwood (*Populus fremontii*), Lombardy poplar (*Populus nigra*), green ash (*Fraxinus pennsylvanica*), and shrub willows such as narrowleaf willow (*Salix exigua*) (PacifiCorp 1991). Other species common to forested and shrub riparian and floodplain habitats within the biophysical region include boxelder (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), Douglas fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), crack willow (*Salix fragilis*), yellow willow (*Salix lutea*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), water birch (*Betula occidentalis*), red osier dogwood (*Cornus sericea*), river hawthorn (*Crataegus rivularis*), and chokecherry (*Prunus virginiana*) (Natureserve 2009; USDA 2019).

6.6.2 Riparian and Vegetated Buffer Habitat

As part of the previous license, PacifiCorp established a vegetative buffer strip on approximately 1,440 acres within the project's riparian zone (PacifiCorp 2018). Table 6-15 includes a conceptual planting list of herbaceous and shrubby vegetation within these buffer areas (PacifiCorp 1991).

The project's 5-year monitoring reports have documented the progress of vegetation within these areas. The 2018 5-year report identified that the majority of the buffer strips are either in *excellent* condition (6 parcels) or *good* condition (41 parcels) meaning that the buffer areas exhibited a variety of healthy conditions including few noxious weeds and showing high functionality including preventing erosion, filtering sediment and nutrients, and providing wildlife habitat (PacifiCorp 2018b).

TABLE 6-15 CONCEPTUAL SPECIES LIST FOR VEGETATED BUFFER STRIPS

COMMON NAME	SCIENTIFIC NAME
Bottlebrush squirreltail	*Sitanion hystrix*
Cottonwoods	*Populus* spp.
Flowering saltbush	*Atriplex canescens*
Golden currant	*Ribes aureum*
Gooseberry-leaf globemallow	*Sphaeralcea grossulariifolia*
Greasewood	*Sarcobatus vermiculatus*
Green needlegrass	*Stipa viridula*
Hawthorn	*Crataegus douglasii*
Indian ricegrass	*Oryzopsis hymenoides*
Intermediate wheatgrass	*Agropyron intermedium*
Lewis flax	*Linum lewisii*
Needle-and-thread grass	*Stipa comata*
Palmer penstemon	*Penstemon palmerii*
Red osier dogwood	*Cornus sericea*
Russian wildrye	*Psathyrostachys juncea*
Saltgrass	*Distichlis spicata*
Skunkbush	*Rhus trilobata*
Small burnet	*Sanguisorba minor*
Smooth brome	*Bromus inermis*
Western wheatgrass	*Agropyron smithii*
Willow	*Salix* spp.
Wood's rose	*Rosa woodsii*

Source: PacifiCorp 2002

6.6.3 Invasive Wildlife Species

The non-indigenous aquatic species (NAS) information resource for the USGS provides scientific reports, online/real-time queries, spatial datasets, distribution maps, and general information related to non-indigenous species throughout the United States. Table 6-16 includes a list of the NAS identified in Utah (USGS 2018b); based on available information, the majority of these species are not known to occur in the Project Boundary and Project Area, however, bull frogs are known to occur within the Project Boundary and Project Area. Although Northern leopard frog is listed as a NAS by USGS it is considered a USGCN by the State of Utah.

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TABLE 6-16 NON-INDIGENOUS AQUATIC SPECIES OF UTAH

COMMON NAME	SCIENTIFIC NAME
Texas spiny softshell	*Apalone spinifera emoryi*
Asellid isopod	*Caecidotea racovitzai*
Snapping turtle	*Chelydra serpentina*
Waterflea	*Daphnia lumholtzi*
Virile crayfish	*Faxonius virilis*
Anchor worm	*Lernaea cyprinacea*
American bullfrog	*Lithobates catesbeianus*
Green frog	*Lithobates clamitans*
Northern leopard frog	*Lithobates pipiens*
Signal crayfish	*Pacifastacus leniusculus*
Red swamp crayfish	*Procambarus clarkii*

Source: USGS 2018b

6.6.4 Invasive Plants and Weeds

The Project's 2018 5-year monitoring report notes that out of 55 buffer parcels surveyed in 2017, eight (8) parcels are identified as being in fair or poor condition. Buffer parcels identified as fair have small and controllable levels of noxious weeds present and those that are identified as poor are either un-vegetated or mostly dominated by noxious species (PacifiCorp 2018b). Table 6-17 includes a list of noxious weeds currently present within Utah. The Utah Department of Agriculture and Food (UDAF) designates five (5) classes for noxious weeds within Utah. Class 1A includes species that pose significant risk and are a high priority, class 1B occur within the state in very limited populations, class 2 species exist at levels where control or eradication may be possible, class 3 are designated for containment and may be treated by approved methodologies, and class 4 are prohibited species having the potential or are known to be detrimental to human or animal health, the environment, public roads, crops, or other property (UDAF 2019). A number of these species are likely present within portions of the project's riparian and floodplain habitat at varying levels. Shoreline buffer areas identified as poor in the 2018 monitoring report likely contain the highest density of noxious weeds (PacifiCorp 2018b).

Littoral areas may include aquatic invasive vegetation as well, which would include species such as common reed (*Phragmites australis*) or purple loosestrife (*Lythrum salicaria*). While no invasive submerged aquatic vegetation is known to occur within the Project Boundary, species such as Eurasian water-milfoil pose a threat to all waterbodies in Utah.

Based on data gathered in 1970, the original description of vegetation communities within the Project Boundary included the identification of pure stands of common reed occurring within areas of emergent vegetation, along the edges of the marsh. In data gathered from field visits during the previous 1991 relicensing effort, these patches of common reed were not identified (PacifiCorp 1991). Common reed is present within the Project Boundary today and invasive plant species management within the Project Boundary has continued to improve over the course of the current license. Treatment of invasive species has occurred and is monitored as part of the 5-year monitoring of buffer areas.

TABLE 6-17 CACHE AND BOX ELDER COUNTY STATE-LISTED NOXIOUS WEEDS

COMMON NAME	SCIENTIFIC NAME	CLASS
African mustard	*Brassica tournefortii*	1B
African rue	*Peganum harmala*	1A
Bermudagrass	*Cynodon dactylon*	3
Black henbane	*Hyoscyamus niger*	2
Blueweed (vipers bugloss)	*Echium vulgare*	1B
Camelthorn	*Alhagi maurorum*	1B
Canada thistle	*Cirsium arvense*	3
Cogongrass (Japanese blood grass)	*Imperata cylindrica*	4
Common crupina	*Crupina vulgaris*	1A
Common St. Johnswort	*Hypericum perforatum*	1B
Cutleaf vipergrass	*Scorzonera laciniata*	1B
Dalmation toadflax	*Linaria dalmatica*	2
Dames rocket	*Hesperis matronalis*	4
Diffuse knapweed	*Centaurea diffusa*	2
Dyers woad	*Isatis tinctoria*	2
Elongated mustard	*Brassica elongata*	1B
Field bindweed (wild morning glory)	*Convolvulus* spp.	3
Garlic mustard	*Alliaria petiolata*	1B
Giant reed	*Arundo donax*	1B
Goatsrue	*Galega officinalis*	1B
Hoary cress	*Cardaria* spp.	3
Houndstongue	*Cynoglossum officianale*	3
Japanese knotweed	*Polygonum cuspidatum*	1B
Johnson Grass	*Sorghum halepense*	3
Jointed goatgrass	*Aegilops cylindrica*	3
Leafy spurge	*Euphorbia esula*	2
Malta starthistle	*Centaurea melitensis*	1A

COMMON NAME	SCIENTIFIC NAME	CLASS
Mediterranean sage	*Salvia aethiopis*	1A
Medusahead	*Taeniatherum caputmedusae*	2
Musk thistle	*Carduus nutans*	3
Myrtle spurge	*Euphorbia myrsinites*	4
Oxeye daisy	*Leucanthemum vulgare*	1B
Perennial pepperweed (tall whitetop)	*Lepidium latifolium*	3
Phragmites (common reed)	*Phragmites australis* ssp.	3
Plumeless thistle	*Carduus acanthoides*	1A
Poison hemlock	*Conium maculatum*	3
Puncturevine (goathead)	*Tribulus terrestris*	3
Purple loosestrife	*Lythrum salicaria*	2
Purple starthistle	*Centaurea calcitrapa*	1B
Quackgrass	*Elymus repens*	3
Rush skeletonweed	*Chondrilla juncea*	2
Russian knapweed	*Acroptilon repens*	3
Russian olive	*Elaeagnus angustifolia*	4
Scotch broom	*Cytisus scoparius*	4
Scotch thistle (cotton thistle)	*Onopordum acanthium*	3
Small bugloss	*Anchusa arvensis*	1A
Sorghum almum	*Sorghum almum*	3
Spotted knapweed	*Centaurea stoebe*	2
Spring millet	*Milium vernale*	1A
Squarrose knapweed	*Centaurea virgata*	2
Syrian beancaper	*Zygophyllum fabago*	1A
Tamarisk (saltcedar)	*Tamarix ramosissima*	3
Ventenata (North Africa grass)	*Ventenata dubia*	1A
Yellow starthistle	*Centaurea solstitialis*	2
Yellow toadflax	*Linaria vulgaris*	2

Key: 1A - Species that pose significant risk and are a high priority
1B - Occur within the state in very limited populations
2 - Species exist at levels where control or eradication may be possible
3 - Designated for containment and may be treated by approved methodologies
4 - Prohibited species having the potential or are known to be detrimental to human or animal health, the environment, public roads, crops, or other property.
Source: UDAF 2019

6.7 Rare, Threatened and Endangered Species

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 USFWS and the National Marine Fisheries Service (NOAA Fisheries). Terrestrial and freshwater species are the primary responsibility of the USFWS. Species may be listed as endangered or threatened under the ESA. "Endangered" species are "in danger of extinction throughout all or a significant portion of its range. "Threatened" species are "likely to become endangered within the foreseeable future" (USFWS 2017a). In addition to the ESA, birds designated as migratory birds (the vast majority of North American bird species) are protected under the Migratory Bird Treaty Act of 1918. The bald eagle was removed from the ESA list on June 28, 2007. However, bald eagles remain federally protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act (USFWS 2017b).

There are 25 plant species and 17 wildlife species in Utah currently listed as threatened or endangered by the USFWS (BLM 2018). The Project Vicinity for rare, threatened, and endangered (RTE) species is defined as Cache and Box Elder counties in Utah. An unofficial federal species list was generated using the Information Planning and Conservation (IPaC) Trust Resources tool to provide a list of federally threatened and/or endangered species in the Project Vicinity. The list indicates that one threatened mammal species one threatened bird species, and one threatened plant species have the potential to occur in the Project Vicinity (USFWS 2018b; Table 6-18). The threatened plant species, Ute ladies'-tresses is known to occur in the Project Area in the nearby Bear River Land Conservancy's Mendon Meadow population. The species is also is known to occur in the Project Boundary (SWCA 2018). Although Canada lynx (*Lynx canadensis)*, and Yellow-billed cuckoo (*Coccyzus americanus*) were identified as potentially occurring in the Project Vicinity, their presence in the Project Boundary and Project Area is highly unlikely.

TABLE 6-18 FEDERALLY LISTED THREATENED SPECIES POTENTIALLY OCCURRING WITHIN PROJECT VICINITY BASED ON IPAC

COMMON NAME	SCIENTIFIC NAME	FEDERAL/STATE
Canada lynx	*Lynx canadensis*	Threatened
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened

Source: USFWS 2018b

Additionally, there are 13 migratory birds (all migratory birds in the United States are federally protected under the Migratory Bird Treaty Act) listed on the IPaC that have the potential to occur in the Project Vicinity (Table 6-19) (USFWS 2018b). Of these, Black rosy-finch (*Leucosticte atrata)* is highly unlikely to be present in the Project Boundary and Project Area. The remaining 12 species are known to occur or are likely to occur in the Project Boundary and Project Area.

TABLE 6-19 IPAC LISTED MIGRATORY BIRDS POTENTIALLY OCCURRING WITHIN PROJECT VICINITY

COMMON NAME	SCIENTIFIC NAME	BREEDING SEASON
Bald eagle	*Haliaeetus leucocephalus*	Dec 1 to Aug 31
Black rosy-finch	*Leucosticte atrata*	Jun 15 to Aug 31
Brewer's sparrow	*Spizella breweri*	May 15 to Aug 10
Clark's grebe	*Aechmophorus clarkii*	Jan 1 to Dec 31
Golden eagle	*Aquila chrysaetos*	Dec 1 to Aug 31
Green-tailed towhee	*Pipilo chlorurus*	May 1 to Aug 10
Lesser yellowlegs	*Tringa flavipes*	Breeds elsewhere
Lewis's woodpecker	*Malanerpes lewis*	Apr 20 to Sep 30
Long-billed curlew	*Numenius americanus*	Apr 1 to Jul 31
Marbled godwit	*Limosa fedoa*	Breeds elsewhere
Sage thrasher	*Oreoscoptes montanus*	Apr 15 to Aug 10
Willet	*Tringa semipalmata*	Apr 20 to Aug 5
Willow flycatcher	*Empidonax traillii*	May 20 to Aug 31

Source: USFWS 2018b

For state sensitive species in Utah, UDWR has prepared the Utah Sensitive Species List. Wildlife species that are federally listed, candidates for federal listing, or for which a conservation agreement has been prepared are automatically included on the list. Additionally, species for which there is evidence of substantial threat to the continued viability of the species are listed as

"wildlife species of concern." Wildlife species of concern designations are meant to identify species at risk and implement appropriate conservation actions to prevent the need to federally list the animal (UDWR 2017). There are 40 wildlife species on the Utah Sensitive Species List that occur in the Project Vicinity (UTNHP 2017; Table 6-20). There are records for bobolink, California floater, Columbian sharp-tailed grouse, grasshopper sparrow, short-eared owl, American white pelican, Deseret mountain snail, Great Plains toad and long-billed curlew within the Project Area. Additionally, there are records of occurrence for burrowing owl and Lewis's woodpecker within a two-mile radius of the Project Boundary (response to PAD information request letter from Sarah Lindsey, Utah Natural Heritage Program, December 10, 2018). The brown bear, gray wolf, June sucker, and Lahontan cutthroat trout are all listed under the ESA, however these species did not show up in the IPaC, and are unlikely to occur in the Project Boundary or Project Area (USFWS 2018b). The following Utah Sensitive Species were identified as potentially occurring or are known to occur in the Project Vicinity, Project Area, and Project Boundary (Table 6-20).

TABLE 6-20 UTAH SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING OR KNOWN TO OCCUR IN THE PROJECT VICINITY

COMMON NAME	SCIENTIFIC NAME	COUNTY[1]	STATE STATUS[2]
American white pelican*	*Pelecanus erythrorhynchos*	BE,CC	SPC
Bald eagle	*Haliaeetus leucocephalus*	BE,CC	SPC
Bluehead sucker	*Catostomus discobolus*	BE,CC	CS
Bobolink*	*Dolichonyx oryzivorus*	BE,CC	SPC
Bonneville cutthroat trout	*Oncorhynchus clarkii utah*	BE,CC	CS
Burrowing owl^	*Athene cunicularia*	BE,CC	SPC
California floater*	*Anodonta californiensis*	BE,CC	SPC
Columbian sharp-tailed grouse*	*Tympanuchus phasianellus columbianus*	BE,CC	SPC
Deseret mountainsnail*	*Oreohelix peripherica*	BE,CC	SPC
Ferruginous hawk	*Buteo regalis*	BE	SPC
Grasshopper sparrow*	*Ammodramus savannarum*	BE,CC	SPC
Great plains toad*	*Bufo cognatus*	BE,CC	SPC

Source: BIOTICS 2017

[1] BE=Box Elder County, CC=Cache County

[2]S-ESA=Federally-listed or candidate species under the Endangered Species Act; SPC=Wildlife species of concern; CS=Species receiving special management under a Conservation Agreement in order to preclude the need for federal listing.

*Species recorded within a ½ -mile radius of the Project Boundary.

^Species recorded within a 2-mile radius of the Project Boundary.

Botanical species of special concern are not included in the UDWR Sensitive Species List. However, the BLM Utah also provides a list of sensitive species that occur on BLM-administered lands. The BLM state director's sensitive species list includes 108 plant species (BLM 2011). These species are not federally listed as threatened or endangered but require special management to preclude the need to list the species in the future (BLM 2018). There are three (3) botanical species that are included on the BLM state director's sensitive species list that occur in Box Elder County (Table 6-21). There are no botanical species on the list that occur in Cache County.

TABLE 6-21 BLM STATE DIRECTORS SENSITIVE SPECIES LIST OF BOTANICAL SPECIES FOR THE PROJECT VICINITY, UTAH

COMMON NAME	SCIENTIFIC NAME	COUNTY[1]
Cottam's cinquefoil	*Potentilla cottamii*	BE
Goose Creek milkvetch	*Astragalus anserinus*	BE
Idaho beardtongue	*Penstemon idahoensis*	BE

Source: BLM 2011

[1]BE=Box Elder County

The Goose Creek milkvetch is also listed as a candidate species under the ESA; however, this species did not appear in the IPaC, and is unlikely to occur in the Project Boundary or Project Area (USFWS 2018b). Although Cottam's cinquefoil (*Potentilla cottamii)* was identified as potentially occurring in the Project Vicinity, its presence in the Project Boundary and Project Area is highly unlikely.

Idaho beardtongue (*Penstemon idahoensis*) is unlikely to occur in the Project Area, due to the underlying soils. Further, the only known occurrences in the area are in the western portion of Box Elder County; there are no known occurrences in Cache County.

Additionally, there is a federally listed threatened plant, the Maguire primrose (*Primula maguirei*), that occurs in Cache County; however, this plant is endemic to Logan Canyon and therefore, does not occur within the Project Area or Project Boundary (USFWS 2015).

6.7.1 Threatened and Endangered Wildlife and Botanical Species Distribution and Life History

Based on the preliminary IPaC list of federally threatened and/or endangered species Canada lynx (*Lynx canadensis)*, and Yellow-billed cuckoo (*Coccyzus americanus*) were identified as potentially occurring in the Project Vicinity. However, their presence in the Project Boundary and Project Area is highly unlikely and further analysis of their distribution and life history is not provided. The threatened plant species, Ute ladies'-tresses is known to occur in the Project Area and the Project Boundary. Distribution and life history of Ute ladies'-tresses is provided below.

6.7.1.1 Ute Ladies'-Tresses

Ute ladies'-tresses was listed as threatened by the USFWS in 1992 due to the small population and low reproductive rate of this species as well as the danger of habitat loss and modification (USFWS 2004). This showy, terrestrial orchid typically has one stem approximately 5-20 inches tall with few to many white flowers clustered in a spike at the top. The leaves are linear-lanceolate and can reach 11 inches long. Flowering typically begins in early August and, depending on conditions, persists into early September (USDA 2009).

A population of this orchid is known to occur in Mendon Meadow in the Bear River Land Conservancy. In 2017, there were 1,979 orchids recorded on the preserve (BRLC 2019). This population is found in a wet meadow, but can also be found in riparian areas, specifically along gravel bars, old oxbows, and channels with high flow. Within these areas, this orchid is restricted to a small microhabitat signified by "calcareous, wet-mesic, temporarily-inundated meadow in shallow wetlands." There are three (3) general areas in the western United States that support populations of this orchid: 1) southeastern Wyoming, Nebraska, and southeastern Wyoming at the base of the eastern slope of the Rocky Mountains; 2) the upper Colorado River basin, in particular the Uinta basin as well as the Bonneville basin and west along the Wasatch Front to the Great Basin in Utah, Nevada, and Idaho; 3) southwestern Montana and along the Columbia River in north-central Washington. No critical habitat has been designated for the Ute ladies'-tresses (USFWS 2018).

6.7.2 Essential Fish Habitat

Pursuant to the amended Magnuson-Stevens Fishery Conservation and Management Act (Act), Congress mandated that habitats essential to federally managed commercial fish species be identified, and that measures be taken to conserve and enhance habitat. In the amended Act, Congress defined essential fish habitat (EFH) for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (PFMC 2016). According to the NOAA Fisheries, EFH Mapper there are no EFH areas protected from fishing identified in the Project location (NOAA 2016).

6.8 Recreation and Land Use

This section describes recreation facilities and opportunities within the Project Boundary and the surrounding region. The Project Boundary encompasses approximately 9,115 acres (FERC 2009). With the exception of three (3) parcels administered by the BLM, land ownership adjacent to the Project but outside of the Project Boundary is private. There are no federally-managed lands within the Project Boundary.

