

CUTLER HYDROELECTRIC PROJECT (FERC PROJECT NO. 2420)

FINAL LICENSE APPLICATION

VOLUME I

Exhibit A, B, C, D, E, F (Public), G, H



MARCH 2022

INITIAL STATEMENT

**BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

**CUTLER HYDROELECTRIC PROJECT
FERC PROJECT NO. 2420**

**FINAL APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

INITIAL STATEMENT
(Pursuant to 18 CFR § 4.51)

1. PacifiCorp (“Licensee” or PacifiCorp) applies to the Federal Energy Regulatory Commission (FERC) for a new license for the Cutler Hydroelectric Project (Project), as described in the attached exhibits. The Project is currently licensed to PacifiCorp as FERC Project No. 2420, by Order dated April 29, 1994 (67 FERC ¶ 62,082). PacifiCorp is the only entity that has, or intends to obtain and maintain, and will maintain, any proprietary rights or interest to construct, operate, or maintain the Project.

2. The location of the Project is:

State:	Utah
Counties:	Box Elder and Cache
City or Town:	Collinston; Logan
Stream or other body of water:	Bear River

3. The exact name and business address of the applicant are:

PacifiCorp
825 NE Multnomah Street, Suite 1800
Portland, OR 97232
Telephone: (503) 813-6657

The exact name and business address of each person authorized to act as agent for the applicant in this application are:

PacifiCorp
Eve Davies, Cutler Relicensing Project Manager
1407 West North Temple, Suite 210
Salt Lake City, UT 84116
Phone: (801) 220-2245
E-mail: Eve.Davies@pacificorp.com

PacifiCorp
Todd Olson, Director of Compliance
825 NE Multnomah Street, Suite 1800
Portland, OR 97232
Phone: (503) 813-6657
E-mail: Todd.Olson@pacificorp.com

It is requested that all copies of all correspondence pertaining to this application be provided to:

Eve Davies, Cutler Relicensing Project Manager
PacifiCorp
1407 West North Temple, Suite 210
Salt Lake City, UT 84116
(801) 220-2245

4. PacifiCorp is a public utility corporation incorporated in the State of Oregon and doing business in Utah, Idaho, Wyoming, Oregon, Washington, California, and Montana and is not claiming preference under Section 7(a) of the Federal Power Act, 16 U.S. Code § 800.
5. The statutory or regulatory requirements of the State of Utah, the state in which the Project is located, which would, assuming jurisdiction and applicability, affect the Project with respect to bed and banks, and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power, and in any other business necessary to accomplish the purposes of the license under the Federal Power Act are:
 - a. 401 Water Quality Certification from the Utah Department of Environmental Quality to assure compliance with Section 401 of the Federal Clean Water Act.
 - b. State of Utah Division of Water Rights for regulation of the water rights required to operate the Project.
6. The steps the applicant has taken, or plans to take, to comply with each of the laws cited above are:
 - a. The applicant will apply for 401 Water Quality Certification per 18 CFR § 5.23(b).
 - b. PacifiCorp will maintain its water rights as shown below for 1,460 cubic feet per second (cfs) to operate the Project and to be used for power generation.

WATER RIGHT NUMBER	FLOW (CFS)	PRIORITY	TYPE OF RIGHT
29-1855 UT	270	12/1/1903	Decreed
29-2146 UT	135	12/1/1906	Decreed

WATER RIGHT NUMBER	FLOW (CFS)	PRIORITY	TYPE OF RIGHT
29-2147 UT	135	12/1/1908	Decreed
29-2148 UT	500	12/1/1912	Decreed
29-4364 UT	420	4/3/2008	Certificate

- c. PacifiCorp will maintain its 1923 water right (29-1506; Certificate) for 2,500 cubic feet per second (cfs) for storage.
7. All existing Project facilities are owned by:
- PacifiCorp
825 NE Multnomah Street, Suite 1800
Portland, OR 97232
8. PacifiCorp possesses all proprietary rights necessary to construct, operate, or maintain the Project.
9. The name and mailing addresses of the counties in which any part of the Project and any Federal facilities that would be used by the Project are located as outlined in 18 CFR § 4.32(a)(2)(i):
- | | |
|--|---|
| <p style="padding-left: 40px;">Box Elder County
1 South Main Street
Brigham City, UT 84302</p> | <p style="padding-left: 40px;">Cache County
179 N Main Street & 199 N Main Street
Logan, UT 84321</p> |
|--|---|
- There are no Federal facilities that would be used by the Project.*
10. The name and mailing address of every city, town, or similar local political subdivision in which any part of the Project and any Federal facilities that would be used by the Project are located as outlined in 18 CFR § 4.32(a)(2)(ii)(A):
- There are no cities or towns in which any part of the Project is located, and which contain any Federal facilities used by the Project (there are no Federal facilities at the Project). There are, however, several smaller unincorporated communities located either adjacent to, or within, the Project. These include: Wheelon, Cache Junction, Petersboro, Newton, Benson, Mendon, and College Ward. Direct contact information for these places is not publicly available. As of the 2020 Census, Newton, Petersboro, and Mendon were classified as census designated places (CDP).
11. The name and mailing address of every city, town, or similar local political subdivision that has a population of 5,000 or more people and is located within 15 miles of the Project dam as outlined in 18 CFR § 4.32(a)(2)(ii)(B):

Hyde Park City
113 East Center
Hyde Park, UT 84318
(435) 563-6507
cityoffice@hydeparkcity.org

City of Tremonton
102 S. Tremont Street
Tremonton, UT 84337
(435) 527-9500
tremonton@tremontoncity.com

City of Providence
164 North Gateway Drive
Providence, UT 84332
(435) 752-9441
providencecityutah@gmail.com

City of Logan
290 North 100 West
Logan, UT 84321
(435) 716-9002
Holly.daines@loganutah.org

City of North Logan
2076 N 1200 E
North Logan, UT 84341
(435) 752-1310
receptionist@northlogancity.org

Smithfield City
96 South Main
Smithfield, UT 84335
(435) 563-6226
info@smithfieldcity.org

12. The name and mailing address of each irrigation district, drainage district, or similar special purpose political subdivisions in which any part of the Project is located or affected as outlined in 18 CFR § 4.32(a)(2)(iii)(A) and (B):

Bear River Water Conservancy District
Carl Mackley, P.E., General Manager
102 W Forrest Street
Brigham City, UT 84302
carlm@brwcd.com

Cache Water Conservancy District
Nathan Daus, Executive Director
199 Main Street
Logan, UT 84321
(435) 999-0051
ndaugs@cachewaterdistrict.com

West Cache Irrigation
Edward Cottle, Secretary
1207 S 400 E
Trenton, UT 84338

Logan Cow Pasture Water Co.
Katy Fuller, Registered Agent
4132 W 2600 N
Benson, UT 84335
logancowpasturewaterco@gmail.com

Bear River Canal Company
Trevor Nielson, General Manager
275 N 1600 E
Tremonton, UT 84337
trevor@brcanal.com

Benson Bear Lake Irrigation
Company
4705 West 3800 North
Benson, UT 84301

13. There are no other political subdivisions in the general area of the project that the Applicant has reason to believe would likely be interested in or affected by the Application as outlined in 18 CFR § 4.32(a)(2)(iv).

14. The name and mailing addresses of each Federally recognized Native American tribe potentially affected by the Project as outlined in 18 CFR § 4.32(a)(2)(v):

Confederated Tribes of Goshute
Rupert Steele, Chairperson
HC 61 Box 6104
195 Tribal Center Road
Ibapah, UT 84043
rupert.steele@ctgr.us

Navajo Nation
President Jonathan Nez
100 Parkway
PO Box 7440
Window Rock, AZ 86515
(928) 871-7000
jonathannez@navajo-nsn.gov

Northwestern Band of Shoshone Nation
Chairperson Dennis Alex
Ogden Tribal Office
2575 Commerce Way
Ogden, UT 84401
(435) 734-2286
Banner02@gmail.com

Paiute Indian Tribe of Utah
Chairperson Corrina Bow
440 N. Paiute Drive
Cedar City, UT 84270
(435) 586-1112
corrina_bow@yahoo.com

Skull Valley Band of Goshute Indians
Chairperson Candace Bear
407 Skull Valley Road
Skull Valley, UT 84029
(435) 831-4079
candanceb@svgoshutes.com

San Juan Southern Paiute Tribe
Vice President Candelora Lehi
PO Box 2950
Tuba City, AZ 86045
(928) 283-4762
c.lehi@sanjuanpaiute-nsn.gov

Shoshone-Bannock Tribe
Chairman Devon Boyer
PO Box 306
Fort Hall, ID 83203
208-478-3700
dboyer@sbtribes.com

Ute Indian Tribe
Betsy Chapoose
Uintah and Ouray Reservation
PO Box 190
Fort Duchesne, UT 84026
(435) 722-5141
betsyc@utetribes.com

White Mesa Band of the Ute Mountain Ute
Council Representative Malcolm Lehi
Administration Division
PO Box 7096
White Mesa, UT 84511
(435) 678-3397
malcolm.lehi@utemountain.org

15. PacifiCorp will not seek benefits under Section 210 of PURPA as outlined in 18 CFR § 4.32(c)(1) and 18 CFR § 4.38(b)(2)(vi).

SUBSCRIPTION

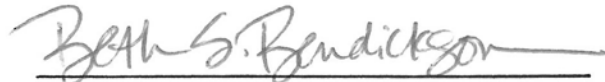
This Final License Application for the Cutler Hydroelectric Project, FERC Project No. 2420, is executed in the State of Utah, County of Salt Lake, by Eve Davies of PacifiCorp, 1407 West North Temple, Suite 210, Salt Lake City, Utah 84116, who, being duly sworn, deposes and says that the contents of this application are true to the best of her knowledge or belief and that she is authorized to execute this application on behalf of PacifiCorp. The undersigned has signed this application this 28th day of March 2022.

PACIFICORP

By: _____
Eve Davies, Cutler Relicensing Project
Manager
PacifiCorp

CERTIFICATE OF SERVICE

I hereby certify that on this 28th day of March 2022, I have served PacifiCorp's *Final License Application (Transmittal Letter only)* for the Cutler Hydroelectric Project (FERC Project No. 2420) via email or U.S. postal mail if no email address was available, upon each person designated on the official service list compiled by the Secretary in this proceeding.