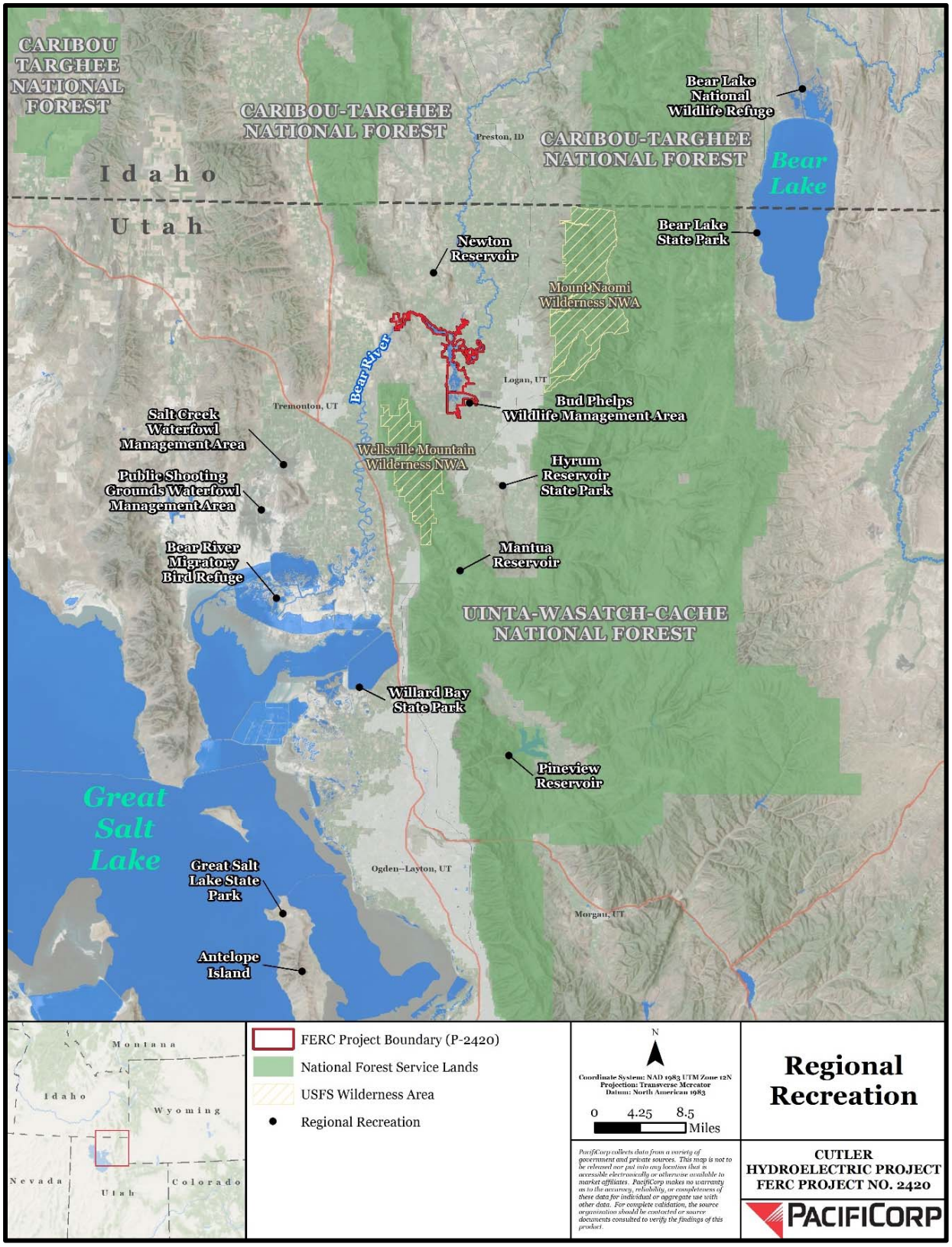
6.8.1 Regional Recreation Areas

The Bear River passes through varied terrain in the states of Wyoming, Idaho, and Utah before emptying into the Great Salt Lake. With lower lying valleys and desert ranges in the western portion and rugged mountains and plateaus on the eastern side, including the Great Salt Lake, the Bear River region offers a considerable diversity of recreation opportunities. These include both land and water-based resources in wilderness, rural, and urban areas.

Due to Utah's arid and warm summer climate, access to water is extremely important to the recreating public. Water-oriented recreation includes sailing and waterfowl hunting around the Great Salt Lake as well as motorized boating, waterskiing, non-motorized boating, angling, and camping adjacent to area waterbodies. Major recreation areas include national forests, wilderness areas, wildlife refuges, and the Bear River. Recreation facilities in the area include ski resorts, snowmobile trails for winter use, and hiking trails and reservoirs for summer and winter use.

The Bear River basin's distinct seasons, characteristic of the Intermountain West, attract recreationists year-round. During the summer when it is typically hot, valley reservoirs, rivers, and nearby forest campgrounds experience heavy use by water sport enthusiasts and vacationing families. Autumn brings pleasant weather to all elevations with hunters visiting wetlands in search of waterfowl, upland areas for game birds, and mountains for big game. Winter snowfalls provide excellent skiing in the Wasatch Mountains, while hunting activity at reservoirs is replaced by ice skating, ice fishing, and snowmobiling.

Figure 6-15 below displays the recreation areas described thereafter.



Source: PacifiCorp 2018a

FIGURE 6-15 REGIONAL RECREATION AREAS IN UTAH AND IDAHO

6.8.1.1 Cache National Forest

Cache National Forest is managed as a part of the Uinta-Wasatch-Cache National Forest. The Cache National Forest portion lies to the south, east, and west of the Project Boundary. The nearest area of the forest is approximately 2 miles west of the Project. The Cache National Forest encompasses 701,453 acres in Idaho and Utah and was established in 1908 when the Bear River National Forest was disbanded (USDA 2012a; Davis 1983). Opportunities exist for a variety of recreational pursuits including bicycling, camping, climbing, fishing, hiking, horseback riding, hunting, nature viewing, off-highway vehicle (OHV) riding, picnicking, snowshoeing, and cross-country skiing. The Cache National Forest includes two (2) designated wilderness areas, Wellsville Mountain and Mount Naomi.

- Wellsville Mountain Wilderness is included in the national forest and lies approximately 2.5 miles to the west and southwest of the Project Boundary. Wellsville Mountain Wilderness was designated as wilderness in 1984 and encompasses 22,843 acres of extremely rugged and picturesque terrain. It includes narrow and steep mountains such as Wellsville Cone and Box Elder Peak. The wilderness area supports deer, moose, mountain lions, and big horn sheep. Recreation use is typically day hikers and hunters. The wilderness area includes 17 miles of trails and trailhead access is limited. (wilderness.net 2018).

- Mount Naomi Wilderness lies within the Cache National Forest to the east of the Project Boundary, approximately 6.5 miles from the Project Boundary. It was designated as wilderness in 1984 and encompasses 44,473 acres. Its namesake, Naomi Peak, is 9,980 feet in elevation, and the wilderness area contains several other peaks over 9,000 feet. The area provides habitat for large populations of moose, deer, elk, and beaver. Recreation uses include hikers, trail runners, campers, and hunters who use the area's 65 miles of trails (wilderness.net 2018).

6.8.1.2 Caribou National Forest

Caribou National Forest is managed as a part of the Caribou-Targhee National Forest. The Caribou National Forest portion of this forest lies to the northwest of the Project Boundary, with its nearest edge approximately 4.3 miles northwest of the Project Boundary's northwestern edge. The Caribou National Forest occupies a total of 972,430 acres, from Utah near the Project Boundary, and extending primarily into Idaho and Wyoming (USDA 2012). The national forest offers hiking, hunting, fishing, picnicking, OHV riding, sightseeing and nature viewing,

snowshoeing, cross country skiing, and many other recreation opportunities. The Dry Creek Campground, southwest of Malad City, Idaho, approximately 30 miles away, is the nearest developed recreation site to the Project in the Caribou National Forest.

6.8.1.3 Great Salt Lake

The Great Salt Lake is located southeast of the Project Boundary, with its nearest edge approximately 18 miles away. Recreation at the Great Salt Lake is limited due to the lake's shallow depth, fluctuating water levels, salinity, and pollution. The Great Salt Lake is popular for sail boating and waterfowl hunting. It is generally not used for waterskiing, fishing, or swimming. Two (2) state parks, Antelope Island and Great Salt Lake, are located at the southern end of the lake and include day-use facilities.

Primarily because of its shallowness, water recreation activities on the Great Salt Lake are similar to Cutler Reservoir. Waterfowl hunting opportunities exist at both, although at Great Salt Lake they are generally associated with the relatively large diked areas where incoming fresh water can be retained during periods (seasonally and annually) of high water. The waterfowl hunting areas outside of Cache Valley that are most likely to be used by residents of the lower Cache Valley include the Salt Creek Waterfowl Management Area (WMA), Farmington Bay WMA, Public Shooting Grounds WMA, and the Bear River Migratory Bird Refuge, described below. A concert venue, The Great Saltair, is located on the southern shore of the Great Salt Lake.

6.8.1.4 Bear River Migratory Bird Refuge

The 74,000-acre Bear River Migratory Bird Refuge is located on the shores of the Great Salt Lake, at the mouth of the Bear River immediately north of Willard Bay State Park. Forty percent of the refuge is open to hunting during the state hunting season, and some fishing is allowed but not in closed areas of the refuge. Other public uses include nature study and bird watching along a 12-mile auto tour route. The refuge is closed to public access in the fall after snow and ice make vehicle access difficult. Typically, the refuge reopens in April. The original visitor center and refuge facilities were destroyed by Great Salt Lake flooding between 1983 and 1987. In

2006, the visitor center was rebuilt and now includes a wildlife education center and a 0.5-mile accessible walking trail.

6.8.1.5 Bear Lake National Wildlife Refuge

Bear Lake National Wildlife Refuge is located approximately 70 miles from Cutler, and is comprised of 17,600 acres at the north end of Bear Lake in Idaho, covered primarily with marsh. It is managed as a migratory bird nesting area. Recreational opportunities here are waterfowl hunting, fishing, bird watching, and nature study. Hiking and vehicle access are restricted to a 2-mile auto tour. Leaflet boxes with interpretive brochures are available.

6.8.1.6 Salt Creek Waterfowl Management Area

The Salt Creek Waterfowl Management Area is managed by the UDWR. The management area is located at the mouth of the Bear River Valley, north of the Bear River Migratory Bird Refuge and approximately 16 miles southwest of Cutler Reservoir. Outside of the hunting season, only the Compton's Knoll wildlife viewing area portion of the management area is open to public use for wildlife viewing and nature study. Access to other portions of the management area is restricted and only open to public use 1 week prior to and during the waterfowl hunting season. During the hunting season, Salt Creek Waterfowl Management Area provides opportunities for waterfowl hunting, upland game hunting, camping, and use of motorized and non-motorized boats. No vehicular access is allowed at other times of the year; fishing, and dove and deer hunting are also prohibited.

6.8.1.7 Public Shooting Grounds Waterfowl Management Area

Public Shooting Grounds Waterfowl Management Area is managed by the UDWR. The management area is located immediately north of the Bear River Migratory Bird Refuge, on either side of State Highway 83 and approximately 25 miles southwest of Cutler Reservoir. Increased hunting use of the 13,063-acre management area occurred during the mid-1980s due to Great Salt Lake flooding. No developed facilities exist on the site. Management practices and public use are similar to the Salt Creek Waterfowl Management Area.

6.8.1.8 Winter Sports

Nearby regional snowmobile trails extend from the Bear River Valley into the Yellowstone area. Those nearest the Project include the Monte Cristo, Hardware Ranch, Tony Grove and Logan Canyon systems. Trails are groomed and provide riding through canyons, up mountains, and into bowls and play areas. Groomed trails provide access to backcountry areas.

6.8.2 State Recreation Areas

Five (5) recreation areas in the Bear River region, which generally includes the area between Bear Lake and the Great Salt Lake, are managed by the Utah Division of Parks and Recreation. Willard Bay State Park near the Great Salt Lake, Antelope Island in the Great Salt Lake, Great Salt Lake Marina, Hyrum State Park in Cache Valley to the north, and Bear Lake State Park in the Wasatch Mountains. Bud Phelps WMA, managed by UDWR, is the closest recreation area to the Cutler Project that is not a part of the Project.

6.8.2.1 Willard Bay State Park

Willard Bay State Park is located at Willard Bay, a freshwater reservoir on the Great Salt Lake floodplain approximately 12 miles north of Ogden. The state park includes two separate marinas offering day use facilities, camping, boat launch ramps, and group use areas. The reservoir provides opportunities for boating, swimming, waterskiing, and fishing (Utah State Parks 2019).

6.8.2.2 Antelope Island

Antelope Island provides 28,571 acres of parklands for wildlife viewing and scenic park purposes. It is accessible by a 7-mile long causeway and is the largest island in the Great Salt Lake. Its average annual visitation between 2007 and 2011 was 275,842 patrons (Utah DNR 2013). Antelope Island is an important local recreation area for Salt Lake, Weber, and Davis counties (Utah DNR 2009).

6.8.2.3 Great Salt Lake Marina

The Great Salt Lake Marina is located on the south shore of the Great Salt Lake in Salt Lake County near the Tooele County border, 17 miles west of Salt Lake City. It contains

approximately 162 acres including a marina and an area along the access road and shoreline. Amenities include a year-round boat launch, 320 boat slips, restrooms, and a scenic viewpoint. Visitation from the 1990s to 2003 was approximately 130,000 annually, with a decline to approximately 58,000 annually between 2003 and 2006, likely due to lower lake levels (Utah DNR 2007).

6.8.2.4 Hyrum Reservoir

The Little Bear River feeds the 475-acre Hyrum Reservoir located beside the town of Hyrum, 15 miles south of Cutler Reservoir. Hyrum State Park is located on land leased from the U.S. Bureau of Reclamation and has been managed by Utah State Parks since 1959. Forty of the park's 291 acres are developed for public use on two (2) separate sites. One site includes two (2) campgrounds, a boat launch, a group area, picnic sites, a beach, docks, and a ranger's office. The other serves as a day use area for swimming and picnicking. The most popular recreation activities, listed in order of participation numbers, are swimming, waterskiing, and motorized boating. Trout fishing is also popular. Hyrum Reservoir is managed according to the 2004 Hyrum Reservoir Resource Management Plan (DOI 2004).

6.8.2.5 Bear Lake State Park

Due to its large size and the extensive number of facilities around it, Bear Lake, located approximately 30 miles from Cutler, provides the greatest amount of water access and opportunity. Bear Lake opened to the public as a state park in 1962 and is the largest freshwater lake in the region. It is located at elevation 5,900 feet in the Wasatch Mountains on the Utah-Idaho border. Bear Lake has approximately 50 miles of shoreline, of which 15 miles are available to the public. Public access opportunities around the lake include the full-service marina, campgrounds, and numerous day use sites. Around the entire shoreline of Bear Lake there are boat launch facilities, many of which are open to the public. Unlike Cutler Reservoir, Bear Lake is deep, which allows for extensive motor boating, fishing, and large boat sailing. Water quality and clarity is superior to Cutler Reservoir, making Bear Lake attractive to swimmers. Its average annual visitation between 2007 and 2011 was 214,318 patrons (Utah DNR 2013).

6.8.2.6 Bud Phelps Waterfowl Management Area

The Bud Phelps WMA, located adjacent to the Project Boundary at the south end of Cutler Reservoir, includes 150 acres of wetland, marsh, and associated habitats just south of Cutler Reservoir. The area is managed by UDWR and provides opportunities for hunting, birding, and wildlife viewing which can be done on foot, by canoe, or kayak. Wildlife management in the WMA necessitates seasonal recreation closures to benefit wildlife (UDWR 2019, Wasatch Audubon Society 2019).

6.8.3 County/Municipal/Other Recreation Areas

6.8.3.1 Newton Reservoir

Located approximately 5 miles north of Cutler Reservoir, Newton Reservoir was originally built for irrigation supply purposes and is managed by the U.S. Bureau of Reclamation. Cache County previously provided recreation facilities on the reservoir. Currently, the site has primitive facilities and no on-site manager or law enforcement. Activities available at the Newton Reservoir are boating; primitive camping; and fishing for perch, bluegill, sunfish, and rainbow trout.

6.8.3.2 Mantua Reservoir

Mantua Reservoir is located along Highway 89/91 approximately 4 miles east of Brigham City and 25 miles south of Cutler Reservoir. The 554-acre reservoir is used for irrigation water storage and is owned and managed by Brigham City. The reservoir is popular for fishing, boating, and picnicking. Some waterskiing also occurs at the reservoir. However, facilities and maintenance are limited. There is only one small boat ramp. The shallowness of the reservoir limits the fishery potential to warm water species. There is a private campground and a U.S. Forest Service (USFS)-operated campground near the reservoir.

6.8.3.3 Pineview Reservoir

Pineview Reservoir is located on the Ogden River approximately 8 miles east of Ogden and 50 miles south of Cutler Reservoir. Recreation facilities and management are provided by the USFS. The reservoir has a surface area of 2,870 acres and a shoreline of 25 miles. Numerous

campgrounds, marinas, stores and picnic areas ring the shore, including Anderson Cove Campground, Jefferson Hunt Campground, Bluffs Swim Area, and Port Ramp. Recreation activities listed in order of participation are picnicking, camping, and motorized boating.

6.8.3.4 Logan Canyon and Other Camping Areas

The Uinta-Wasatch-Cache National Forest operates approximately 15 campgrounds along U.S. Highway 89 and the Logan River between Cache Valley and Bear Lake Summit. There are approximately 224 campsites in Logan Canyon. The campgrounds vary in size and include group facilities and picnic areas. Visitors stay in Logan Canyon for a variety of reasons: to fish and play in the Logan River; to seek relief from the summer heat in the Wasatch Front cities; to hike the trails; and to gaze at the canyon's outstanding and unique mountain scenery. In addition to the Logan Canyon campgrounds, there are other USFS, state, county, and private campgrounds and recreational vehicle (RV) parks in the region. The private campgrounds tend to be more developed, offering showers, tent sites, and RV sites with or without water and electrical hookups. Many of the private facilities are located within a 45-minute drive of Cutler Reservoir near the communities of Logan, Honeyville, and Plymouth.

6.8.4 Existing Recreation Opportunities Inside the Project Boundary

The Project offers a broad range of no-fee recreation opportunities available to the public year-round. Spring, summer, and fall recreation opportunities include motorized and non-motorized boating; swimming; waterskiing; fishing; hunting for waterfowl, upland bird, and big game species; trapping; hiking; wildlife watching; birding; photography; and picnicking. Numerous recreation opportunities extend into the winter depending on the severity of the season. Periodic ice cover can restrict some open-water recreation opportunities while creating new activities such as ice skating. Upland bird and waterfowl hunting, and trapping continue into the winter months as determined by state and PacifiCorp hunting and trapping regulations.

Visitor use of recreation facilities was collected in 2014 as part of the Licensed Hydropower Development Recreation Report, FERC Form No. 80. In 2014, the Project had 212,786 annual visitor days (PacifiCorp 2018b). The peak weekend average was 371 visits per day. Recreation facilities are increasingly utilized by organized groups for educational science programs

(PacifiCorp 2018b). This includes primary schools, secondary schools, and universities classes as well as research projects. The Project provides an ideal outdoor classroom to investigate terrestrial and aquatic ecosystems. In addition, numerous user groups host events at the Project such as dog trial competitions, fishing competitions, and Eagle Scout and other service projects. PacifiCorp requires commercial and not-for-profit groups to apply for a temporary special use permit. The permit informs permittees of special requirements, resource constraints, and insurance requirements.