Beth S. Bendickson
Sr. Business Administrator
PacifiCorp

EXPLANATION OF TERMS

TERM	EXPLANATION
A	
Acre	A measure of land area equal to 43,560 square feet.
Acre-feet	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.
Appurtenant Facilities	Any buildings, structures or other property which are clearly incidental to, and customarily found in connection with major facilities of public utilities and are operated and maintained for the benefit or convenience of the occupants, employees, customers, or visitors of such major facilities.
Aquatic Life	Any plants or animals that live at least part of their life cycle in water.
B	
Baseline	A set of existing environmental conditions upon which comparisons are made during the NEPA process.
Bear Lake	A natural lake and storage reservoir. Water released from Bear Lake into the Bear River 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	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.
Bypass Reach	A bypass reach is an area in a waterway between the initial point where water has been diverted, and the point at which water is released back into the waterway downstream of the turbines. In the case of the Cutler Project, this reach extends from approximately the flowline intake structure at the dam to discharge at the Powerhouse.
C	
Clean Water Act	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.
Critical Energy	Project-related documents related to the design and safety of dams and

Infrastructure Information	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	The volume of a cube with equal sides one foot in length.
Cubic Feet per Second	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.
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, Cutler Dam, upstream into flat land consisting of pasture, meadows, meandering river channels, marshes, wetland, agricultural land, and forest. It is formed by the confluences of the Bear, Logan, Spring Creek, and Little Bear Rivers.
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.
Differential Surge Tank	A vertical standpipe installed on large pipelines to relieve excess pressure caused by water hammer and to provide a supply of water to reduce negative pressure if a valve is suddenly opened.
Dissolved Oxygen	Perhaps the most 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, loss of aquatic organisms, and aesthetic problems.
Drainage Area	The land area where precipitation falls off into creeks, streams, rivers, lakes, and reservoirs. It is a land feature that can be identified by tracing a line along the highest elevation between two areas on a map, often a ridge.
Drawdown	The distance the water surface of a reservoir is lowered from a given elevation as the result of releasing water. Also the reduction in flow downstream of a dam.
E	
Eutrophic	Waters with a high concentration of nutrients, greatly fluctuating DO, and a high level of primary production.
F	

Fahrenheit	Fahrenheit is a temperature scale that uses the degree symbol °F.
Federal Energy Regulatory Commission	The governing federal agency responsible for overseeing the licensing, relicensing, and operation of non-federal hydroelectric projects in the United States.
Flow	The volume of water passing a given point over a given amount of time.
G	
Gravity Arch Dam	A specific type of dam that curves upstream in a narrowing curve and directs most of the water pressure against the canyon rock walls, providing force to compress the dam.
Gross Storage Capacity	The maximum possible volume of water impounded by a dam with zero spill; that is, with the discharge of water over the dam or spillway.
H	
Habitat	The locality or external environment in which a plant or animal normally lives and grows.
I	
Impoundment	The body of water created by a dam.
Integrated Licensing Process	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.
L	
Lessee	An individual or entity leasing property from another individual or entity.
License	FERC authorization to construct a new hydroelectric project or continue operating an existing project. A license contains the operating conditions for a typical term of 40 years.
License Application	Application for a new license that is submitted to FERC no less than two years in advance of expiration of an existing license.
Licensee	Holder of FERC project license. In the case of the Cutler Project, PacifiCorp, a subsidiary of Berkshire Hathaway Energy.
M	
Megawatt	A unit of electrical power equal to one million watts or 1,000 kW.
Megawatt-hour	A unit of electrical energy equal to 1 MW of power used for one hour.
Model Boundary	The study area for the hydraulic modeling effort included all facilities within the PacifiCorp Project Boundary, as well as 1.5 miles of the Bear River downstream of the PacifiCorp Project Boundary near the Cutler powerhouse.
N	
National Environmental Policy Act	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.
Non-	Local, regional, and national organizations such as conservation,

Governmental Organization	sportsman's, or commerce groups.
P	
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	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. The Project Area includes some open water, wetlands, uplands surrounding Cutler Reservoir including areas of confluence with its major tributaries.
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 9,277 acre 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 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.
Proposed Action	For the purposes of this document, Proposed Action refers to the approval process of PacifiCorp's proposal to gain a new license for the Cutler Hydroelectric Project (FERC Project No. 2420), located on the Bear River in Box Elder and Cache counties, Utah.
R	
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 water impoundment into which water flows and maybe stored for future use.
Resident Fish	Fish that do not migrate out to a larger body of water such as a larger river, lake, or the ocean, but instead remain in the freshwater tributary where they hatched.
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	Of, relating to, or situated or dwelling on the bank of a river or other body of water. Frequently refers to the shrub- and tree-dominated habitats that are commonly found adjacent to these bodies of water.
S	
Salt Creek Waterfowl Management Area	The management area managed by the Utah Division of Wildlife Resources (UDWR) 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.
Scoping Document 1	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	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 disk is lowered; an indicator of water clarity.
Spillway	A passage for releasing surplus water from a reservoir or canal.
Spinning Reserve	The amount of unused capacity in online energy assets which can compensate for power shortages or frequency drops within a given period of time. Traditionally, the spinning reserve is a concept for large synchronous generators.
Stakeholder	Any individual or organization (government or non-governmental) with an interest in a hydroelectric project; similar to an interested party.
Stratification	A physical process that results in the formation of distinct layers of water within a lake or reservoir (i.e., epilimnion, metalimnion, and hypolimnion) separated by temperature.
Study Plan	The aggregate of all study descriptions.
T	
Tailrace	The channel located between a hydroelectric powerhouse and the river where discharged water passing through the powerhouse turbines enters the river immediately downstream of the powerhouse.
Tailwater	The waters immediately downstream of a dam; for hydroelectric dams, also referred to as the tailrace.
Turbidity	A measure of the extent to which light passing through water is reduced due to suspended materials. Measured as NTU or FTU.
W	
Watershed	An entire drainage basin including all living and nonliving components of the basin.
Wetlands	Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the terrestrial 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 AND ABBREVIATIONS

µg/l	microgram per liter
µm	one millionth of a meter (micrometer)
1D	1 dimensional
2D	2 dimensional

A

ac	acre
ADA	Americans with Disabilities Act of 1990
Advisory Council	Advisory Council on Historic Preservation
af	acre-feet
AFO	Animal Feeding Operation
AFUDC	allowances for funds used during construction
AIS	aquatic invasive species
Al	aluminum
ANOVA	analysis of variance
APE	Area of Potential Effects
ATV	all-terrain vehicle
AU	assessment unit
AWQMS	Ambient Water Quality Monitoring System

B

BAA	Balancing Authority Areas
BBS	Breeding Bird Survey
BHE	Berkshire Hathaway Energy
BLM	Bureau of Land Management
BMI	Benthic Macroinvertebrate Index
BMP	best management practice
BOD	Biological Oxygen Demand
BRCC	Bear River Canal Company
BRLC	Bear River Land Conservancy
BYU	Brigham Young University

C

°C	Celsius
CaCO ₃	calcium carbonate
CAFO	Concentrated (or Confined) Animal Feeding Operation
CAISO	California Independent System Operator
CBC	Christmas Bird Count
CEC	cation exchange capacity
CEII	Critical Energy Infrastructure Information
CESCP	Construction Erosion and Sediment Control Plan
CDP	census designated places
cf	cubic feet
CFR	Code of Federal Regulations

cfs	cubic feet per second
cm	centimeter
COVID-19	Coronavirus Disease 2019
CRA	Cultural Resources Assessment
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act

D

DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DFFSL	Division of Forestry, Fire, and State Lands
District	Cutler Hydroelectric Power Plant Historic District
DLA	Draft License Application
DO	dissolved oxygen
DSM	Demand Side Management
DTP	dissolved total phosphorus
DTPsed	dissolved total phosphorus from water in the interstitial voids of the sediment

E

EA	Environmental Assessment
EAP	Emergency Action Plan
EC	Eligible/Contributing
eDNA	environmental deoxyribonucleic acid
EFH	Essential Fish Habitat
EIM	Energy Imbalance Market
EPT [taxa]	Ephemeroptera, Plecoptera, and Trichoptera
ESA	Endangered Species Act
ERI	Ecosystems Research Institute

F

°F	Fahrenheit
FAA	Federal Aviation Administration
Fe	Iron
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FPA	Federal Power Act
FOIA	Freedom of Information Act
ft/s	foot per second
FTU	Formazin Turbidity Unit

G

GIS	geographic information system
GLO	General Land Office
GPS	global positioning system

H

HCC	Hydro Control Center
hp	horsepower
HPMP	Historic Properties Management Plan

I

IBA	Important Bird Area
ID	identification
IF	isolated features
ILP	Integrated Licensing Process
ILS	intensive-level survey
IO	isolated occurrences
IPaC	Information Planning and Conservation
IRP	integrated resource planning
ISR	Initial Study Report

J

JHU	Johns Hopkins University
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K

K	thousand
kg	kilogram
kHz	kilohertz
kv	kilovolt(s)
kW	kilowatt(s)
Kwhs	kilowatt-hour(s)

L

LBM	Little Bear Marsh
LiDAR	Light Detection and Ranging
LRM	Logan River Marsh

M

MBTA	Migratory Bird Treaty Act
mg/kg	milligram per kilogram
mgd	million gallons per day
mg/L	milligrams per liter
mL	milliliter
mm	millimeter
msl	mean sea level
MVA	megavolt-ampere
MW	megawatt
MWh	megawatt-hour

Mya million years ago

N

N/A not applicable
NAIP National Agricultural Imagery Program
NAS non-indigenous aquatic species
NC non-contributing
NEPA National Environmental Policy Act
NERC North American Reliability Council
NGO Non-Governmental Organization
NGVD 29 National Geodetic Vertical Datum of 1929
NH₃ ammonia
NHPA National Historic Preservation Act
NLCD National Land Cover Database
NMFS National Marine Fisheries Service
NO₂ nitrite
NO₃ nitrate
NOAA Fisheries National Marine Fisheries Service (also NMFS)
NOI Notice of Intent
NPDES National Pollutant Discharge Elimination System
NPS National Park Service
NRCS Natural Resources Conservation Service
NRHP National Register of Historic Places
NTS National Trails System Act
NTU nephelometric turbidity unit
NWI National Wetland Inventory
NWPPP Northwest Power and Conservation Council

O

OHV off-highway vehicle
OHWL Ordinary High-Water Line
OPMC Operations Compliance Monitoring Plan
OP orthophosphate

P

P Phosphorus
PACE PacifiCorp East
PAD Preliminary Application Document
PACW PacifiCorp West
PCB polychlorinated biphenyl
PM&E Protection, Mitigation, and Enhancement
PF Power Factor
ppb parts per billion
Project Cutler Hydroelectric Project (FERC No. 2420)
psi pounds per square inch