6.8.4.1 Recreation Facilities

Under the current license, PacifiCorp implemented a recreation site development program to improve public access and develop recreation facilities in the Project Boundary (PacifiCorp 2002). As part of this program, PacifiCorp developed and maintains 13 recreation facilities in the Project Boundary (Figure 6-16). The recreation facilities provide a range of amenities (Table 6-22). Recreation facilities are limited to day use only. Camping is not permitted at any of the recreation facilities. Recreation facility hours of operation are as follows:

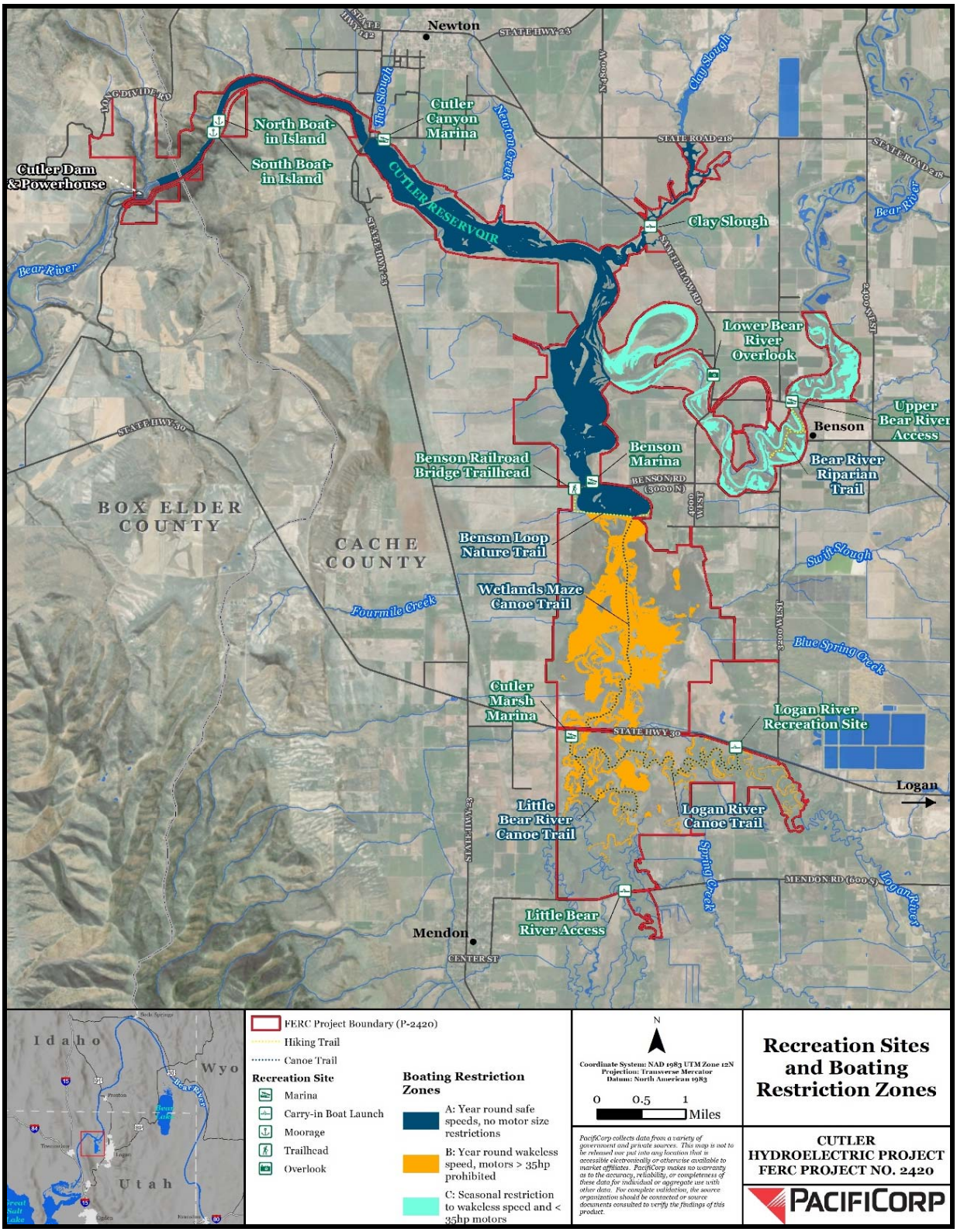
- April 1 – September 30, 5 a.m. to 10 p.m.
- October 1 – March 31, 5 a.m. to 7 p.m.

Annual facility maintenance typically includes the following:

- Facility site maintenance
- Vandalism repair
- Adding gravel to parking areas as needed
- Sign repair
- Maintaining seasonal permanent and portable recreation facilities
- Standardized signs for all recreation sites (maps, FERC Form No. 80, regulations for motorized uses, drones, and tobacco/cannabis use).

Under the current license, PacifiCorp completes an RMP Monitoring Report in 5-year increments. The report provides, in part, monitoring results of recreation facility condition and visitor use. PacifiCorp monitors recreation facility conditions regularly in the spring, summer, and fall seasons. Monitoring frequency and annual start and stop dates vary by recreation facility (PacifiCorp 2018b). Monitoring is limited during the winter period. PacifiCorp will continue recreation monitoring in the current license period as described in the RMP (2018b). The next RMP report will be completed in 2023. As of 2018, FERC Form No. 80 data collection and

analysis, previously scheduled to occur in 2020, is no longer required and has therefore been discontinued.



Source: PacifiCorp 2018a

FIGURE 6-16 MAP OF PROJECT RECREATION FACILITIES AND BOATING RESTRICTION ZONES

TABLE 6-22 CUTLER HYDROELECTRIC PROJECT RECREATION FACILITIES

Site Name	Day-Use Only	Parking	Restrooms	Picnic Table	Bar-b-Cue Grill	Pavilion	Swimming Area	Dock	Concrete Boat Ramp	Carry-in boat launch	Angling	Trail
Bear River Riparian Trail	●	●	●									●
Benson Loop Nature Trail	●	●									●	●
Benson Marina	●	●	●	●	●	●	●	●	●		●	
Benson Railroad Bridge Trailhead	●	●										●
Clay Slough	●	●								●	●	
Cutler Canyon Marina	●	●	●	●	●	●		●	●		●	
Cutler Marsh Marina	●	●	●	●		●		●	●		●	
Little Bear River Access	●	●	●							●	●	
Logan River Recreation Site	●	●	●					●		●	●	
Lower Bear River Overlook	●	●		●								
North Boat-in Island	●							●			●	
South Boat-in Island	●							●			●	
Upper Bear River Access	●	●	●					●	●		●	

6.8.4.2 Boat Launches

PacifiCorp developed and maintains four (4) boat ramps in the Project Boundary: Upper Bear River Access Site Boat Ramp (Photo 6-3), Benson Marina (Photo 6-4), Cutler Canyon Marina (Photo 6-5), and Cutler Marsh Marina. Each of these locations provides a concrete boat ramp and adjacent dock for launching trailered boats on Cutler Reservoir as well as parking, restrooms, picnic tables, and other amenities for day use activities. The upper Bear River access site has a concrete boat ramp and dock for trailered boats allowing parties to launch on the Bear River within the Project Boundary. Three (3) additional launches are in the Project Boundary: Clay Slough, Little Bear River access (Photo 6-6) and the Logan River recreation site. These sites are designed for carry-in boat access and do not have a concrete boat ramp.

Source: Kleinschmidt 2018

PHOTO 6-3 UPPER BEAR RIVER ACCESS SITE BOAT RAMP

Source: Kleinschmidt 2018

PHOTO 6-4 BENSON MARINA BOAT LAUNCH

Source: Kleinschmidt 2018

PHOTO 6-5 CUTLER CANYON MARINA ENTRANCE NEAR THE HIGHWAY 23 BRIDGE

Source: Kleinschmidt 2018

PHOTO 6-6 LITTLE BEAR RIVER ACCESS SITE PUBLIC SAFETY SIGNS

6.8.4.3 Canoe Trails

There are three (3) canoe trails in the Project Boundary: Little Bear River canoe trail, Logan River canoe trail, and the Wetlands Maze canoe trail. All three (3) canoe trails are located in the South Boater Zone (see Section 6.8.4.4). The Bear River is used for canoeing and kayaking but is not designated as a canoe trail as it also allows for motorized boat use. Project boat launches provide access to each of the canoe trails. PacifiCorp conducts routine monitoring of canoe trails including trail marker replacement between March 1 and November 30 annually depending on ice cover (PacifiCorp 2018b).

6.8.4.4 Boater Use Zones

PacifiCorp, Utah State Parks, and UDWR have adopted three (3) boater use zones for the project waters: North Boater Zone A, South Boater Zone B, and Bear River Boater Zone C (PacifiCorp 2018b). Watercraft size and operation prescribed for each zone help maintain unique recreation opportunities, public safety, and wildlife habitat. In the North Boater Zone A, there are no restrictions on motor size or speed, outside of state boater safety regulations and standards. In the South Boater Zone B, motor size is restricted to a maximum of 35 hp and wakeless speeds year-round. In the Bear River Boater Zone C, motor size is restricted to a maximum of 35 hp and wakeless speeds from the last Saturday in September to March 31, annually, but is open to all watercraft and safe speeds from April 1 to the end of September.

6.8.4.5 Utah Boating Regulations

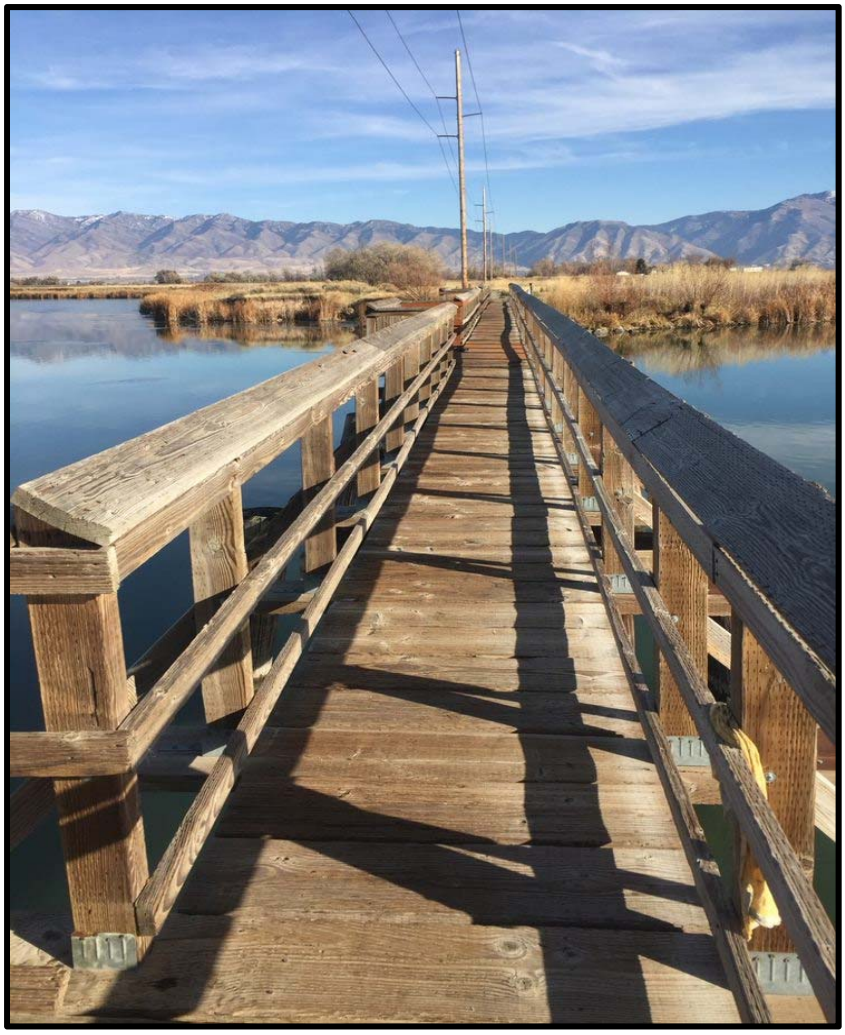


PHOTO 6-7 RAILROAD TRAIL AND FISHING BRIDGE

Motorized boats must be properly registered with the Utah Division of Motor Vehicles and must carry liability insurance while operating on Utah waters (motorboats with engines less than 50 hp are exempt from the insurance requirement). Utah law requires all boats to have at least one wearable, approved personal flotation device (life jacket) for each person on board (Utah Code 73-18-8). Children under 13 years of age are required to wear a life jacket. Life jackets are required for boaters engaged in towing, people driving personal watercraft (jet skis), and people in any type of vessel on river sections that are not designated as flat water. Utah law also requires that an extra oar or paddle be on board for those engaged in paddle sports. In addition, boaters must have a bailing device and a whistle. It is unlawful to launch a boat without first certifying that it has not been in a quagga or zebra mussel infested water within the last 30 days, or that the boat has been properly decontaminated.

6.8.4.6 Hiking Trails

The Project Area contains two (2) hiking trails: the Benson Railroad nature trail (Photo 6-7) and the Bear River riparian trail. PacifiCorp maintains these trails for pedestrian use. Parking is available at the respective trailheads.

6.8.4.7 Important Bird Areas

Cutler Reservoir and marsh were designated Audubon Important Bird Areas (IBA) in 2009 (BAS 2018).[22] The IBA includes all lands within the Project Boundary, plus additional non-PacifiCorp lands like the Bud Phelps WMA. The area contains a high diversity of bird species and habitat, including a white-faced ibis rookery and a great blue heron rookery. Bird watching is a common recreation activity in the Project Boundary. The IBA and list of bird species documented is described in more detail in Section 6.5.4.2.

6.8.4.8 Hunting, Fishing, and Trapping

Hunting, fishing, and trapping in the Project Boundary is regulated by UDWR and PacifiCorp. At a minimum, all hunters must possess a basic hunting license to hunt game animals on private or public lands in Utah (UDWR 2018a). Waterfowl hunters over the age of 16 must also possess a federal migratory bird hunting and conservation stamp. Some Utah game species require special licenses in addition to the basic license. Fishing licenses are required for anyone 12 years old or older (UDWR 2018b). Hunters and anglers are advised to consult UDWR's website to determine special license requirements or closures for respective game species for areas in the Project. Trappers must have a valid Utah furbearer license (UDWR 2018d), as well as a PacifiCorp permit.

Hunting opportunities in the Project Area include big game species, upland game birds (particularly pheasant), and waterfowl. Project recreation facilities are utilized to access both waterfowl and upland birds. Project lands, including those in PacifiCorp's agricultural lease program, are available for hunting.

[22] Bridgerland Audubon Society (BAS) website: https://bridgerlandaudubon.org/our-projects/cutler-reservoir-marsh-important-bird-area/

Trapping in the Project Boundary is permitted by written permission only. PacifiCorp implemented special regulations that limit the type of trapping and the season allowed on the Project. DWR Conservation Officers enforce PacifiCorp's restricted trapping on Project lands.

Fishing on Cutler Reservoir offers opportunities to catch black bullhead, black crappie, bluegill sunfish, channel catfish, common carp, and walleye (Utah DNR 2017b) (Section 6.4). Night fishing for channel catfish is popular near Benson Marina. The UDWR established specific fishing regulations for Cutler Reservoir (UDWR 2018c).

6.8.5 Public Safety Notification

To ensure public safety at Cutler Reservoir, emergency evacuation sirens have been installed at Cutler Dam and near the Camp Fife Boy Scout Camp downstream of the Project. The sirens have been installed as a proactive measure to prevent delays in communication in the unlikely event that sudden flooding or rapid changes in water flows force evacuation of the camp or areas immediately below Cutler Dam. The sirens are not intended to communicate evacuation orders to residences outside the area. Any necessary evacuations at other Cutler recreational areas will be conducted by local authorities as appropriate. PacifiCorp is required by FERC to create, file, and maintain Public Safety Plans for all developed recreation sites for the Project.

6.8.6 Recreation Needs Identified in Management Plans

The 2014 Utah State Comprehensive Outdoor Recreation Plan (SCORP) (Utah DNR 2013) identifies and prioritizes outdoor recreation opportunities and constraints most critical in Utah, with specific information available for planning districts.[23] The Project is located in the Bear River Planning District. The SCORP reported that popular activities in this district were picnicking, camping, hiking, walking, swimming, and bicycling (Utah DNR 2013). The Bear River Planning District had the highest percentage of participants in bicycling and mountain biking in the state, and a high percentage of swimmers, field-based sports, and running. Recreation needs identified in the Bear River Planning District by respondents included OHV riding areas, paved and un-paved trails, swimming pools, and camping areas. Further,

[23] The next State Comprehensive Outdoor Recreation Plan will be completed in 2019 according to https://stateparks.utah.gov/resources/grants/land-and-water-conservation-fund/.

participants stated that recreation facility needs were parks and other facilities, pools, and trails (Utah DNR 2013).

The 2010 Utah Boating Program Strategic Plan (Utah DNR 2010) identifies statewide boating issues and provides a plan for meeting boaters' recreation needs. The plan provides the following recommendations for northern Utah:

- Consider expanding facilities at Hyrum and Willard Bay reservoirs if use continues to increase in this region
- Protect the opportunity for sailing at Bear Lake (Utah DNR 2010)

6.8.7 National Wild and Scenic River System or State-Protected River Segment

No rivers are designated in the National Wild and Scenic Rivers System in northern Utah.[24] The Virgin River and its tributaries located in Zion National Park in southwest Utah were added to the National Wild and Scenic Rivers System in 2009.[25] Similarly, no rivers or river segments in the Project Vicinity are listed in the National Rivers Inventory (NPS 2018c).[26] Rivers or river segments are added to the National Rivers Inventory if they possess one or more outstandingly remarkable values.

6.8.7.1 National Trail System or Wilderness Area Designation

The National Trails System Act (NTSA) was passed in 1968. The NTSA established four (4) classes of national trails: national scenic trails, national historic trails, national recreation trails, and side/connecting trails (American Trails 2018).[27]

6.8.7.1.1 National Historic Trails

Three (3) national historic trails occur in northern Utah. Each trail is described briefly below including location relative to the Project.

- **The California National Historic Trail** is an auto, biking, hiking, and horseback riding route traveling the road to California during the Gold Rush. It covers portions of 10 states including northern Utah in its 5,000-mile length. Several route choices on the California

[24] https://www.rivers.gov/map.php
[25] https://www.rivers.gov/map.php
[26] https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977
[27] https://www.nps.gov/subjects/nationaltrailssystem/index.htm

Trail existed for pioneers traversing from Wyoming into northern Utah on their westward journey. A cut-off on the California Trail (a.k.a. the Bidwell-Bartelson Route) paralleled segments of the Bear River from Soda Springs, Idaho to Logan, Utah and further westward across lands north of the Great Salt Lake.

- **The Mormon Pioneer National Historic Trail** is an auto tour route traversed by Mormon Pioneers from Illinois to Salt Lake City, Utah. The trail crossed the Wasatch Mountains descending through Emigration Canyon into the Salt Lake City area approximately 70 miles south of the Project Boundary.

- **The Pony Express National Historic Trail** is an auto tour that traces the route used to carry mail from Missouri to California. The Utah section of the trail crossed the Wasatch Mountains descending through Emigration Canyon into the Salt Lake City area approximately 70 miles south of the Project Boundary.

6.8.7.1.2 National Scenic Trails

Trails listed as national scenic trails are 100 miles or longer (NPS 2018a).[28] No national scenic trails are listed in Utah.

6.8.7.1.3 National Recreation Trails

The National Recreation Trail database[29] identifies three (3) national recreation trails in Northern Utah: the 0.5-mile Wetland Wonders Trail on the outskirts of Brigham City in Box Elder County, Utah, the 3.2-mile Bicentennial Trail on the North Fork of the Ogden River on the Cache National Forest, and the 9-mile Mount Naomi Peak Trail located in the Mount Naomi Wilderness Area. No national recreation trails are located in the Project Area or the Project Boundary.

6.8.7.1.4 National Water Trails

National water trails are a subset of the national recreation trail designation recognized as part of the National Trails System (NPS 2018b).[30] Designated water trails are added to the National Water Trails System. Utah currently does not have any water trails designated on the National Water Trails System.

[28] https://www.nps.gov/subjects/nationaltrailssystem/national-scenic-trails.htm
[29] http://www.nrtdatabase.org
[30] https://www.nps.gov/WaterTrails/Home/About

6.9 Land Use and Management of Project Lands

The Cutler Project is primarily situated in southern Cache Valley, approximately three (3) miles west of the city of Logan, Utah, where most of the valley's population is concentrated. The Project lies between the Bear River Range of the Wasatch Mountains to the east and the Wellsville Mountain Range to the south and west, and despite its proximity to Logan, Cutler Reservoir and the lands within and adjacent to the Project Boundary are predominantly rural and dominated by agriculture.