PSP Proposed Study Plan

Q

QA/QC Quality Assurance/Quality Control
QR Quick Response Code Scan

R

RCRA Resource Conservation and Recovery Act
Reclamation U.S. Bureau of Reclamation
RLS Reconnaissance-level Survey
RMP Resource Management Plan
RR railroad
RSP Revised Study Plan
RV recreational vehicle

S

SCM Spring Creek Marsh
SCORP Statewide Comprehensive Outdoor Recreation Plan
SD1 Scoping Document 1
SD2 Scoping Document 2
SDM Sewage Discharge Marsh
SHPO State Historic Preservation Office
SPD Study Plan Determination
SRP soluble reactive phosphorus
SDR Supporting Design Report
SMS Scenery Management System
STEP Sustainable Transportation and Energy Plan
STID Supporting Technical Information Document
SWCA SWCA Environmental Consultants

T

T&E threatened and endangered
TCPs Traditional Cultural Properties
TDP total dissolved phosphorus
TDS Total Dissolved Solids
TIN triangular irregular network
TIV turbine isolation valve
TKN Total Kjeldahl Nitrogen
TMDL Total Maximum Daily Load
TP Total phosphorus
TPsed total phosphorus bound to bed sediments
TSS Total Suspended Solids

U

U.P. Union Pacific
UDEQ Utah Division of Environmental Quality

UDOT	Utah Department of Transportation
UDSH	Utah Division of State History
UDWR	Utah Division of Wildlife Resources
UDWRi	Utah Division of Water Rights
UDWQ	Utah Division of Water Quality (a division within UDEQ)
UHSF	Utah Historic Site Form
UP&L	Utah Power and Light
URN	Utah Reference Network
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USR	Updated Study Report
USU	Utah State University
USUAL	Utah State University Analytical Lab

V

V	velocity
VEP	Vegetation Enhancement Program

W

WECC	Western Electricity Coordinating Council
WMA	Wildlife Management Area
WQC	Water Quality Certification
WSE	Water Surface Elevation
WSoC	Wildlife Species of Concern
WWTP	Wastewater Treatment Plant

FINAL LICENSE APPLICATION

EXHIBIT A

PROJECT DESCRIPTION

CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT NO. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)**

**FINAL LICENSE APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT A
PROJECT DESCRIPTION**

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1.0 INTRODUCTION

The Cutler Project Hydroelectric Project (Project) is located on the Bear River in Cache Valley, Utah, between the Wasatch and the Wellsville Mountains. The Project lies within two counties: Box Elder County, where the Cutler Dam is located, and Cache County, where much of the reservoir and adjacent Project lands are located. The Cutler Reservoir is formed at the confluence of the Bear, Logan, Spring Creek, and Little Bear Rivers. The Project has been in operation since 1927, although an earlier predecessor dam, the Wheelon Dam, created a smaller reservoir beginning around 1896. The Wheelon Dam was inundated by the construction of the Cutler Project in 1927 and remains submerged in place approximately one mile upstream of the Project dam. The Project Boundary includes approximately 9,277 acres of open water, associated wetlands, and uplands surrounding Cutler Reservoir, including the areas of confluence with its major tributaries. The Bear River drains into the Great Salt Lake, which is the fourth-largest terminal lake in the world.