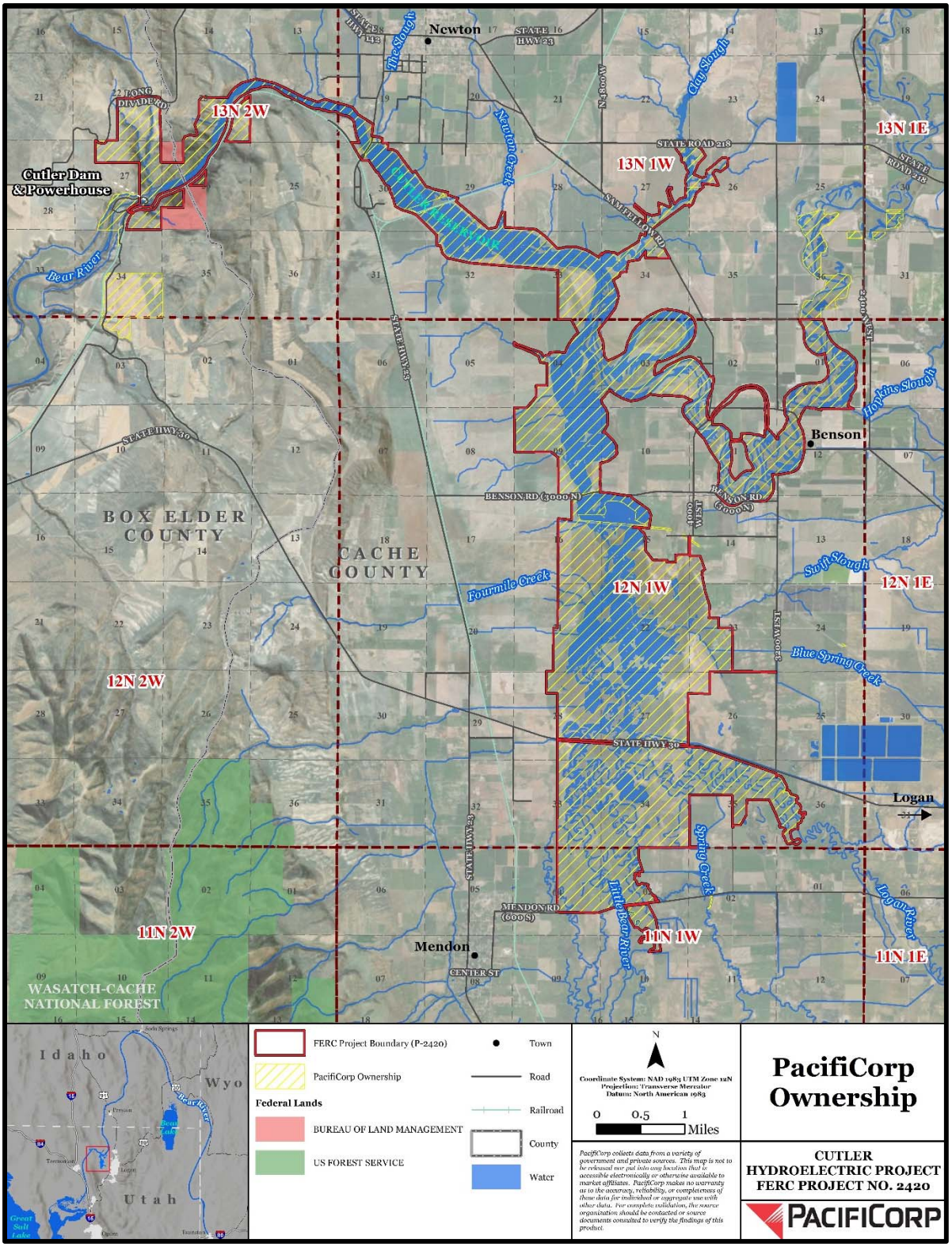
Typical of the Intermountain West, approximately 268,511 acres, or 36 percent of Cache County is considered farmland according to the USDA 2012a Census of Agriculture (USDA 2014). Pastureland comprises 51.1 percent of Cache County's farmland with 52,367 cattle and calves and 6,445 hogs and pigs, and cropland accounts for 40.9 percent with principal crops including forage land used for hay and haylage, grass silage, and greenchop; wheat for grain; barley for grain; and safflower (USDA 2012a).

While only a small portion of the Project is located within Box Elder County in Cutler Canyon, Box Elder County is also dominated by agriculture. Approximately 1,170,736 acres, or 27 percent of Box Elder County is considered farmland according to the USDA 2012 Census of Agriculture (USDA 2014). Pastureland comprises 68.8 percent of Box Elder County's farmland with 85,635 cattle and calves and 37,720 sheep and lambs, and cropland accounts for 28.1 percent with principal crops including forage land used for hay and haylage, grass silage, and greenchop; wheat for grain; safflower; and corn for grain (USDA 2012b). Although agriculture is the base economy of Cache Valley, there are numerous manufacturing industries, including printing, dairies, lumber mills, farm equipment manufacturers, exercise equipment manufacturers, canneries, and meat packing operations. USU in Logan is the county's major employer. No intensive industries are located near Cutler Reservoir; however, there are several dairies and stockyards adjacent to Clay Slough and the Bear River. Logan City's sewage treatment facility is additionally located along the eastern shore of the reservoir, approximately 1.5 miles from the Benson Marina recreation site. Currently, Logan City's facilities do not provide tertiary treatment of wastewater, although the city is under a compliance schedule to complete construction and have a new treatment plant online, originally scheduled for 2017, but currently delayed until 2021.

6.10 Land Use of Project and Adjacent Lands

Lands within the Project Boundary are entirely composed of private ownership, most of which is owned by PacifiCorp[31] (Figure 6-17). Lands adjoining the Project Boundary are also owned by other private entities, and are primarily used for either agricultural or residential (only a few) uses, with the exception of three (3) parcels administered by the BLM located near Cutler Dam but outside the Project Boundary. Over the course of the current license term, PacifiCorp revised the Project Boundary once, as approved by FERC's April 3, 2009 Order Approving Revised Exhibit G Drawings (FERC 2009), to incorporate land ownership modifications required by Article 402 of the license. As stated in FERC's order, the total Project Boundary includes 9,151 acres of Project lands.

[31] It should be noted that although at least portions of the Bear River was deemed navigable at statehood in 1896, there have been questions as to whether the State of Utah may claim fee title ownership to the bed and bank of Bear River by virtue of the Equal Footing Doctrine. It is PacifiCorp's stance that unique title was obtained for some portions of the Bear River that pass through the Project and that this claim may not apply to all Bear River submerged lands within the FERC Project Boundary.



Source: PacifiCorp 2018a

FIGURE 6-17 PACIFICORP OWNERSHIP WITHIN THE PROJECT BOUNDARY AND PROJECT AREA

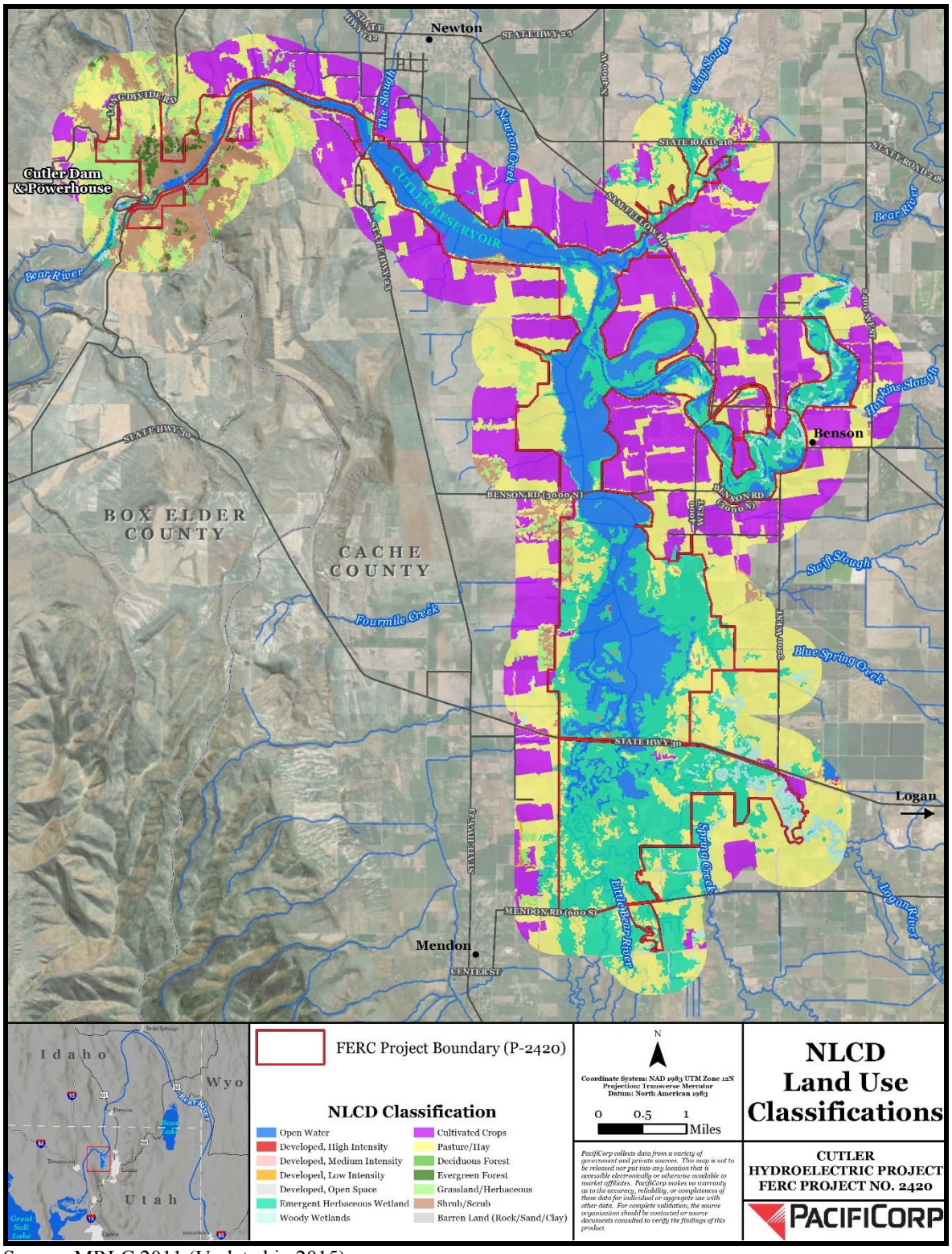
Land use within the Project Boundary and Project Area was estimated by analyzing the Multi-Resolution Land Characteristics (MRLC) Consortium's 2011 National Land Cover Database (NLCD), which provides land use information by generalizing land cover within the area (MRLC 2011) and is depicted below in Figure 6-18. As summarized in Table 6-23, predominant land cover within the Project Boundary is the reservoir (32 percent) and associated wetlands (42 percent) (emergent herbaceous wetlands 39 percent and woody wetlands 3 percent), while upland classifications are dominated by pasture/hay (16 percent), shrub/scrub (4 percent), and cultivated crops (2 percent) (MRLC 2011).[32] Lands in the Project Area were also analyzed. Pasture/hay (33 percent) and cultivated crops (24 percent) are the dominant land uses in the Project Boundary and Project Area (MRLC 2011). Overall, pasture/hay and cultivated crops dominate the Cache Valley lands surrounding Cutler Reservoir, and shrub/scrub cover is dominant along the steeper walls of Cutler Canyon near Cutler Dam.

[32] There are also approximately 1,400 acres of PacifiCorp perennial grass buffers. The data used to compile these percentages was last gathered in 2011 (with a 2015 update), however, it is unclear what updates were made in 2015. It is likely that since 2011, land cover has changed.

TABLE 6-23 LAND COVER WITHIN PROJECT BOUNDARY AND PROJECT AREA

GRID CODE	WITHIN PROJECT BOUNDARY		WITHIN PROJECT AREA		LAND CLASS
	ACRES	PERCENTAGE	ACRES	PERCENTAGE	
11	2,986	32%	3,051	11%	Open Water
21	34	<1%	393	1%	Developed, Open Space
22	38	<1%	381	1%	Developed, Low Intensity
23	11	<1%	50	<1%	Developed, Medium Intensity
24	5	<1%	13	<1%	Developed, High Intensity
31	1	<1%	1	<1%	Barren Land (Rock/Sand/Clay)
41	0	0%	6	<1%	Deciduous Forest
42	64	1%	123	<1%	Evergreen Forest
52	351	4%	1,371	5%	Shrub/Scrub
71	198	2%	924	3%	Grassland/Herbaceous
81	1,446	16%	8,758	33%	Pasture/Hay
82	207	2%	6,424	24%	Cultivated Crops
90	294	3%	582	2%	Woody Wetlands
95	3,562	39%	4,825	18%	Emergent Herbaceous Wetland

Source: MRLC 2011



Source: MRLC 2011 (Updated in 2015)

FIGURE 6-18 NLCD LAND COVER CLASSIFICATIONS WITHIN THE PROJECT AREA

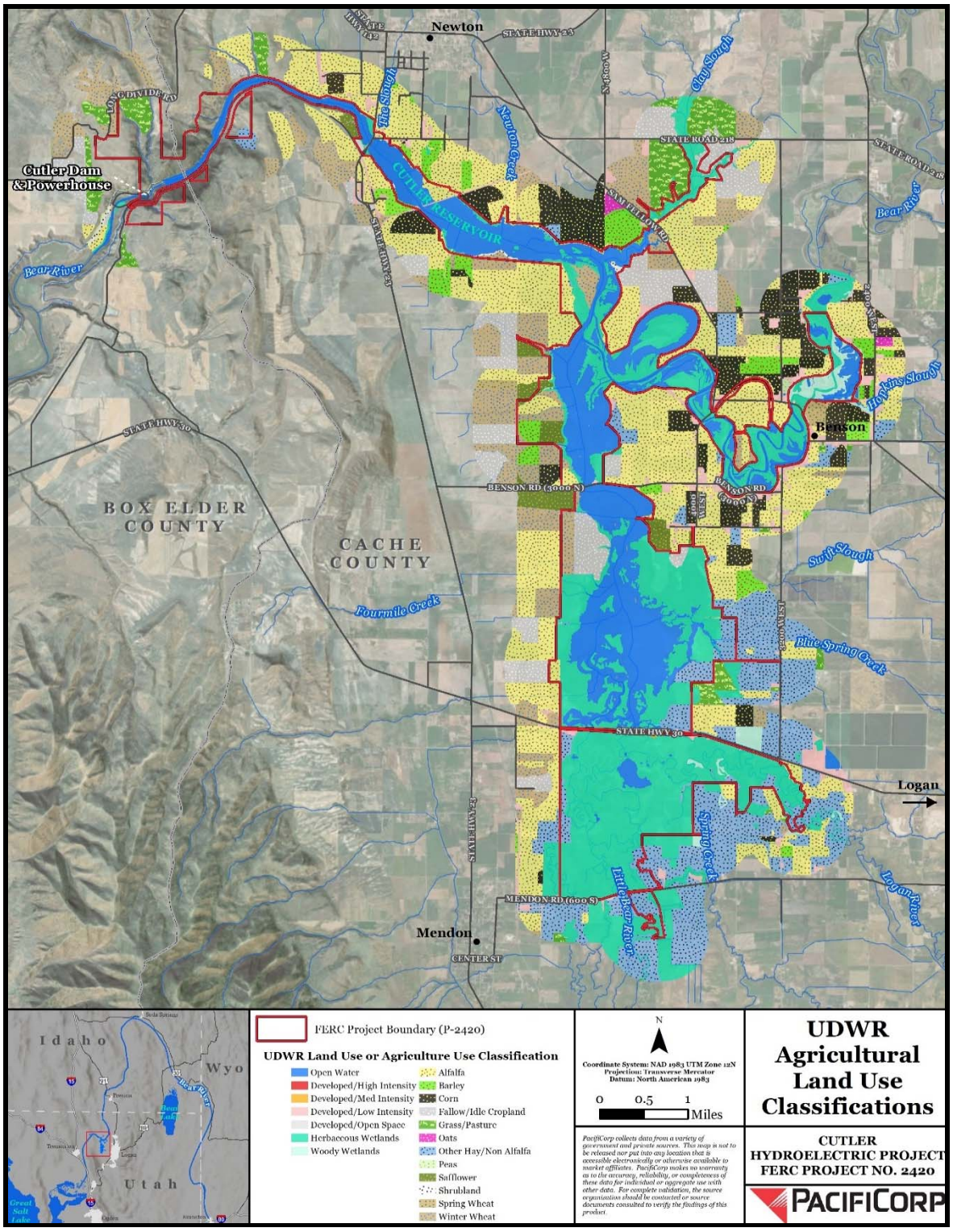
The Utah Division of Water Resources at the Department of Natural Resources annually publishes agricultural land use data for the state of Utah (UDNR 2017b). The data includes, among other things, delineations of specific crop types throughout Utah. Excluding lands designated as herbaceous and woody wetlands, which are often used as grazing areas, the data estimate that 16 percent of the Project Boundary is used for agricultural purposes. Of the area delineated as agricultural use, other hay/non-alfalfa (30 percent), alfalfa (20 percent), winter wheat (19 percent), fallow/idle cropland (14 percent), and grass/pasture (7 percent) are the dominant uses. Land use was also analyzed for the Project Area. Approximately 63 percent of lands in the Project Area are used for agricultural purposes. Of the area delineated as agricultural use, alfalfa (39 percent), other hay/non-alfalfa (18 percent), winter wheat (14 percent), corn (9 percent), and fallow/idle cropland (9 percent) are the dominant uses (Table 6-24 and Figure 6-19).

TABLE 6-24 AGRICULTURAL USE WITHIN PROJECT BOUNDARY AND PROJECT AREA

AGRICULTURAL LAND USE	AGRICULTURAL USE WITHIN PROJECT BOUNDARY		AGRICULTURAL USE WTIHIN PROJECT AREA	
	ACRES	PERCENTAGE	ACRES	PERCENTAGE
Alfalfa	269	20%	5,976	39%
Barley	51	4%	624	4%
Corn	16	1%	1,350	9%
Fallow/Idle Cropland	194	14%	1,389	9%
Grass/Pasture	90	7%	735	5%
Oats	0	0%	39	<1%
Other Hay/Non-Alfalfa	415	30%	2,708	18%
Peas	0	0%	9	<1%
Safflower	61	4%	297	2%
Spring Wheat	0.3	<1%	73	<1%
Winter Wheat	264	19%	2,064	14%

Source: Utah DNR 2017b[33]

[33] Recent changes in land cover may not be captured in the base data used to compile this table.



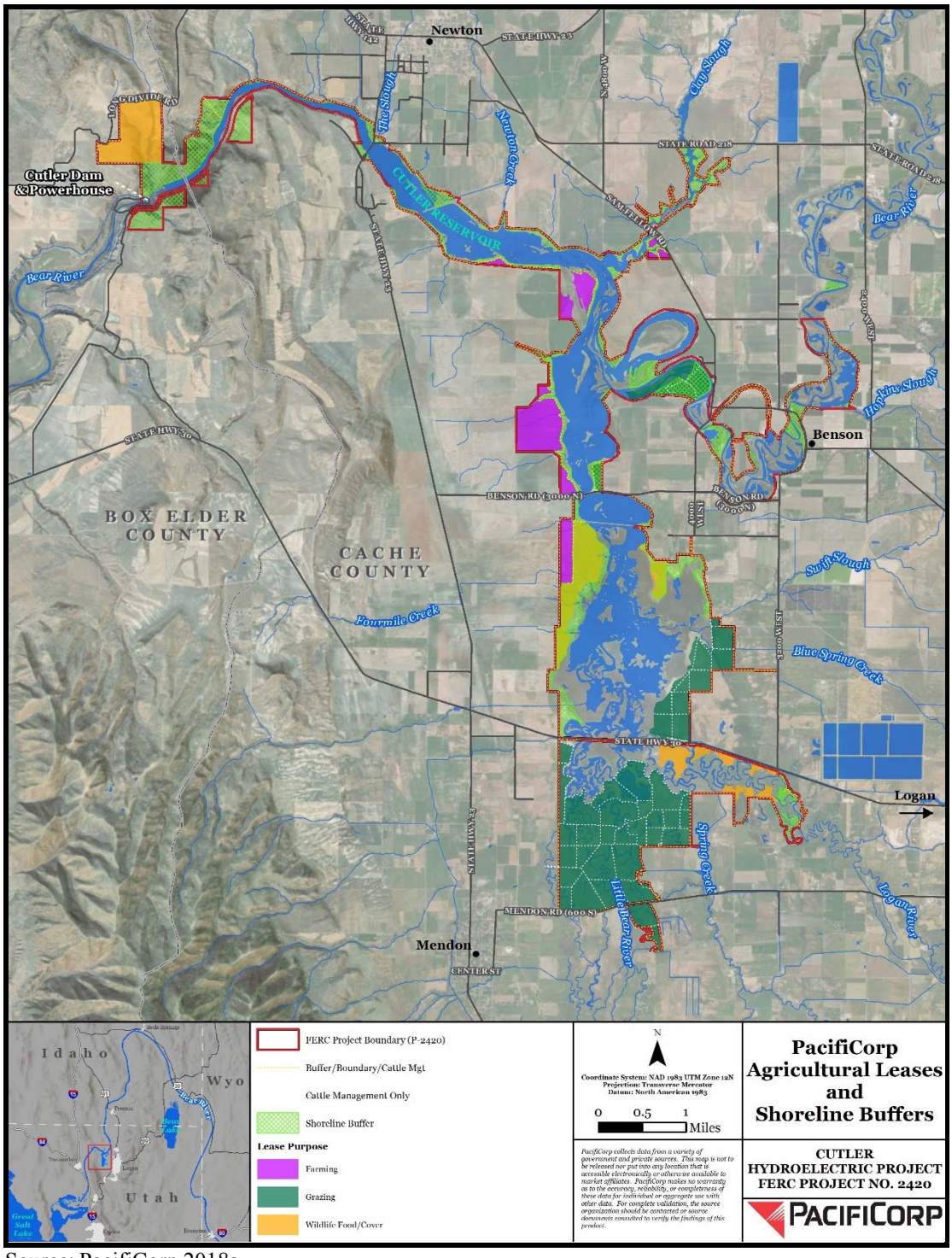
Source: UDWR 2017

FIGURE 6-19 UDWR AGRICULTURAL LAND USE CLASSIFICATIONS WITHIN THE PROJECT AREA

6.10.1 Cutler Hydroelectric Project Resource Management Plan

Historically, much of the Project's shoreline was farmed to the water's edge, which contributed significantly to soil erosion and associated negative effects on water quality, as well as increasing the ongoing rate of bank loss in some areas. Under the current license, PacifiCorp has implemented an Agricultural Lease Program (Figure 6-20) and a Vegetation Enhancement Program (as detailed in Section 6.5.3 and below), to address these and other concerns, as part of its approved Resource Management Plan (RMP). The Agricultural Lease Program includes the following sub-components:

- Grazing leases
- Farming leases
- Wildlife food/cover plots
- Cattle management fences
- Property coordination



Source: PacifiCorp 2018a

FIGURE 6-20 PACIFICORP AGRICULTURAL LEASES AND SHORELINE BUFFERS

The leasing program currently consists of 1,733 acres of Project lands available for use as grazing pastures and approximately 445 acres of Project lands available for farming. Another 663 acres of Project lands potentially available for grazing are managed as wildlife food/cover plots. Functioning cattle management fences are integral to the success of the overall lease program since grazing is one of the primary tools utilized to create and maintain much of the wildlife habitat on Project lands. Excluding the 60 miles of boundary/buffer fencing that has been constructed to both protect the Project Boundary and shoreline buffer, an additional 21 miles of fencing was constructed to control cattle and conflicting uses that may impact the reservoir shoreline and pastures.

Implementation of the Agricultural Lease Program was largely completed at end of the first monitoring period in 2002. Agricultural Lease Program enhancements are monitored annually, and encroachments or other issues resolved according to the schedule provided in Table 6-25. Monitoring activities are reported to FERC every 5 years, with the next monitoring report for 2018 to 2022 due in 2023.

TABLE 6-25 CUTLER RMP AGRICULTURAL LEASE PROGRAM MONITORING SCHEDULE

MONITORING ACTIVITY	START DATE	END DATE
Grazing Leases	April 1	Nov. 30
Wildlife Food/Cover Plots (spring)	May 1	May 31
Cattle Management Fence	May 1	May 31
Farming Leases	Year-round	
Property Coordination	Year-round	

Source: PacifiCorp 2018b

6.10.2 Shoreline Buffer Zone and Management Plan

Under the current license, PacifiCorp implemented a VEP as part of its approved RMP. The VEP includes the following sub-components:

- Shoreline buffer establishment
- Shrub planting
- Bank stabilization
- Fencing (buffer/boundary fencing)
- Erosion control sediment basins
- Sensitive/unique wildlife habitats

The program emphasizes the improvement of water quality, wildlife habitat, recreation opportunities, and scenic quality on the reservoir by establishing shoreline buffer vegetation between the reservoir and adjacent farming activity and implementing shrub planting and bank stabilization efforts within that buffer. Erosion control basins have also been created within shoreline buffers to minimize sheet flow erosion from agricultural lands and reduce sediment and nutrient loading into the reservoir. To protect these efforts and better control the shoreline from future unauthorized use, buffer/boundary fencing was constructed where needed.

Implementation of the VEP has resulted in the establishment of approximately 1,440 acres of shoreline buffer covering 51.7 miles of shoreline, including 610 acres of tilled land converted to permanent grass buffer to improve water quality; 15 woody vegetation pockets at a density of 5,000 shrubs per acre; 13 erosion control catch basins; approximately 5.54 miles of stabilized shoreline; and approximately 60 miles of buffer/boundary fencing (Figure 6-20).

These enhancements are monitored annually and encroachments or other issues resolved according to the schedule provided in Table 6-26. Monitoring activities are reported to FERC every 5 years, with the next monitoring report due in 2023.

TABLE 6-26 CUTLER RMP SHORELINE BUFFER MONITORING SCHEDULE

MONITORING ACTIVITY	START DATE	END DATE
Bank Stabilization	June 1	June 30
Buffer/Boundary Fence	May 1	July 31
Erosion Control Sedimentation Basins	April 1	May 31
Sensitive/Unique Wildlife Habitat	April 1	May 31
Shoreline Buffer	May 1	July 31
Woody Vegetation	May 1	May 31

Source: PacifiCorp 2018b

6.10.3 Reservoir Boating Zones

PacifiCorp does not implement a shoreline management plan other than the buffer land management described previously, and generally does not permit non-Project development of piers, boat docks and landings, bulkheads, or other shoreline facilities on PacifiCorp-owned Project lands or waters (with the exception of permitted irrigation pumps) but does implement a reservoir boating policy. PacifiCorp developed a reservoir boating policy during the 2003 to 2008 RMP monitoring report period; the policy was formally adopted as law in Utah Code (Rule 651-205-17) in 2008. As depicted in Figure 6-16, PacifiCorp developed three (3) boating zones. Zone A, centered on the deeper portion of Cutler Reservoir from Cutler Dam to the Benson Railroad Bridge, requires year-round safe speeds with no motor size restrictions. Zone B, the shallow southern portion of the reservoir south of Benson Railroad Bridge, is restricted to year-round wakeless speed with motors greater than 35 horsepower prohibited. Zone C, including Project waters along the Bear River, is seasonally restricted (in the fall and winter) to wakeless speed and no motors greater than 35 horsepower, and is enforced by the local sheriff, state park rangers, and UDWR Conservation Officers per UDWR R651-205-17.

6.10.4 Cache and Box Elder County General Plans

Utah state law requires that each county prepare and adopt a comprehensive and long-range general plan for its physical development (Title 17-27-301). On January 27, 1998, the County

Council of Cache County, Utah adopted the Cache Countywide Comprehensive Plan and Land Use Element (Cache General Plan) (Cache County 1998), a comprehensive general plan to recommend orderly future patterns of land use in Cache County. Table 6-27 provides the specific goals of the Cache General Plan applicable to land use for the Project.

TABLE 6-27 CACHE COUNTY GENERAL PLAN MANAGEMENT GOALS

Agriculture GOAL 1	Maintain agricultural and open space within Cache County, which provide food, security, watersheds, clean air and adds to the quality of life for people and nature of the region
Agriculture GOAL 2	Preserve agriculture and agricultural industry within Cache County to allow farm operators the opportunity to use their farm land in appropriate farming operations which will be in harmony with the agricultural use of the land
Residential Housing Development GOAL 1	To limit urban sprawl and growth in non-urban areas of Cache County and protect the agriculture and open space
Residential Housing Development GOAL 2	Preserve and protect the rural atmosphere of non-urban areas of Cache County
Residential Housing Development GOAL 6	Provide protection of the sensitive areas and sites, accounting for the public good and property owner rights
Quality of Life GOAL 1	Maintain and protect open spaces and environmentally sensitive areas of Cache County
Quality of Life GOAL 2	Develop recreational areas in harmony with open space and canyon environments
Essential Services and Facilities GOAL 3	Electric Utilities - Ensure a reliable, safe, adequate and economical supply and use of electric power to meet the current and future needs of all users in Cache County
Essential Services and Facilities GOAL 8	Water Supply - Ensure a continued safe, high quality, least cost, water supply for municipal/residential, industrial and agricultural uses
Essential Services and Facilities GOAL 9	Storm Drainage - Minimize the threat from flooding to life and property
Essential Services and Facilities GOAL 10	Water Quality - Ensure a reliable, adequate, affordable and safe water supply of sufficient quality to meet human, animal and agricultural standards and needs

Source: Cache County 1998

In 1998, the Box Elder County Commission adopted the Box Elder County General Plan, a comprehensive general plan to address present and future needs in Box Elder County (BEC

1998). The plan provides guidance on land use and development priorities, citing that future land use decisions will consider the following (BEC 1998):

- Maintaining the current quantity and quality of public services and facilities through balancing growth and development with facility/service capacity e.g., water, sewer, waste disposal, transportation and roads, law enforcement, and emergency services
- Protecting rural, agricultural, mineral and other county interests or traditional land uses
- Promoting development patterns consistent with, and sensitive to, resident preferences
- Balancing private property rights with public interests

6.11 Aesthetic Resources

6.11.1 Nearby Scenic Attractions

The Project Vicinity for scenic attractions is defined as northern Utah and southern Idaho. The distinct topography of the Project Vicinity provides a host of national and state scenic byways with unparalleled vistas and heritage along their routes. In the Project Vicinity, there are two (2) nationally recognized scenic byways (Logan Canyon Scenic Byway in Utah and Pioneer Historic Byway in Idaho) and two (2) state-recognized scenic byways (Bear Lake Scenic Byway and Great Salt Lake Legacy Parkway Scenic Byway).

Logan Canyon Scenic Byway is a nationally recognized scenic byway extending 41 miles from Logan (20 miles east of the Project) to Bear Lake in Garden City, Utah. The byway parallels the Logan River through Logan Canyon along U.S. Highway 89 through the Uinta-Wasatch-Cache National Forest and ending at Bear Lake. The route passes through and past many USFS facilities, dense forests, lush meadows, rugged rock formations and panoramic views, and is especially popular for its autumn colors (US FHA 2018).

Pioneer Historic Byway is a nationally recognized scenic byway extending 127 miles from Franklin, Idaho (12 miles northeast of the Project) on the Utah/Idaho state border to Freedom, Idaho on the Idaho/Wyoming state border. Beginning in Idaho's first city (Franklin), the byway generally follows the Bear River upstream along State Highway 34 past Grace to Soda Springs, where it crosses the east-west Oregon National Historic Trail. The byway continues north and east past Blackfoot River Reservoir, Grays Lake National Wildlife Refuge, and through the Caribou-Targhee National Forest to Freedom, Idaho. The route passes through and near historic Mormon settlements, military campaign sites, major geologic and natural sites, and to the first Yellowstone route (US FHA 2018).

Bear Lake Scenic Byway is a state-recognized scenic byway stretching 10 miles from Laketown, Utah to Garden City, Utah (approximately 50 miles east of the Project Boundary) on the shores of Bear Lake south to Laketown. The byway follows State Highway 30 south along the brilliant turquoise waters of Bear Lake, known as the "Caribbean of the Rockies" (Visit Utah 2018).

The Great Salt Lake Legacy Parkway Scenic Byway is a state-recognized scenic byway extending 14 miles from Farmington, Utah (approximately 55 miles southwest of the Project Boundary) south along State Highway 67 towards Salt Lake City. The byway passes the coastal ecosystem of the Great Salt Lake past the Farmington Bay Waterfowl Management Area and Legacy Nature Preserve with ample opportunities for hiking, biking and bird-watching along the way (Visit Utah 2018).

6.11.2 Visual Character of Project Lands and Waters

Cutler Reservoir is located at the confluence of the Bear, Little Bear, and Logan rivers, as well as Spring Creek, in the lower Cache Valley. The Project Area can be characterized as a rural, agricultural valley surrounded by high mountains. Aesthetically, the Project Boundary can be roughly divided into three (3) zones, each with distinct visual characteristics and land use features, as described from downstream to upstream: 1) Cutler Dam and the Cutler Canyon portion of Cutler Reservoir (Cutler Canyon Management Unit, 2) the main body of Cutler Reservoir as it exits Cutler Canyon and broadens into the lower lying landscape of Cache Valley (Reservoir Management Unit, and 3) the oxbow bends, marshlands, and meandering waterways of the reservoir's tributaries (Bear River and North and South Marsh management units).

The most prominent infrastructure features visible in the Project Boundary include the dam, flowline, penstocks, surge tank, powerhouse, substation, various canals, minor roads, railroads, bridges, and transmission/distribution lines. The Project's operational facilities – Cutler Dam and associated flowline, penstocks, surge tank, powerhouse, substation, and access roads – are relatively confined to the narrow, western end of Cutler Canyon, where steeply incised hillsides dominated by rocky scarps and juniper and maple shrub/scrub vegetation restrict view of the facilities from any easily or commonly accessible vantage point (Photo 6-8). Public access or view of facilities in this portion of the canyon would be solely for access to the dam and nearby canal features. There is no vehicle access through the canyon; however, a Utah Northern Railroad line does run roughly east-west along the upper reaches of the north-facing slopes of the canyon and through the canyon (Photo 6-9).

The Cutler gravity arch dam is constructed of concrete at an approximate height of 109 feet above the riverbed and a maximum thickness at the base of 50 feet (Photo 6-10). The overall

length along the centerline of the crest is 545 feet including two (2) irrigation canal intakes near the top at the abutments – one canal at each end of the dam. An 18-foot-diameter riveted-steel flowline parallels the right bank of the river for a distance of approximately 1,160 feet to a point downstream of the surge tank located near the powerhouse (Photo 6-11). The 45-foot-diameter surge tank is constructed of riveted steel and concrete. The riveted-steel portion is 81 feet high and the concrete base portion is 40 feet high. Downstream of the surge tank the flowline bifurcates into two (2) 112-foot-long, 14-foot-diameter riveted-steel penstocks which extend into a brick 60-foot by 123-foot powerhouse (Photo 6-12). Electricity generated by the Project is transmitted to the Cutler Substation and then transmitted to the Wheelon, Bridgerland, Bear River and Honeyville substations.

Heading east from the dam and out of Cutler Canyon and into the main body of Cutler Reservoir, the landscape transitions from a steep-sided, rugged, and remote canyon dominated by rocky scarps and maple/juniper shrub/scrub vegetation (Photo 6-13 and Photo 6-14) to the flat expanses of agricultural land typical of Cache Valley with very few landforms or vegetation punctuating the horizontal, open space (Photo 6-15 - Photo 6-17). Views from the reservoir are dominated by these flat expanses leading to the mountains surrounding the southern end of Cache Valley, the Bear River Range of the Wasatch Mountains to the east, and the Wellsville Mountain Range to the south and west (Photo 6-18). The exceptional height and steepness of these mountains is an important visual resource of the region.

Because of the lack of middle-ground visual elements, the reservoir's water surface and shoreline edge are important components of the Project Boundary aesthetics. Historically, shoreline conditions around the main body of the reservoir were unattractive due to eroded banks and the lack of vegetative cover. Along many stretches of this shoreline, there were rusted car bodies and agricultural debris that had been placed to try and control shoreline erosion (PacifiCorp 1991). Implementation efforts associated with the Project’s RMP, however, have greatly improved the scenic quality of the shoreline by removing old car bodies from the banks and establishing a vegetated shoreline buffer, including shrub plantings and bank stabilization, and fencing to exclude agricultural use from the shoreline (Photo 6-19 to Photo 6-21). Several roads, bridges and railroads occasionally intersect the Project Boundary (Photo 6-22 and Photo 6-23). Cattle

grazing, farming activities and occasional farm structures do remain both inside and outside of the Project Boundary and contribute to the area's rural character (Photo 6-24 to Photo 6-26).

Although cattle grazing occurs throughout the Cutler Marsh area at the south end of the Project Boundary, there are few farm or dairy buildings located along the Little Bear and Logan River tributaries. Because of the scattering of riparian vegetation and cottonwood trees, this area has a more natural appearance than the main body of the reservoir. The wetland vegetation gives a sense of enclosure and direction and provides the wildlife habitat that makes this area attractive to recreationists (Photo 6-27). Upstream of the Bear River in the Project Boundary, the reservoir's influence slowly subsides and the landscape transitions to a more natural, riverine setting (Photo 6-28 and Photo 6-29).

PHOTO 6-8 CUTLER POWERHOUSE WITH THE BYPASSED REACH IN THE FOREGROUND, LOOKING WEST FROM CUTLER CANYON

PHOTO 6-9 RAILROAD ON UPPER NORTH-FACING WALL OF CUTLER CANYON ABOVE CUTLER DAM

PHOTO 6-10 DOWNSTREAM FACE OF CUTLER DAM, LOOKING NORTHEAST

PHOTO 6-11 FLOWLINE AND SURGE TANK, LOOKING UPSTREAM FROM THE POWERHOUSE AT THE BYPASSED REACH

PHOTO 6-12 CUTLER POWERHOUSE AND SUBSTATION (NOT A PROJECT FEATURE), LOOKING UPSTREAM, CUTLER DAM IN THE BACKGROUND

PHOTO 6-13 CUTLER RESERVOIR IN CUTLER CANYON, LOOKING DOWNSTREAM FROM NEAR OLD WHEELON DAM LOCATION

PHOTO 6-14 CUTLER RESERVOIR AND SURROUNDING LANDSCAPE LEAVING CUTLER CANYON, LOOKING UPSTREAM FROM NEAR OLD WHEELON DAM LOCATION

PHOTO 6-15 VIEW FROM LONG DIVIDE ROAD, LOOKING SOUTHEAST AT CUTLER RESERVOIR AND CACHE VALLEY

PHOTO 6-16 CUTLER RESERVOIR NEAR NEWTON, UTAH, TRANSITIONING FROM CANYON TO VALLEY

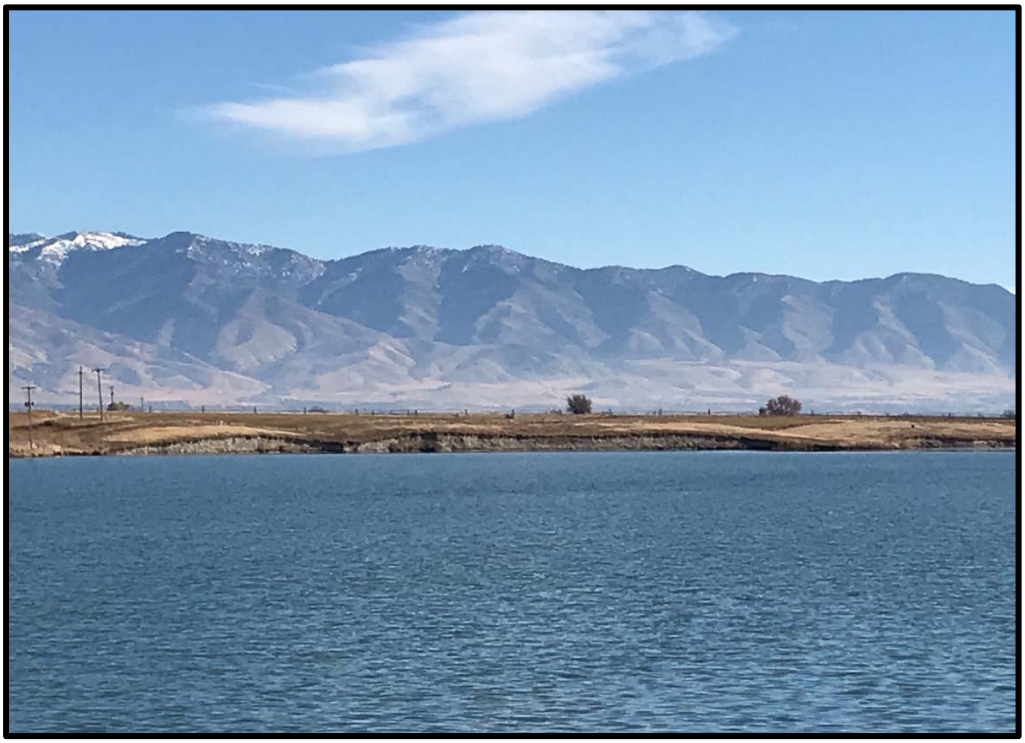


PHOTO 6-17 CUTLER RESERVOIR NEAR CUTLER CANYON MARINA, TRANSITIONING FROM CANYON TO VALLEY

PHOTO 6-18 TYPICAL VIEW OF FLAT LANDSCAPE AT CUTLER CANYON MARINA WITH MOUNTAINS IN BACKGROUND, LOOKING EAST AT WASATCH MOUNTAINS

PHOTO 6-19 SHORELINE VEGETATION AT BENSON RAILROAD BRIDGE TRAILHEAD, LOOKING SOUTH

PHOTO 6-20 SHORELINE BUFFER VEGETATION ALONG BENSON RAILROAD NATURE TRAIL, LOOKING EAST

PHOTO 6-21 SHORELINE BUFFER VEGETATION ALONG BENSON RAILROAD NATURE TRAIL, LOOKING EAST

PHOTO 6-22 BENSON RAILROAD BRIDGE TRAILHEAD, LOOKING EAST

PHOTO 6-23 HIGHWAY 23 BRIDGE OVER CUTLER RESERVOIR NEAR NEWTON, UTAH, LOOKING NORTHEAST

PHOTO 6-24 SHORELINE BUFFER FENCING

PHOTO 6-25 CATTLE FENCING AND CORRAL STRUCTURES IN THE SOUTH MARSH

PHOTO 6-26 GRAZING PASTURE CANAL

PHOTO 6-27 MEANDERING WETLAND AREAS IN THE SOUTH MARSH UNIT OF THE PROJECT, LOOKING SOUTHWEST TOWARDS WELLSVILLE MOUNTAINS

PHOTO 6-28 BEAR RIVER AT LOWER BEAR RIVER OVERLOOK NEAR RESERVOIR CONFLUENCE, LOOKING NORTHWEST TOWARDS CUTLER CANYON

PHOTO 6-29 BEAR RIVER, NEAR UPSTREAM EDGE OF PROJECT BOUNDARY

6.12 Cultural Resources

6.12.1 Identification of Historic and Archeological Sites in the Project Vicinity

Cultural resources include historic architectural resources such as buildings and structures and archaeological sites that are the locations of past human occupation or activities. Previously recorded archaeological sites and historic architectural resources located within 0.5 miles of the Project Boundary are listed in Table 6-28 and Table 6-29, respectively. These lists were compiled from a search of the Utah Division of State History's (UDSH's) Preservation Pro (PresPro) database conducted on November 11, 2018, supplemented by a review of the National Register of Historic Places (NRHP) database (NRHP 2018), the Utah Division of Water Rights Canals dataset (Utah Water Rights 2015), and aerial imagery from Google Earth. These sources indicate that 5 previously recorded archaeological sites and 11 previously recorded historic architectural resources fall within 0.5 miles of the Project Boundary. All five (5) of the archaeological sites fall within the Project Boundary, likely fall within it, or are adjacent to it (i.e., within 200 feet of the Project Boundary), and seven (7) of the historic architectural resources fall within or are adjacent to the Project Boundary.