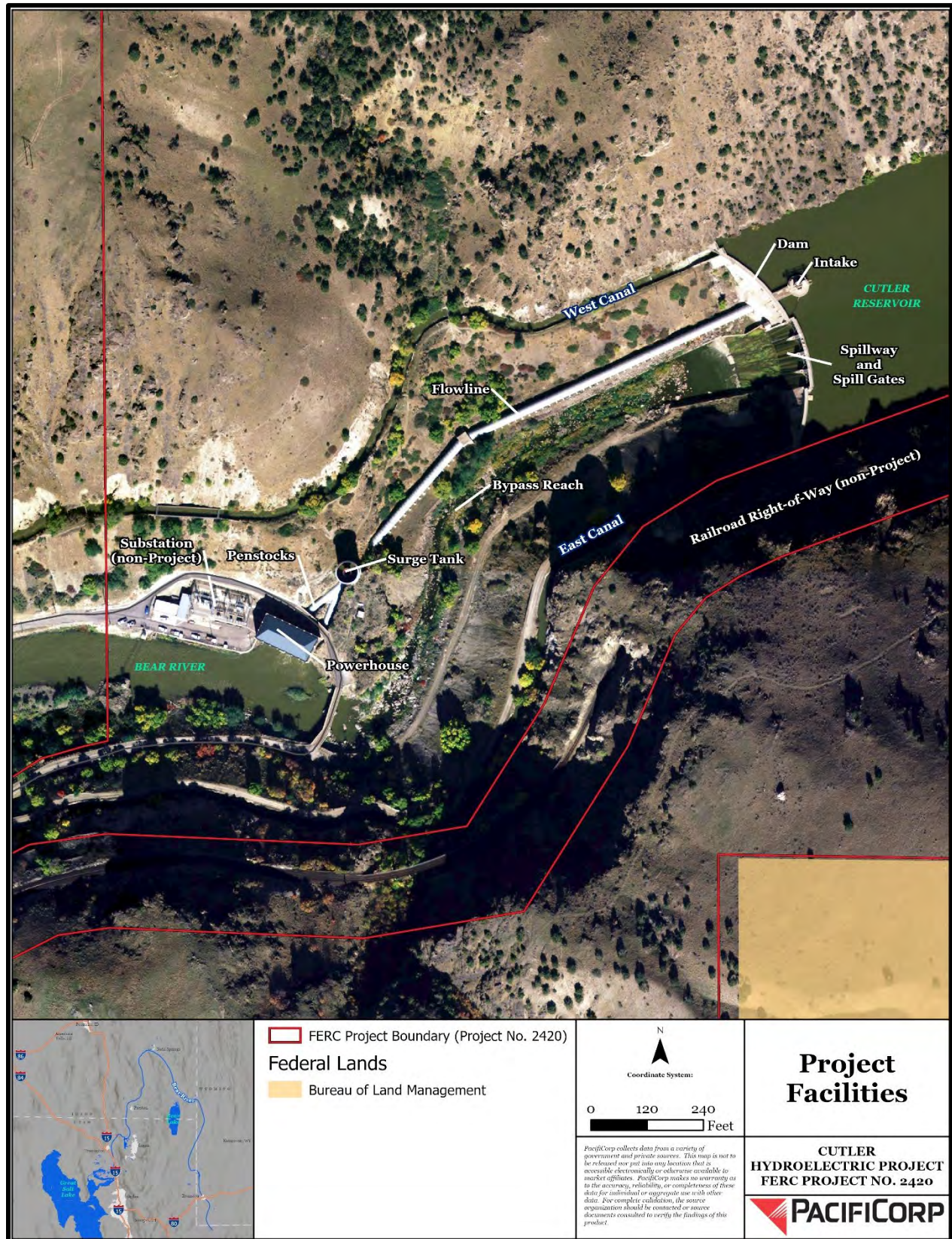
The Project consists of a reservoir, concrete gravity arch dam, gated-overflow spillway, low-level passage gate (non-operational), intake tower and cylinder gate, two irrigation canal intakes, a steel flowline, a surge tank, two steel penstocks, a powerhouse, two turbine-generator units, circuit breakers, transformers, accumulator tanks, an air compressor, several emergency generators, and appurtenant facilities. More details about existing Project structures, including dimensions and capacities, are included below in Section 2.0.

PacifiCorp operates the Cutler Project by diverting flows from the Bear River. Although the Project is typically operated in a run-of-river mode, some of the 8,563-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 1991 to 2020, the Project produces approximately 75,052 megawatt hours (MWh) of electric energy annually serving residential and commercial customers.

In addition to the 30-megawatt (MW) Project, PacifiCorp owns and operates four other hydroelectric developments on the Bear River; all of which are located further north and upstream in Idaho. These are the three Bear River Project developments (Federal Energy Regulatory Commission [FERC] Project No. 20), which include the 14.7-MW Soda

development, the 33-MW Grace development, and the 30-MW Oneida development, and the 1.7-MW Last Chance Project (FERC Project No. 4580), which is a single development, co-owned by PacifiCorp, and operated under its own license. In addition, there are seven other hydroelectric developments on the Logan River, Blacksmith Fork, Mink Creek, and Paris Creek, which are all Bear River tributaries. PacifiCorp owns a hydroelectric development on Paris Creek but is not the owner or operator of the other six developments.

A map of the Project Area and Project facilities is presented below in Figure 1-1. The FERC Project Boundary is provided in Exhibit G.



Source: PacifiCorp 2018

FIGURE 1-1 PROJECT FACILITIES

2.0 PROJECT STRUCTURES

This section describes the physical composition, dimensions, and general configuration of any Project dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed. It also describes the maximum surface area and normal maximum surface elevation; gross and usable storage capacity; the number, type, and rated capacity of any turbines or generators; the number, length, voltage, and interconnections of any primary transmission lines; and all lands of the United States that are enclosed within the Project Boundary.

2.1 EXISTING STRUCTURES

The Project contains the following existing features (Figure 1-1):

- A reservoir with a surface area of approximately 2,476 acres, with gross and useable storage of approximately 8,563 acre-feet (af) at a normal maximum operating elevation of 4,407.5 feet, mean sea level (msl) United States Geological Survey (USGS);^{1,2}
- A concrete gravity arch dam that has an overall length along the centerline of the crest of 465 feet plus an additional 80 feet for canal intake structures near the top of the abutments, for a total of 545 feet in length. It has a hydraulic height of 109 feet high by 7 feet wide at its narrowest location, and a structural height of 126 feet.
- A gated-overflow spillway that contains four 30-foot-wide by 14-foot-high radial (Tainter-type) gates with crest elevation at 4,394.5 feet;
- A 7-foot-diameter low-level opening located near the base of the dam controlled by a slide gate (currently non-operational due to upstream siltation; the gate operators have also been removed);
- 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);
- A 1,157-foot-long by 18-foot-diameter steel flowline;
- An 81-foot-high by 45-foot-diameter Johnson Differential surge tank (surge tank comprised of an external shell and internal riser);

¹ All elevations in this Final License Application refer to USGS mean sea level datum (National Geodetic Vertical Datum of 1929 or NGVD 29).

² Areas of Cutler Reservoir that do not contribute to the usable storage capacity (e.g., areas of emergent marsh vegetation) have been excluded from the reservoir surface area calculation.