TABLE 6-28 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES LOCATED WITHIN 0.5 MILE OF THE PROJECT BOUNDARY

SITE NUMBER	SITE NAME	SITE CLASS	SITE TYPE	NRHP ELIGIBILITY	NOTES
42BO15*	Long Divide Cave	Prehistoric	Habitation	Undetermined	Precise location information not available in PresPro; likely falls within Project Boundary.
42BO1507*	Hammond East Bench Canal (Hammond Main Canal, East Canal)	Historic	Canal	Eligible	Full extent within Project Boundary not formally documented.
42BO1796/42CA88*	Utah Northern Railroad (Oregon Short Line Railroad, Union Pacific Railroad)	Historic	Railroad	Eligible	Linear site with no segments formally documented within the Project Boundary, but site is known to occur there.
42CA174*	Wellsville Mendon Lower Canal	Historic	Canal	Eligible	Linear site with no segments formally documented within the Project Boundary, but site is known to occur there.
42CA178*	Cow Pasture Canal	Historic	Canal	Non-significant	Linear site known to occur adjacent to Project Boundary (north side of SR-30), but no segments formally documented there.

*Site falls within or adjacent to Project Boundary.

TABLE 6-29 PREVIOUSLY RECORDED HISTORIC ARCHITECTURAL RESOURCES LOCATED WITHIN 0.5 MILE OF THE PROJECT BOUNDARY

PROPERTY RECORD ID	STREET ADDRESS	CITY	PROPERTY NAME	PRESPRO EVALUATION	NRHP STATUS	TYPE	ORIGINAL USE	NOTES
22773*	–	–	Utah Sugar Co. Wheelon Hydroelectric Plant	Undetermined	–	–	Energy Facility	No location information in PresPro but known to be within the FERC Project Boundary.
29309	–	Newton	Newton Creek Bridge (005037d)	Inelig./Non-Contributing	–	Bridge	Road Transp. Related	–
38840*	Off UT 30 at Bear River	Beaver Dam	Cutler Hydroelectric Power Plant Historic District	Eligible/ Significant	National Register Listed	–	Energy Facility	
46569*	Black Rock Road	–	Benson Marina Truss Bridge (Benson Bridge)	Undetermined	–	Bridge	Road Transp. Related	Moved or demolished
47098	–	Cache Junction	Ballard Restaurant	Undetermined	–	–	Restaurant	–
47404*	4560 W State Route 30	–	Bridge/Culvert No. OE-588d	Inelig./Non-Contributing	–	Bridge	Road Transp. Related	–
47405*	4000 W State Route 30	–	Bridge/Culvert No. OE-588b	Demolished	–	Bridge	Road Transp. Related	–
48617*	4150 W State Route 30	Logan	Bridge/Culvert No. OE-588a	Inelig./Non-Contributing	–	Bridge	Road Transp. Related	–
51423*	3440 N 3000 West	Benson	Benson Elementary School	Eligible/ Significant	National Register Listed	–	School	Demolished
55008	–	Cache Junction	Cache Junction Depot	Demolished	–	1-Part Block	Rail Transp. Related	–
55009	Highway 23	Cache Junction	Cache Junction Cafe / "Beanery"	Demolished	–	–	Restaurant	–

*Property falls within or adjacent to Project Boundary.

Three (3) of the previously recorded archaeological sites and two (2) of the previously recorded historic architectural resources located in or adjacent to the Project Boundary have been listed on or determined to be eligible for the NRHP. The resources recorded as archaeological sites are two (2) canals, the Hammond East Bench Canal and the Wellsville Mendon Lower Canal, and the Utah Northern Railroad (which later became incorporated into the Oregon Short Line and then the Union Pacific Railroad [UPRR] systems), all of which have been determined to be eligible for the NRHP. The Hammond East Bench Canal has been only partially formally documented within the Project Boundary; an unrecorded segment remains within the Project

Boundary. No segments of the Wellsville Mendon Lower Canal or the Utah Northern Railroad have been formally documented within the Project Boundary; only segments of these linear resources located outside of the Project Boundary have been formally documented. The previously recorded historic architectural resources include the Cutler Hydroelectric Power Plant Historic District and the Benson Elementary School, both of which are listed on the NRHP. The Cutler Hydroelectric Power Plant Historic District, which is within the Project Boundary and consists of the Cutler dam, power plant, and associated structures, was listed on the NRHP in 1989 (Fiege and Ore 1989). The Benson Elementary School was located just outside of the Project Boundary on the east side of 3000 West Street in Benson. It appears on aerial imagery dating up through 1993 but was demolished sometime after that; its location is currently a vacant lot. It was listed on the NRHP in 1985 prior to demolition (NRHP 1985).

There are previously recorded archaeological sites and historic architectural resources located within or adjacent to the Project Boundary whose NRHP eligibility has not been evaluated. These include archaeological site 42BO15, Long Divide Cave, which was recorded in 1965 as a Fremont/Numic site with an artifact scatter on the cave floor and archaeological deposits estimated to be 2- to 4-feet deep. Precise location information is not available for this site in PresPro, but its recorded location would place it within approximately 0.6 mile to the northwest of the Cutler Dam. In addition, the Wheelon Hydroelectric Plant is known to be present within the Project Boundary on the south bank of the Bear River less than 0.6 mile downstream from the Cutler Dam. This facility was built in approximately 1902 by the Utah Sugar Company and sold to Utah Power and Light Company in 1914 (Huchel 1999). Partial Historic American Engineering Record (HAER) documentation for the Wheelon Hydroelectric Plant is available (HAER 1968). And finally, the Benson Marina Truss Bridge formerly crossed Cutler Reservoir along Black Rock Road near Benson. The bridge was built in 1915 but has been replaced by a modern concrete bridge. HAER documentation prepared for this bridge states that the replacement occurred in 1987 (Polk 1988).

The remaining previously recorded archaeological sites and historic architectural resources located within or adjacent to the Project Boundary have either been determined not eligible for the NRHP or have been demolished.

The Utah Division of Water Rights Canals dataset shows additional canals within or adjacent to the Project Boundary that have not previously been recorded as archaeological sites or historic architectural resources but are likely historic. All the canals in this dataset that are within 0.5 miles of the Project Boundary are listed in Table 6-30. In addition to the Hammond East Bench/Hammond Main and Wellsville Mendon Lower canals discussed above, the West Main, North Benson, West Benson, and Benson Bear Lake canals are all located within or adjacent to the Project Boundary. The West Main and Hammond East Bench/Hammond Main canals both currently originate at the Cutler Dam and are described in the Cutler Hydroelectric Power Plant Historic District NRHP registration form (as the West and East canals, respectively). However, neither canal is considered to be a feature of the historic district because "they are unrelated to the Cutler plant's purpose, which is the generation of electricity… [and because they] were built mainly to furnish water to users downstream who owned water rights at the site of the dam prior to its construction" (Fiege and Ore 1989). Initial construction of these canals dates to the 1890s and was associated with early dam-building efforts on this section of the Bear River (Huchel 1999). The North Benson and West Benson canals join northwest of Logan to form the Benson Main Canal, and flows into the Logan Northwest Field Canal, a segment of which has been recorded in Logan as site 42CA143, which is labeled on a USGS topographic map as the Benson Canal.

TABLE 6-30 CANALS IN THE UTAH DIVISION OF WATER RIGHTS CANALS DATASET LOCATED WITHIN 0.5 MILE OF THE PROJECT BOUNDARY

CANAL NAME	NOTES
West Main Canal (West Canal)*	Begins at the Cutler Dam; runs downstream on the north side of the river.
Hammond Main Canal (Hammond East Bench Canal, East Canal)*	Begins at the Cutler Dam; runs downstream on the south side of the river. Partially recorded within Project Boundary as 42BO1507.
West Cache Newton Branch Canal	–
King Irrigation Canal	–
North Benson Canal*	–
West Benson Canal*	–
Benson Bear Lake Canal*	–
Wellsville Mendon Lower Canal*	Segment outside of Project Boundary recorded as 42CA174.
Logan River BSF Main Canal	–

*Canal falls within or adjacent to Project Boundary.

Other sources in addition to PresPro, the NRHP database, and the Utah Division of Water Rights canals dataset were also examined to identify historic or archaeological sites that may be present in or near the Project Boundary but not previously recorded. These sources consist of historical maps and several geographic information system (GIS) layers available from state and federal agencies, including Utah historic trails, Utah historic districts, historic mining layers, and historical aerial imagery. Of these additional sources, only historical maps indicate any potential cultural resources beyond those discussed or listed above. The area covered by the Project Boundary is included on several historical General Land Office (GLO) and topographic maps, many of which show historic features in or within 0.5 miles of the Project Boundary, as listed in Table 6-31. Previously unrecorded historic features shown on these maps consist of several roads (both named and unnamed), an unnamed wagon trail, unnamed railroad alignments, a quarry, approximately 15 unnamed houses/buildings, and a pumping station, as well as some of the canals discussed or listed above.

TABLE 6-31 HISTORIC FEATURES SHOWN ON GLO AND HISTORICAL TOPOGRAPHIC MAPS WITHIN 0.5 MILE OF THE PROJECT BOUNDARY

MAP TYPE	YEAR	AUTHOR	MAP LOCATION/QUADRANGLE NAME	HISTORIC FEATURES
GLO	1856	Burr	Township 11 North, Range 1 West; Salt Lake Meridian	None
GLO	1856	Burr	Township 12 North, Range 1 West; Salt Lake Meridian	None
GLO	1856	Troskolaski	Township 13 North, Range 2 West; Salt Lake Meridian	None
GLO	1877	Stewart	Township 13 North, Range 1 West; Salt Lake Meridian	"Road from Logan"; Wagon trail (runs between Road from Logan and an unnamed house); Unnamed house/building; 2 unnamed roads
GLO	1877	Stewart	Township 13 North, Range 2 West; Salt Lake Meridian	"Road to Plymouth /Road from Corrine to Newton and Clarkston"; "Wood Road"; Unnamed quarry
GLO	1878	Martineau	Township 11 North, Range 1 West; Salt Lake Meridian	None
GLO	1878	Martineau	Township 12 North, Range 1 West; Salt Lake Meridian	None

MAP TYPE	YEAR	AUTHOR	MAP LOCATION/QUADRANGLE NAME	HISTORIC FEATURES
GLO	1897	Hanson	Township 13 North, Range 2 West; Salt Lake Meridian	None
Topographic; 125K	1916	USGS	Logan	Oregon Short Line Railroad; Cache Junction; Unnamed houses/buildings; Slough; West Cache Canal
Topographic; 250K	1960	USGS	Ogden	Dismantled railroad; UPRR (with a bridge indicated crossing the river/reservoir); UT-69 (now UT-30); Cache Junction
Topographic; 250K	1962	USGS	Brigham City	Cutler Dam; Wheelon Station (i.e., Wheelon hydroelectric power plant substation); UT-23
Topographic; 24K	1962	USGS	Wellsville	UT-69 (now UT-30)
Topographic; 24K	1964	USGS	Cutler Dam	Cutler Dam (also powerhouse; intake tower; substation); UT-23; UPRR; West Side Canal (i.e., West Main Canal); Hammond Main Canal
Topographic; 24K	1964	USGS	Newton	UPRR; Unnamed houses/buildings; Old railroad grade (specific line not named); Benson School (adjacent to area); Unnamed pumping station

Source: SWCA 2019

Finally, there are previously unrecorded historic and archaeological sites within the Project Boundary that are known from other sources. The Environmental Report prepared for the previous FERC licensing of the Cutler Hydroelectric Project reports that Native American residential sites were inundated by the filling of Cutler Reservoir in the 1920s, and that some evidence of such sites was found during a reservoir drawdown in 1990-1991 (PacifiCorp 1991). In addition, the Wheelon Dam is known to be present within Cutler Reservoir. This unique collapsible dam, constructed between 1899 and 1901, was built in a way that allowed the crest of the dam to be lowered during high water periods to prevent flooding of farmland upstream (Huchel 1999). The Wheelon Dam was inundated when the Cutler Dam was constructed.

As is noted in the following section, limited cultural resources inventory has been conducted to-date within the Project Boundary. For this reason, it can be expected that there are many

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 would be related to a variety of prehistoric, ethnohistoric and historic activities. Prehistoric and ethnohistoric Native American use of the area was likely related to occupation along the Bear River (e.g., Simms 1990, 2008). Historic period cultural resources in the area may date to as early as the period of initial Euro-American exploration, which began in the early 1800s and was undertaken primarily by fur trappers (Huchel 1999; Peterson 1997; see also Stansbury 1855). The Bidwell-Bartleson Party, the first emigrant group to travel overland to California, passed through the area in 1841 (Huchel 1999), following a route that likely went through, or very near, what is now the Project Boundary (ScienceViews.com 2008), and cultural resources associated with their journey may be present. The most abundant type of historic features in the area are likely related to the extensive irrigation activities that began soon after permanent Euro-American settlement in the mid-1800s (Huchel 1999; Mead et al. 1903; Peterson 1997). In addition, the Utah Northern Railroad, which later became part of the Oregon Short Line and then the UPRR, is known to be present but not fully documented. Based on the review of historical maps, additional rail lines may be present, and historic roads and houses or other buildings likely are as well.

6.12.2 Prior Cultural Resource Investigations

The PresPro file search conducted on November 11, 2018, supplemented by a search of SWCA's in-house records, indicated that 11 cultural resources projects have been conducted within 0.5 miles of the Project Boundary (Table 6-32). Nine (9) of these projects intersect or are adjacent to the Project Boundary. Of the projects that have occurred within or adjacent to the Project Boundary, most were inventories associated with the Project; inventories in support of bridge replacement projects, a land exchange, and fiber optic line installation have also been conducted. The methods used in these surveys primarily involved surface archaeological survey and architectural resource documentation and evaluation. Given Utah cultural resource inventory standards, it is unlikely that any subsurface archaeological testing has been conducted within the Project Boundary. Based on a visual inspection, it is estimated that approximately 1 percent of

the area within the Project Boundary has been subject to formal cultural resource identification and evaluation measures.

TABLE 6-32 PREVIOUS CULTURAL RESOURCES PROJECTS WITHIN 0.5 MILE OF THE PROJECT BOUNDARY

PROJECT NUMBER	PROJECT TITLE	ORGANIZATION
U77BL0012*	Cutler Dam Transmission Line	BLM
U84BL0536*	Cutler Reservoir Disposal	BLM
U86BC0464*	Cutler Reservoir Retention and Access	Brigham Young University Office of Public Archaeology (BYU-OPA)
U86SJ0745*	Bridge Replacement Benson Utah	Sagebrush Archaeological Consultants (Sagebrush)
U90SJ0397*	Bridge Replacement on SR-30	Sagebrush
U95UC0235*	DWR Land Exchange	UDSH-Antiquities
U10ST0695*	Syringa Fiber Optic Riverside to Logan	SWCA
U11ST0607*	Cultural Resources Inventory of the Cutler Dam Maintenance Project	SWCA
U13HY0881	A CRA For the Wellsville Mendon Conservation District Lining and Piping Project Cache County Utah	Certus Environmental Solutions LLC (Certus)
U13ZP0596	An Archaeological Resources Inventory for the Logan Wastewater Treatment Facility Project	Project Engineering Consultants LTD
U14HY0787*	PacifiCorp Cutler East Canal Culvert	Certus

*Project falls within or adjacent to Project Boundary.

6.13 Socioeconomic Resources

6.13.1 General Land Use Patterns

The Project lies in Cache and Box Elder counties with the predominant land uses being agriculture followed by urban development. There are some forested lands and outdoor recreation lands present. Logan is a small city with a total area of 18.5 square miles, located at elevation 4,534 feet (Figure 6-21). The following is a summary of socioeconomic data for Logan and the counties that include the Project, including population patterns, average household income and employment sectors.

The Bear River drains into the Great Salt Lake which is the fourth largest terminal lake in the world. The Great Salt Lake contributes over $1.3 billion to Utah's economy (UDWQ 2012). The Lake ultimately receives 78 percent of Utah's wastewater and this leads to savings of wastewater processing costs. At the same time the nutrients enhance the brine shrimp industry and contribute to primary production that supports migratory bird habitat of hemispheric importance (UDWQ 2012).

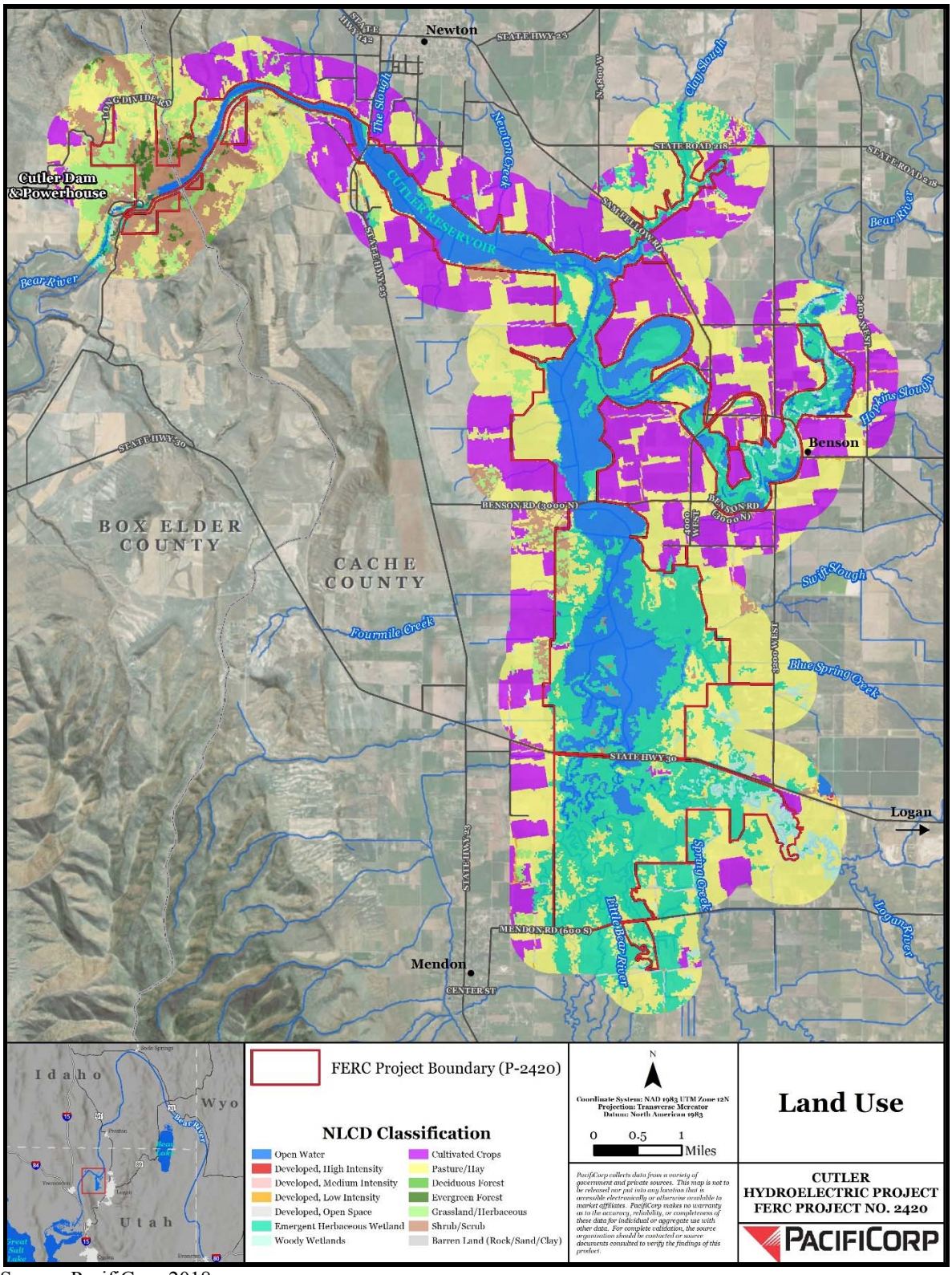
6.13.2 Population Patterns

The Project is located on the Bear River in Cache and Box Elder counties. The current population in Cache County is over 112,650 with 51,000 residents in Logan. The remaining population lives in rural Cache County in numerous small towns or unincorporated areas (US Census Bureau 2017). The Project dam lies in Box Elder County, which has approximately 51,000 residents and similar demographics as Cache County (US Census Bureau 2017), although several differences likely result from the existence of Utah's land-grant public university in Logan (Cache County), USU. The median age in Cache County is 23.9 years, which may be skewed towards a younger population due to the USU student body. Slightly more than half of the population is employed (25,049) and the latest poverty rate is 26.4 percent (DataUSA 2018).

The population of Logan is 75.4 percent white, 15.5 percent Hispanic, and 4.24 percent Asian. The Logan economy employs 25,049 people in educational services (largely USU which is the largest employer in the county), manufacturing, agriculture, forestry, and fishing. The largest

industries are educational services (4,837 jobs), manufacturing (4,064 jobs), and retail trade (3,578 jobs) (DataUSA 2018).

Table 6-33 summarizes the population estimates for the city of Logan, the counties in which the Project lands are located, and for the state of Utah, as reported in the 2000 and 2010 censuses, and as estimated by the U.S. Census Bureau for the year 2016. The next largest towns to Logan, Utah are Providence (7,207), Hyde Park (3,904) and Wellsville (3,498) (Disantias 2016).



Source: PacifiCorp 2018a

FIGURE 6-21 PREDOMINANT LAND USES WITHIN PROJECT AREA

TABLE 6-33 COMPARISON OF CHANGES IN TOTAL POPULATIONS IN LOGAN CITY, BOX ELDER AND CACHE COUNTIES AND THE STATE OF UTAH

CITY/ COUNTY/ STATE	2000 CENSUS POPULATION	2010 CENSUS POPULATION	% CHANGE 2000-2010	2016 POPULATION ESTIMATES	% CHANGE 2010-2016
Logan City	42,670	48,210	+11.5	50,371	+15.2
Box Elder County	42,745	49,975	+14.5	51,528	+17
Cache County	91,391	112,656	+18.9	118,124	+22.6
Utah	2,233,169	2,763,885	+19.2	2,948,427	+24.2

Source: U.S. Census Bureau 2000, 2010, and 2016

6.13.3 Household/Family Distribution and Income

Table 6-34 provides the income for households and families for Box Elder and Cache counties from the 2010 Census year.

TABLE 6-34 HOUSEHOLD AND FAMILY DISTRIBUTION AND INCOME FOR BOX ELDER AND CACHE COUNTIES FROM CENSUS YEAR 2010

	BOX ELDER	CACHE
2010 Households	16,058	37,024
2010 Percentage of Population in Civilian Workforce	95.3%	96.7%
Median Household Income	$55,135	$51,935
Unemployment Rate	4.5%	5.5%
Average Household Size	3.09	3.14

Source: U.S. Census Bureau 2010 Census

In terms of specific occupations, Table 6-35 provides a summary of occupation types for Box Elder and Cache counties (Census Bureau 2016).

TABLE 6-35 DISTRIBUTION OF OCCUPATION TYPES IN BOX ELDER AND CACHE COUNTIES FROM 2010 CENSUS DATA AND 2016 CENSUS ESTIMATE

	BOX ELDER	CACHE
Management, business, science and arts	30.5%	37.4%
Service occupations	14.3%	15.2%
Sales and office occupations	21.1%	23.4%
Natural resources, construction and maintenance	10.5%	8.1%
Production, transportation and materials moving	23.6%	16.0%

Source: U.S. Census Bureau 2016 Census

The top seven (7) common occupations in Cache and Box Elder counties are administrative, sales, production, education, training, library, and management. Additionally, the most specialized occupations in Logan include: life, physical and social science, production, education, training, library, farming, fishing, forestry, and material moving. For the Logan area, the highest paid occupations include health practitioners, legal, architecture and engineering, management, and health technicians (DataUSA 2018).

The highest paid industries (median salaries) are utilities ($32,685), mining, quarrying, oil and gas extraction ($31,595), and finance and insurance ($22,217) (DataUSA, 2018).

6.13.4 Project Employment Sources

PacifiCorp, owner and operator of the Project, employs approximately 6,000 people throughout California, Oregon, Washington, Idaho, Utah, and Montana. The Project is operated by three (3) full-time employees and two (2) seasonal summer temporary positions. Another five (5) full-time maintenance employees switch duties between this Project and other PacifiCorp Utah and Idaho hydro projects including Lifton, Soda, Grace and Oneida (together known as the Bear River Project). In addition, there are 8-10 PacifiCorp Hydro Resource staff (based in Salt Lake City, UT) and contractors that support the Bear River Project and other company hydroelectric projects.

6.13.5 Health and Safety

For Logan, Utah in Cache County, the age groups most likely to have health coverage are 6 to 17 and 18 to 24 for men and women, respectively. The locale has a 1 to 47 primary care clinician-to-patient ratio and a Medicare annual reimbursement average of $8,316 per patient (DataUSA, 2018).

6.13.6 Diversity

The ethnic composition of the Logan, Utah population is composed of 37,329 white, 7,654 Hispanic, 2,098 Asian, 885 two+ ethnicities residents, and 522 black residents. As of 2016, 92.2 percent of Logan, Utah residents were U.S. Citizens, which is lower than the national average of 93 percent. Approximately 8,300 U.S. Citizens in Logan speak a non-English language. The most common non-English language spoken is Spanish, followed by Chinese and two other

Asian languages. Logan has a relatively high number of native Laotian speakers (98 people). This is 3.76 times more than would be expected based on the language's frequency in the United States (DataUSA 2018).

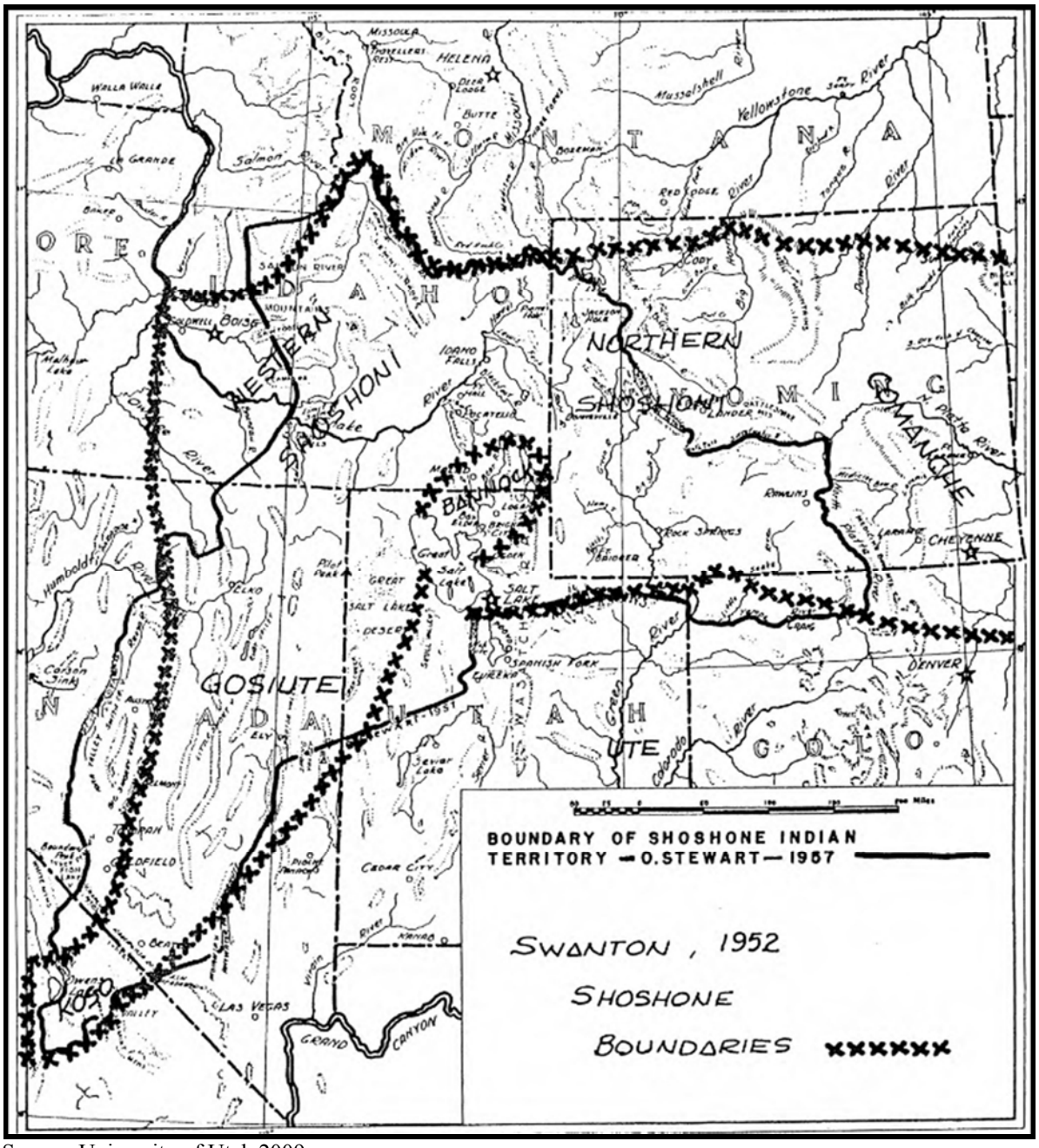
6.13.7 Education

Logan colleges and universities awarded 6,877 degrees in 2015. Most university students are white followed by unknown, Hispanic or Latino, and American Indian. USU is the largest university in Logan, and one of the largest in Utah (DataUSA 2018).

6.14 Tribal Resources

Historically, Shoshoni-speaking bands lived in the part of the northeastern Great Basin that includes the Cache Valley and adjacent areas (Madsen 1985; Thomas et al. 1986) (Figure 6-22), many of whom later organized into federally-recognized tribes including the Shoshone-Bannock Tribes in 1936 and the Northwestern Band of Shoshone in 1987. Ute, Crow, and Blackfeet were observed by some of the earliest Euro-American explorers in the valley (Peterson 1997), and it is likely that members of other Native American groups made use of the area as well. Steward (1938) reported, based on informant interviews, that a single Shoshone band called "fish eaters" lived in the Cache Valley during the period of Euro-American settlement, though he noted that the Shoshone population of the area was likely much larger prior to the Bear River Massacre of 1863 (this event is considered by historians to be the deadliest reported attack on Native Americans by the U.S. military; it is also one of the least known) when hundreds of Shoshone were killed in an attack on their camp near modern-day Preston, Idaho by the United States Army after reports of skirmishes and food raids by Shoshone on local farms and ranches were reported.

Steward (1938) reported further that the Cache Valley Shoshone had a winter village on the Logan River above its confluence with the Little Bear River and traditionally ranged along the Bear River between Bear Lake and the Great Salt Lake. The Shoshone and Bannocks entered into peace treaties in 1863 and 1868 that also led to the establishment of the Fort Hall Reservation in 1869. Following the Bear River Massacre, most of the remaining Shoshone-Bannock tribe settled on the Fort Hall Reservation (Madsen 1985); however, some were settled by the Latter Day Saints Church near the town of Portage, Utah during the 1870s (Clemmer and Stewart 1986). Descendants of these individuals were later organized into the Northwestern Band with tribal offices that are currently located in Brigham City, Utah.



Source: University of Utah 2009

FIGURE 6-22 1952 BOUNDARY OF SHOSHONE INDIAN TERRITORY ACCORDING TO SWANTON

Given this history, it is likely that members of the Northwestern Band of the Shoshone Nation and of the Shoshone-Bannock Tribes attach religious and cultural significance to historic properties within the Project Boundary. Pending Tribal consultation, no Indian traditional or religious cultural properties are known in or near the Project Boundary. Peterson (1997) reports

that one Shoshone elder "indicated that Temple Hill in Logan and some of the other area foothills were viewed as sacred healing places by the Native Americans."

6.14.1 Identification of Indian Tribes That May Attach Religious and Cultural Significance to Historic Properties

Under Section 106 of the National Historic Preservation Act, FERC is obligated to seek any federally recognized Indian tribe that can demonstrate a traditional cultural or religious connection to land under its jurisdiction and to involve them in the relicensing process.

Although the Project Boundary encompasses no federally recognized Tribal lands, some federally recognized tribes may have an interest in the Project relicensing. The following tribes are on FERC's mailing list, and FERC will contact them to determine if they will participate in the relicensing process. The following tribes will remain on the mailing list, will be invited to attend cultural resources meetings, and will be informed of all other meetings for the Project.

Although there are no tribal lands within or near the Project Boundary, the following Native American Indian 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

PacifiCorp will contact representatives from the following tribes for initial consultations concerning the Project relicensing:

- Darren Parry, Chairman (Northwestern Band of Shoshone Nation)
- Nathan Small, Chairman (Shoshone-Bannock Tribe)
- Luke Duncan, Chairman (Ute Indian Tribe of the Uintah and Ouray Reservation)
- Candace Bear, Chairwoman (Skull Valley Band of Goshute)

6.15 Public Utility Regulatory Policy Act Benefits

PacifiCorp is a domestic corporation and is not claiming preference under Section 7(a) of the Federal Power Act, nor seeking benefits under Section 210 of the Public Utility Regulatory Policies Act of 1978 (PURPA).

7 DESCRIPTION OF IMPACTS, ISSUES, STUDY AND INFORMATION NEEDS, RESOURCE MEASURES, AND EXISTING PLANS

7.1 Issues Pertaining to the Identified Resources

Title 18 of the CFR 5.6(d)(3) requires that the applicant provide a description of any known or potential adverse impacts associated with the proposed operation of the Project, including continuing and cumulative impacts. At this time, PacifiCorp is not proposing a specific change to operations but is instead seeking to study a range of potential operational scenarios. Once the operational scenarios have been modeled and analyzed, the direct, indirect, and cumulative impacts to each resource will be defined in detail.

Similarly, the need for Protection, Mitigation, and Enhancement measures (PM&Es) will be informed by the studies implemented in response to FERC's scoping process. In addition to new specific PM&Es, PacifiCorp's proposal will likely include maintaining the completed components of the 1994 license VEP and for cultural resources, updating the current CRMP to a Historic Properties Management Plan (HPMP).

For wildlife and botanical resources, the 1994 license VEP shoreline buffers, bank stabilization areas, fences, and erosion control basins that were previously developed should be maintained; the sensitive and unique wildlife habitats should continue to be monitored.

Potential PMEs to be included in the HPMP are:

- Project review prior to ground disturbance to avoid or minimize impacts on archaeological resources
- Archaeological site monitoring to assess the effects of erosion, trampling, looting, vandalism, and to identify site-specific protection or mitigation measures, as needed
- Specification of appropriate archaeological site protection (e.g., soil capping, fencing) and mitigation (e.g., data recovery) measures
- Project review prior to maintenance or alteration of historic buildings or structures, or prior to new construction near historic buildings or structures, to avoid impacts, or to ensure compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties if impacts cannot be avoided
- Specification of protocols for any required decommissioning or demolition of historic resources

- Project review prior to sale or transfer of land or of historic buildings or structures to ensure that either cultural resources remain subject to federal historic preservation laws or that impacts due to transfer from federal jurisdiction are appropriately mitigated
- Continued consultation with tribes to ensure appropriate treatment of traditional cultural and religious properties
- Development of an educational and public interpretation program
- Specification of protocols for inadvertent discoveries of archaeological resources or human remains, and for emergency situations (e.g., fires or floods involving historic resources)

7.1.1 Geology and Soils

Current and proposed actions will contribute to turbidity and suspended sediment loads, particularly in areas where reservoir banks are not already stabilized. To the extent that the proposed operations may mobilize sediment that was previously deposited by river inflows and which has not been previously mobilized through the reservoir by the current operation regime, nutrients and potential sediments and/or non-Project related contaminants (e.g. fertilizers, pesticides.) could be re-suspended into the reservoir.

7.1.2 Reservoir Shoreline and Streambank Conditions

As summarized in Section 6.2, operations under the current license have potentially had impacts in the form of reservoir bank erosion due to wave action on shoreline areas. The impact of shoreline erosion will continue to cause turbid waters and the resulting total suspended sediments will contribute to the existing non-Project related high sediment load in the Project Area. Additionally, reservoir bank erosion could lead to loss of shoreline lands and a reduction in buffers, agricultural lease lands, and wildlife habitat.

7.1.3 Water Resources

7.1.3.1 Hydrology

Proposed changes in the reservoir operating band will not change the overall run-of-river nature of the reservoir, but may vary the volume and timing of water leaving the Project Area. Increasing the reservoir operating range during flood control periods may provide advantages not currently available.

7.1.3.2 Water Rights

All existing water rights including PacifiCorp's will remain in place. PacifiCorp has no plans to seek additional water rights in this relicensing process. Potential effects resulting from changes to the reservoir operating range on water delivery infrastructure, including irrigation pumps and diversions, can be found in Section 7.1.8.

7.1.3.3 Water Quality

As summarized in Section 6.3, elevated levels of turbidity and TSS currently occur during high run-off periods, due to the elevated background levels in the reservoir tributaries at those times. Elevated turbidity could cause reduction of phytoplankton production over time, which would reduce the food base for fish (discussed in Section 6.3.10) and shore birds (discussed in Section 7.1.4).

Sediment contributions from erosion can have long and short-term water quality effects, including increased turbidity, which could result in impacts on fish and wildlife habitat and the physical integrity of the reservoir shoreline. Farming and ranching practices, as well as municipal and industrial waste streams in the Project Area and upstream of the Project on the Bear River and southern tributaries will likely continue to send sediment inputs to the Bear River system. Phosphorous could be mobilized as a result of Wheelon Dam removal or from a change in operations causing water quality changes and potentially algal blooms that could deplete oxygen levels.

A water quality monitoring program, which is on-going for the remainder of the current license period, will continue to serve as a study that will help identify the extent and source of sediment inputs. As described above, the potential for re-suspending nutrients and contaminants as a result of proposed Project operations should be examined. PacifiCorp will assess if water quality conditions have improved with the current Cutler and tributary TMDL mitigation efforts, including the planned construction of a new Logan City wastewater treatment facility.

7.1.4 Fish and Aquatic Resources

Current and ongoing Project and non-Project actions will likely contribute to turbidity and suspended sediment loads. Operations under the current license have potentially had impacts in the form of reservoir bank erosion due to wave action. The proposed operations may cause additional bank erosion because the reservoir operating band would increase and the surface elevations would change in larger increments than at present, potentially exposing deeper shoreline areas to wave action erosion. Fluctuating reservoir levels may also cause fish stranding and effects to benthic macroinvertebrate populations, especially in the shallower marsh locations. Greater reservoir fluctuations could cause effects in littoral habitat, which is an important element of juvenile fish rearing and a productive zone for plankton and benthic macroinvertebrates. There could also be resultant changes in the food base for other reservoir inhabitants such as shore birds and bats. Altering reservoir levels could disrupt nesting habitat for shorebirds and waterfowl, and could also affect freshwater mussel populations residing in the reservoir sediments.

7.1.5 Upland Wildlife and Botanical Resources

There are currently no known issues regarding terrestrial wildlife and botanical resources within the Project Area or associated with the Project facilities or operations; however, as noted above, fluctuations in the reservoir level may have impacts on waterfowl and shorebird habitat. The Vegetative Enhancement Monitoring component of the RMP includes several PME measures including vegetative buffers, erosion control, and sensitive/unique wildlife habitat areas, which protect wildlife and botanical resources in the Project Boundary.

Under PacifiCorp's proposed operations, the Project could have impacts on wildlife, including migratory bird and waterfowl habitat, and on mammals and herptiles that use littoral areas of the reservoir. The proposed operations may expose more shoreline, thus modifying waterfowl and shorebird habitat over current conditions. Shoreline vegetation may be altered following repeated exposures and impact the forage base for wildlife. In addition, potential changes to the amount of and composition of riparian areas may impact wildlife that use these areas for cover, migration, and food.

7.1.6 Wetlands, Riparian, and Littoral Habitat

Operations under the existing license have potentially impacted the littoral habitat availability. Due to the reservoir water levels provided by the operation of the Project, the amount of available littoral habitat has been increased. The littoral zone provides important habitat for aquatic species, as well as for waterfowl that feed on aquatic vegetation that grows within the littoral zone. With respect to wetland and riparian areas, water levels maintained by the Project have allowed the establishment of both emergent and submerged aquatic vegetation including extensive emergent marsh and aquatic vegetation beds. These habitats are important for avian species, terrestrial wildlife, fish and aquatic habitat, water quality, and shoreline stabilization.