- Two 118-foot-long by 14-foot-diameter steel penstocks that bifurcate from the surge tank into the powerhouse;
- A 74-foot by 130-foot brick powerhouse;
- Two General Electric 15,000 kilowatt (kW), 6,900-volt (V), 1,570 amperes (amp), 0.8 power factor (PF) generators with a total installed capacity of 30 MW, and appurtenant facilities;
- Two I.P. Morris Vertical Francis turbines:
 - Unit 1 (2008 efficiency upgrade): 15 MW, 23,602 horsepower (hp) (or 17,600 kW), 124-feet of static head, and 150 revolutions per minute (rpm).
 - Unit 2 (2007 efficiency upgrade): 15 MW, 21,180 hp, 124-feet of static 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. 1 138 kilovolt (kV)–46 kV–6.6 kV 50 megavolt ampere (MVA) generator step-up transformer (not part of Project; associated with transmission);
 - No. 2 46 kV–7.2 kV 20 MVA generator step-up transformer (part of Project);
- Two accumulator tanks located in the powerhouse;
- One air compressor located in the powerhouse;
- One bubbler system with compressor located on the wooden bridge deck between the intake and dam (see Section 6.3 for details);
- A 115-kW emergency generator installed next to the surge tank for backup station power, which also runs to the cylinder gate; and
- A 100-kW back-up power unit for the cylinder gate, installed on the wooden bridge deck between the intake and dam.

2.2 IMPOUNDMENT

The Cutler Reservoir (Photo 2-1) has a surface area of approximately 2,476 acres, and gross and useable storage of approximately 8,563 af, at an elevation of 4,407.5 feet NGVD 29. The portion of the reservoir from the dam to where the Bear River enters the reservoir has been impacted by silt deposits. The portion of the reservoir extending south from the confluence of the Bear River to the confluences with the Logan River, Little Bear River, and Spring Creek tributaries is relatively shallow, and is dominated by areas of emergent marsh vegetation islands. Therefore, the usable storage capacity (the storage accessible to the flowline intake structure) is equal to the gross storage capacity of approximately 8,563 af at elevation 4,407.5 feet msl.



PHOTO 2-1 CUTLER RESERVOIR LOOKING UPSTREAM (EAST) FROM CUTLER DAM

2.2.1 GRAVITY ARCH DAM

Designed in 1924 and completed in 1927, the concrete gravity arch dam (Photo 2-2) is situated in a wide inverted U-shaped canyon and 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. At its narrowest location, the dam is 109 feet high by 7 feet wide, and the radius of the arch is 350 feet measured to the upstream face of the structure. The upstream face of the arch is vertical, except for the corbel in the spillway section of the dam at approximately elevation 4,352.5 feet. The downstream face of the arch has a slope ratio of 5⅔ 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 feet. Decking spans the spillway from pier to pier at approximately elevation 4,413 feet.



PHOTO 2-2 CUTLER DAM, PENSTOCK, AND SPILL GATES FROM DOWNSTREAM

2.2.2 SPILLWAY GATES AND APRON

The gated overflow spillway is located in the center portion of the arch dam and includes four 30-foot-wide by 14-foot-high spillway gates (Photo 2-2). The gates are operated with a traveling carriage-type electric chain hoist. Five 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 4,401.5 feet. The top of the spillway gates in a closed position is elevation 4,408.5 feet. Normal maximum pool elevation is 4,407.5 feet and the ogee spillway crest elevation is 4,394.5 feet. The capacity of the spillway at reservoir elevation of 4,407.5 feet is 21,000 cubic feet per second (cfs). The capacity of the spillway at a reservoir elevation of 4,412 feet (i.e., the top of the concrete dam) is 34,000 cfs.

2.2.3 LOW-LEVEL OPENING PASSAGE

A 7-foot-diameter low-level opening passage (low-level opening) is located near and through the base of the dam, on the right side of the spillway. The low-level opening is controlled by a slide

gate installed on the downstream face. The invert of the low-level opening is at elevation 4,312.46 feet. The low-level opening is currently non-operational due to silt blockage within the passage and at the passage entrance. Additionally, the hydraulic fluid within the operator has been removed from the system.

2.2.4 IRRIGATION CANAL INTAKE STRUCTURES

The Project contains two irrigation intake structures, one located on either abutment of the dam, each controlled by 8-foot by 8-foot gates, two on the west intake (Westside Canal, located on the north abutment bank) (Photo 2-3) and two on the east intake (Eastside or Hammond Canal, located on the south abutment bank). Under the 1912 Agreement with the canal company that has the rights to this irrigation water, PacifiCorp is obligated to deliver a flow of 900 cfs during the irrigation season, and up to 150 cfs during the remainder of the year. Although individual canal capacity may vary depending on canal conditions, in accordance with the 1912 Agreement the flow capacity of the Eastside (Hammond) and Westside canals is generally described as 165 and 735 cfs, respectively, as the contract obligations in aggregate are limited to 900 cfs. One of the Eastside Canal intake gates is not functional, and as the capacity is not currently needed, there are no plans to repair it. The operator of the irrigation canals, the Bear River Canal Company, is investigating potential changes in alignment to their intake gates and canals, which may result in changes to the relative flows in the two canals, but not to the timing or overall volume of water diverted from Cutler Reservoir. The proposed future operation of the Cutler Project would not interfere with PacifiCorp's ability to meet the 1912 Agreement obligations.