The Project results in some positive effects on the overall water quality of the area when viewed collectively with the overall land use within the region. The existing riparian zones, extensive emergent wetlands, and aquatic vegetation associated with Project operations improve local water quality. The habitats within the Project provide such improvements through the presence of dense emergent and submerged vegetation, and of sediment control basins, both of which provides nutrient uptake and conversion, shoreline stabilization, sediment stabilization, and retention time. The Vegetative Enhancement Monitoring component of the RMP includes several PME measures (e.g., vegetative buffers, erosion control basins, bank stabilization, sensitive/unique wildlife habitat areas) which protect wildlife and botanical resources within the Project Area.

Under PacifiCorp's proposed operations, the Project could impact existing habitat, vegetation, and water quality. Impacts may include a change in the amount of available littoral habitat, due to the potential water level fluctuations which would be greater than the current operation; the reduction of the amount of submerged aquatic vegetation as a periodic exposure of substrates due to water level fluctuations may desiccate aquatic vegetation; and possibly the establishment of invasive species within newly exposed shoreline sediments dependent on the timing and length of exposure. Species such as common reed can become established in newly exposed substrates more rapidly due to the lack of competing native vegetation. Impacts to local water quality may result if there is a reduction in aquatic vegetation; however, water level fluctuations may result in an increase in emergent vegetation diversity and expansion due to the exposure of shoreline

substrates. In this case there may be an improvement to some water quality and retention functions as a result of increased emergent plant diversity.

7.1.7 Rare, Threatened, and Endangered Species

Current and on-going operations under the existing license have potentially had impacts on the federally threatened (as listed under the ESA) Ute ladies'-tresses by increasing the amount of wetland habitat within the Project Area. This orchid is associated with vegetated shoreline and wetland habitat. The establishment of wetlands in this area have increased the habitat area that is available to this orchid on a local and regional level, which support at least one population of this orchid (another population is known nearby, just outside the Project Area). When considering the overall land use in the RTE Project Vicinity, the wetlands associated with the Project provide a substantial portion of habitat available to this species.

Under PacifiCorp's proposed operations, the Project could potentially have impacts on the Ute ladies'-tresses which has very specific habitat requirements. This orchid is restricted to a small microhabitat signified by "calcareous, wet-mesic, temporarily-inundated meadow in shallow wetlands" (USFWS 2018). Depending on the duration of the water drawdowns, wetland habitat may be affected by drier subsurface conditions. Impact for these species as a result of the proposed operations may include the establishment of invasive species in newly exposed substrates. Once established, invasive species may invade the terrestrial wetlands and quickly out-compete other wetland species including Ute ladies'-tresses. Additionally, drier areas may also support larger, more robust terrestrial plant species. This orchid occurs primarily in areas that are not overly dense or overgrown. Therefore, dense overstory vegetation may shade out this species. However, the exposure of shoreline substrates may result in an increase in emergent vegetation diversity and expansion. In this case, it may expand or shift the available habitat for this species.

7.1.8 Recreation

Current Project operations offer a broad range of recreation opportunities to the public year-round, which create benefits to recreation as the Project recreation facilities add to the region's recreational resources, allowing for more regional recreation capacity and a greater diversity of

recreation opportunities. Under the current license, PacifiCorp implemented a Recreation Site Development Program to improve public access and develop recreation facilities in the Project (PacifiCorp 2002). As part of this program, PacifiCorp developed and maintains 13 recreation facilities within the Project Boundary .Most of this land is available for hunting, bird watching, dog walking, and other forms of dispersed recreation, at no fee. The recreation facilities provide a range of amenities. PacifiCorp conducts annual monitoring of recreation facility conditions and maintenance as warranted. Current operations do not impede recreation opportunities within the Project Boundary or regionally; in fact, they enhance it. Project recreational facilities add regional recreation capacity.

Under PacifiCorp's proposed operations, the Project could potentially have impacts on recreation. Lower pool elevations may limit access to the reservoir for water-based recreation including waterfowl hunting, fishing, bird-watching, canoeing, and waterskiing. Recreation resources impacted could include boat ramps at Project marinas, canoe trail access points, canoe trails, and portions of the reservoir. Lower reservoir pool conditions could impact navigation for motorboats and waterski enthusiasts. Lower reservoir elevation in the fall and winter could result in fewer waterfowl and decrease hunting success. Angling success may also decline due to potential decreases in access to fishing areas as well as decreases in fish populations associated with fluctuating reservoir levels. Potentially reduced water quality could also lead to risks associated with bodily contact during water-based recreation activities. If new Project operations cause reduced recreational opportunities at the Project, use pressures on other regional recreation areas would increase as users choose to utilize other resources.

7.1.9 Land Use

As summarized in Section 6.10.1, PacifiCorp's Cutler Hydroelectric Project RMP was implemented under the current license to address land use issues identified during the 1994 relicensing process. Most notably, much of the Project land had historically been leased for farming or livestock grazing to the water's edge, which contributed significantly to soil erosion and associated negative effects on water quality, as well as increasing the ongoing rate of bank loss in some areas. The RMP implemented, in part, an Agricultural Lease Program and a VEP to alter farming and grazing patterns, reduce conflicting uses, and restore and enhance vegetation,

wildlife habitats, and stability along the reservoir shoreline. These measures have greatly reduced, if not eliminated, the detrimental effects of farming and grazing practices on water quality and shoreline erosion of the Project; however, current operations have potentially had impacts in the form of continued bank erosion due to the existence of the reservoir. One feature of the RMP implementation was the completion of multiple shoreline stabilization projects to reduce erosion on the current shoreline. These projects have proved to be successful under the current license, and PacifiCorp could propose to continue to identify and implement shoreline stabilization efforts under a new license.

Under PacifiCorp's proposed operations, the Project could potentially have an impact on water withdrawal and livestock management practices within the Project Boundary. Irrigation pumps can be found at many locations along the reservoir's edge, some associated with PacifiCorp's Agricultural Lease Program, and some associated with infrastructure designed to fulfill non-Project related irrigation water rights. Reservoir fluctuations related to future operations may impede certain agricultural, domestic, or industrial water withdrawers ability to access their water rights. This potential affect would likely not affect the various canal companies with diversion rights at Cutler given the elevation range being proposed, but could affect individual pump diversions/infrastructure on the reservoir, depending on their location and elevation. The proposed effect of a lower pool elevation at the dam would be felt less in the southern reaches of the reservoir; however, the horizontal distance from historic minimum pool shoreline to proposed minimum pool shoreline could be more drastic in these lower gradient areas. The analysis of effects will explore impacts to this infrastructure and identify potential solutions. Fencing is a necessary component of livestock management around the reservoir, in many cases extending to the water's edge or beyond to restrain livestock. While most livestock grazing leases within the Project Boundary have been altered to include a setback from the reservoir, there remains a handful of areas where this is not the case. In these instances where fencing to the water's edge still exists, fencing may need to be extended to account for the full range of proposed operating pool elevations.

PacifiCorp's proposed operations could also have impacts on reservoir bank erosion along the shoreline. Bank erosion due to increased reservoir fluctuation could lead to further loss of shoreline lands, as well as a potential reduction in small areas of grazing land/wildlife habitat.

7.1.10 Aesthetic Resources

As summarized in Section 6.10.1, PacifiCorp's Cutler Hydroelectric Project RMP was implemented under the current license to address scenic quality issues identified during the prior relicensing process. Historically, shoreline conditions around the main body of the reservoir were unattractive due to eroded banks and the lack of vegetative cover. Along many stretches of this shoreline, there were lines of rusted car bodies purposely placed end-to-end to provide bank stabilization and agricultural debris (PacifiCorp 1991). Implementation efforts associated with the Project RMP, however, have greatly improved the scenic quality of the shoreline by removing hundreds of old car bodies from the banks and establishing a vegetated shoreline buffer, including shrub plantings and bank stabilization, and fencing to exclude agricultural use from the shoreline. These measures have been quite effective, and there are currently no known issues regarding scenic quality within the Project Area or associated with the Project facilities or operations.

PacifiCorp's proposed operations could have impacts on scenic quality of the reservoir due to additional reservoir bank erosion along the shoreline. Along with the potential bank erosion, the proposed operating band would increase and the reservoir elevations would change in larger increments, thus exposing more shoreline area. Where the reservoir is shallow low-gradient, shoreline locations may also change drastically in their horizontal position, thus exposing previously submerged areas as mud flats. Aesthetically, the potential increase in exposed mud flats, eroding banks, and turbid waters could be detrimental to the scenic quality expected by outdoor users at the reservoir.

7.1.11 Cultural Resources

Current and on-going operations under the existing license could have potential impacts on cultural resources (e.g., archaeological sites, historic buildings and structures, or Tribal traditional cultural properties) due to inundation and subsequent erosion along the reservoir shoreline. Fluctuating reservoir levels and wave action from wind-blown or human-caused waves can result in erosion of cultural resources located within drawdown zones or along shorelines. Further, recreational use may have had either unintentional (e.g., trampling) or intentional (e.g., looting or vandalism) impacts on cultural resources. In addition, historic resources

(e.g., those that comprise the Cutler Hydroelectric Power Plant Historic District, Wheelon Dam, or significant irrigation canals) require continued maintenance, repair, upgrading, or removal to meet safety and operational requirements, and those activities may have altered important historical characteristics of these resources.

Under the proposed operations, the range of reservoir elevations may increase, and this could increase the effects of erosion on cultural resources located along the shoreline. It is unknown whether the new lower elevation limit would result in exposure 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 flows downstream of the dam are increased, erosional effects on cultural resources may increase there as well.

7.1.12 Socioeconomic Resources

There are currently no known issues regarding Socioeconomics within the Project Area or associated with the Project facilities or operations. Implementing the Proposed Action could lead to more efficient management of the water supply, which allows for better control of high flows for irrigation purposes and the potential to provide reactive energy to the grid which supports intermittent renewable generation (i.e., wind projects). A fully functional project supports PacifiCorp's customers and communities served by PacifiCorp. As part of the license process, PacifiCorp expects to provide an Operations Plan for managing water flows and meeting all water rights and contracts under state law, and efficient management of the water supply. None of the proposed changes in operations would change the number of company staff positions required to operate or maintain the Project. No changes are proposed that would impede water deliveries to Project associated Irrigation Districts. PacifiCorp is not proposing any studies associated with this resource, other than those associated with water diversion infrastructure, as noted above in Section 7.1.9.

7.1.13 Tribal Resources

Pending Tribal consultation, current and on-going operations have no known impacts on Tribal cultural or economic interests. Tribal consultation will occur to discuss and resolve issues that affect Tribal cultural or economic interests.

7.2 Potential Studies and Information Gathering

To further characterize the areas affected by the proposed change in reservoir elevations, PacifiCorp is proposing to perform a bathymetric LiDAR survey of the reservoir to map reservoir bottom elevations over the full range of potential operating levels. This data would help inform a variety of studies by providing volume, surface area, and contour information for the proposed lower pool elevations. PacifiCorp proposes to conduct the survey during fall 2019 after the irrigation season, independent from any study plan determination; however, stakeholders would be consulted on the scope and intended use of the LiDAR data. Additionally, PacifiCorp would conduct hydraulic modeling of the proposed changes. As outlined below (Section 7.2.1), PacifiCorp would consult with stakeholders during the ILP study plan process to potentially develop study plans to identify the effects of the proposed operational changes as informed by the LiDAR data and hydraulic modeling.

7.2.1 Proposed Studies

- **Geology and Soils**: PacifiCorp plans to execute a bathymetric LiDAR survey of the reservoir bottom coupled with a drawdown of the reservoir approximately 4 feet from full pool at Benson Marina. The drawdown will allow the bathymetric LiDAR equipment to look deeper into the water column to map the reservoir bottom. Using the bathymetric LiDAR data (and potentially combined with traditional sonar data in some areas), a hydraulic model could be set up to model the behavior of bottom sediments with several scenarios (such as removal of Wheelon Dam or changes in operations/reservoir elevations and associated effects on sensitive habitats such as the colonial nesting bird islands located in the north Marsh). The model would have the capability of modeling water flow and reservoir elevation response to various operational scenarios. Determining the most appropriate model(s) to use for this effort would require a collaborative discussion between interested stakeholders and experts in the field of hydraulic modeling. Sediment coring may be utilized to help determine the depth and composition of specific sediments, as needed. The LiDAR survey will cover the area within the Project Boundary, as well as extending upstream and downstream, per the extent identified as necessary, in collaboration with Project stakeholders.

- **Reservoir Shoreline and Streambank Conditions:** PacifiCorp plans to conduct a shoreline habitat characterization study. This study is further described in the following wildlife and botanical resources section. The study will seek to identify areas where additional vegetation buffers or bank stabilization projects may be beneficial to reduce erosion.

- **Water Resources:** The proposed LiDAR survey and hydraulic modeling would incorporate proposed operation changes with water volume, flow, and possibly water quality data in the model and may be able to address concerns about possible contaminants (such as the pesticides DDT or DDE, and heavy metals) and to determine the potential impact of re-suspension of nutrients such as phosphorous that are currently bound in the sediments. Data collected by PacifiCorp (last dataset was from 2018), UDWQ, UDWR, and other relevant agencies since 1997 could be used in further analysis of water quality of the Project. As noted previously, sediment coring may be utilized to help determine the depth and composition of specific sediments, as needed. Specific goals and methods to be used in the study would be determined during the stakeholder consultation process.

- **Fish and Aquatic Resources:** As noted in Section 7.1.4, the proposed operations may have potential impacts on some aquatic species. PacifiCorp proposes an assessment of the fish and freshwater mussel populations in areas where they frequent, their food habits (including benthic macroinvertebrates), and how these populations might react to reservoir elevation changes. How they react to elevation changes could be observed during a planned reservoir drawdown to perform a LiDAR survey. In addition, PacifiCorp will work with UDWR to help determine presence or absence of bluehead sucker and Northern leatherside chub within the reservoir and downstream of the dam.

- **Wildlife and Botanical Resources (including both disciplines covering Upland, Floodplain, Wetland, Riparian and Littoral Habitats):** PacifiCorp proposes to conduct a shoreline habitat characterization study with the Project Boundary and would consult with stakeholders in the development of the study plan during the ILP study plan process. The study would quantify the amount of available habitat, characterize existing

vegetation, and map invasive species (i.e., *Phragmites* or common reed) which may pose a threat of expansion under the proposed operation. The proposed LiDAR survey would help identify habitats which may be impacted by the proposed operation. The hydraulic modeling data may be used in conjunction with the habitat characterization study to determine if changes in reservoir elevations may affect additional resources, such as, nesting bird success, or the ability of predators (i.e., skunks, raccoons) to move throughout the local areas. This habitat characterization study could identify areas suitable for development of new unique wildlife habitats, if needed.

- **RTE Species:** PacifiCorp is proposing to conduct a Ute Ladies'-tresses Orchid Survey and will consult with stakeholders in the development of the study plan during the ILP study plan process. A study of this federally listed threatened plant species would enhance knowledge of populations already known to occur within the Project Area and Project Boundary, and may include additional information regarding factors such as underlying soil types and influence of cattle grazing. The proposed LiDAR survey may also provide beneficial information for identifying potential habitat and the extent of the habitat, if any, that may potentially be affected by the proposed operations. No other federally-listed species are likely to occur in the Project Area; thus, specific surveys for other species are not proposed, although additional conversations with stakeholders may provide further information on this issue.

- **Recreation and Land Use:** PacifiCorp anticipates that, depending on the elevation constraints developed over the study and analysis period of relicensing, longer boat ramps at Project marinas may be necessary to provide access during lower reservoir operations. Published information on reservoir pool elevations and recreation access thresholds for canoe trails and boat ramps may also be useful. The proposed LiDAR survey data can assist in determining reservoir pool level thresholds for reservoir recreation access at respective recreation sites. PacifiCorp would consult with stakeholders in the development of the analysis during the ILP process. PacifiCorp proposes to topographically delineate boat ramp elevations and canoe trails to assess potential effects of Project operations on recreation opportunities within the Project Boundary. The topographic mapping will provide essential information regarding the

character and extent of recreational facilities that may potentially be affected by Project operation. Similarly, PacifiCorp proposes to obtain data including location and topographic mapping of water delivery infrastructure and their associated water rights to determine any potential effects of Project operations on irrigation water delivery. Similar location and elevation data may be obtained for road crossing areas, particularly where embankments (as opposed to bridges or other hardened infrastructure) are utilized. Water quality and its impacts on recreational fisheries would be addressed through studies developed under those resource areas.

- **Cultural Resources:** It is estimated that only a relatively small portion of the area within the Project Boundary has been subject to formal cultural resource identification and evaluation measures. Therefore, PacifiCorp proposes that archaeological, architectural, and/or ethnographic inventories be conducted, as appropriate, in areas potentially subject to effects from the Project.

7.2.2 Study Requests

In the development of the PAD, PacifiCorp collected and summarized the reasonably available information regarding the Project and its effects on the human and natural environments. Additional information was obtained through interested stakeholders via a pre-relicensing workshop conducted by PacifiCorp that summarized Project details, FERC process, and PacifiCorp's collaborative approach to relicensing. Within the FERC licensing process, participants may request additional studies or investigations as specified in 18 CFR § 5.9(b); requested studies must follow FERC's ILP Study Request Criteria (FERC 2012) as stated below:

- Describe the goals and objectives of each study proposal and the information to be obtained;
- If applicable, explain the relevant resource management goals of the agencies or Native American tribes with jurisdiction over the resource to be studied;
- If the requestor is not a resource agency, explain any relevant public interest considerations regarding the proposed study;
- Describe existing information concerning the subject of the study proposal, and the need for additional information;

- Explain any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
- Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

Study requests must be filed with FERC and may be electronically filed at www.ferc.gov citing the FERC Docket No. 2420. Study requests must be filed within 60 days of FERC's notice of the filing of the NOI and PAD and issuance of FERC's SD1 (Table 3-1). In addition, study requests should be sent to: Eve Davies, Cutler Licensing Project Manager, PacifiCorp – Renewable Resources, 1407 West North Temple, Room 210, Salt Lake City, Utah 84116; email: cutlerlicense@gmail.com.

8 RELEVANT COMPREHENSIVE MANAGEMENT PLANS

8.1 Comprehensive Waterway Plans

Section 10(a)(2)(A) of the FPA, 16 U.S.C. Section 803 (a)(2)(A), requires FERC to consider the extent to which a project is consistent with Federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. On April 27, 1988, FERC issued Order No. 481-A, revising Order No. 481, issued October 26, 1987, establishing that the Commission will accord FPA Section 10(a)(2)(A) comprehensive plan status to any Federal or state plan that: (1) is a comprehensive study of one or more of the beneficial uses of a waterway or waterways; (2) specifies the standards, the data, and the methodology used; and (3) is filed with the Secretary of the Commission.

FERC currently lists 14 comprehensive management plans for the State of Utah (FERC 2018), of which the following 2 comprehensive plans pertain to waters in the vicinity of the Project:

- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
- Utah Department of Natural Resources. Utah Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2014. Salt Lake City, Utah.

8.2 Relevant Resource Management Plans

In addition to the waterways comprehensive plans listed above, some agencies have developed resource management plans to help guide their actions regarding specific resources of jurisdiction. The resource management plans listed below may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions.

- Bureau of Land Management. 2015. Record of Decision and Approved Resource Management Plan for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. Washington, D.C. September 2015.
- Forest Service. 2003. Wasatch-Cache National Forest land and resource management plan. Department of Agriculture, Salt Lake City, Utah. March 2003.
- Forest Service. 2003. Uinta National Forest land and resource management plan. Department of Agriculture, Provo, Utah. May 2003.

- U.S. Fish and Wildlife Service. 1986. Whooping Crane Recovery Plan. Department of the Interior, Albuquerque, New Mexico. December 23, 1986.

- U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

- Utah Department of Natural Resources. 2017. Final Bear River Comprehensive Management Plan. October 2017.[34]

- Utah Department of Natural Resources. 2000. Range-wide Conservation Agreement Strategy for Bonneville Cutthroat Trout (*Oncorhynchus clarki Utah*). Publication Number 00-19. December 2000.

- Utah Division of Wildlife Resources. 2016. Three Species Monitoring Statewide Summary. Roundtrail Chub (*Gila robusta*), Bluehead Sucker (*Catostomus discobolus*), Flannelmouth Sucker (*Catostomus latipinnis*). Publication Number 17-21.

[34] PacifiCorp has identified this plan as potentially relevant, however there are disagreements about aspects of this plan regarding designation of some sovereign lands that have not been resolved and which may not be relevant to the relicensing.

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