PHOTO 2-3 LOOKING DOWNSTREAM AT WESTSIDE CANAL

2.2.5 FLOWLINE INTAKE STRUCTURE

The flowline intake is a concrete tower located in the Cutler Reservoir, approximately 60 feet upstream from the dam. It 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 is at elevation of 4,379.0 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 2-4).



PHOTO 2-4 CUTLER FLOWLINE INTAKE STRUCTURE

2.2.6 TRASH RACKS

The trash racks are $\frac{3}{8}$ -inch thick flat bars spaced 3 inches apart on-center. The trash racks encircle the entire circular flowline intake tower structure.

2.2.7 FLOWLINE, SURGE TANK & PENSTOCK

An 18-foot-diameter steel flowline (Photo 2-5) 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 flowline creates a bypass reach of the Bear River measuring approximately 1,800 feet. 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 Johnson Differential surge tank is constructed of riveted steel founded on a reinforced concrete structure that rests on foundation rock. The outer shell of the surge tank has a 45-foot diameter, and the inner riser has a 16-foot diameter; both are 81 feet tall. Downstream of the surge tank (Photo 2-6), the flowline bifurcates into two 14-foot-diameter riveted steel pressurized penstocks which extend into the powerhouse. The penstocks are partially embedded in concrete support cradles.



PHOTO 2-5 CUTLER FLOWLINE



PHOTO 2-6 CUTLER JOHNSON DIFFERENTIAL SURGE TANK

2.2.8 POWERHOUSE

The powerhouse (Photo 2-7) is located approximately 1,250 feet downstream of the dam and is a three-story 74-foot by 130-foot brick structure containing two vertical reaction-type Francis

turbines rated at 15 MW, 23,602 hp (or 17,600 kW) with a static head of 124 feet. Upstream of each turbine there is a 13-foot-diameter butterfly turbine isolation valve (TIV). The maximum discharge with both units operating is approximately 3,900 cfs; the minimum hydraulic capacity is zero cfs. Two 15,000 kW, 0.8 PF generators are attached to the turbines. The powerhouse contains a circuit breaker for each generator.



PHOTO 2-7 POWERHOUSE, SURGE TANK, AND (NON-PROJECT) SUBSTATION

2.2.9 APPURTENANT FACILITIES

Appurtenant facilities to the Project include the (non-Project) Cutler substation, and Project transmission lines. These facilities are discussed in Section 5.0.

2.3 PROPOSED STRUCTURES

There are no new proposed facilities planned to increase the generating capacity of the Cutler Project. PacifiCorp plans to make large capital improvements of like-for-like replacement of the

spillway gates and flowline supports (as needed) once the Project has obtained a new license. PacifiCorp is currently in the engineering and construction phase of seismic upgrades to the surge tank, which will include new foundation anchors and a like-for-like replacement of the exterior shell. 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 during high flow events. These capital improvements will not result in changes in the Project operation. Additionally, components such as dedicated lifting hoists to enable remote Project operation may be installed to enhance Energy Imbalance Market (EIM) capabilities.

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

3.0 IMPOUNDMENT

The following section provides an overview of the normal maximum surface area, maximum surface elevation, gross storage capacity, and usable storage capacity of Cutler Reservoir.

3.1 SURFACE AREA, ELEVATION, AND STORAGE CAPACITY

Cutler Reservoir has a normal maximum surface area of approximately 2,476 acres, and storage of approximately 8,563 af at a surface elevation of 4,407.5 feet msl. As discussed above, due to silt deposits, the usable storage capacity is equal to the gross storage capacity of approximately 8,563 af.

3.2 GAGE INFORMATION

The drainage area upstream of the Project is approximately 6,200 square miles. Three PacifiCorp-managed streamflow gaging stations, published through and overseen by the USGS, are located near the Project: Collinston (Station No. 10118000), Westside Canal (Station No. 10117500), and Eastside Canal (Hammond) (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.

4.0 TURBINES AND GENERATORS

This section describes the existing turbines and generators, and their capacity. It also describes any proposed changes to Project turbines and generators.

4.1 EXISTING TURBINES AND GENERATORS

The Project utilizes two vertical reaction-type Francis turbines rated at 23,602 hp (or 17,600 kw) with a static head of 124 feet. Upstream of each turbine there is a 13-foot-diameter butterfly TIV. The maximum discharge with both units operating is approximately 3,900 cfs. Two 15,000 kW, 0.8 PF generators are attached to the turbines. The powerhouse contains a circuit breaker for each generator. Monthly average energy generation for the most recent five-year period (2016 to 2020) and the most recent 30-year period (1991 to 2020) is provided in Table 4-1.

TABLE 4-1 MONTHLY 5-YEAR AND 30-YEAR AVERAGE GENERATION (MWHs)

MONTH	2016	2017	2018	2019	2020	5-YEAR AVERAGE (2016-2020)	30-YEAR AVERAGE (1991-2020)
January	3,864	8,312	12,657	4,872	8,390	7,619	6,672
February	6,071	15,672	11,386	6,940	8,627	9,739	6,767
March	9,882	22,071	14,377	10,158	16,169	14,531	10,835
April	15,520	21,140	14,270	17,864	11,416	16,042	11,944
May	11,307	21,777	7,852	16,888	7,174	13,000	10,484
June	2,185	13,759	167	11,381	3,987	6,296	7,640
July	(463)	2,287	(514)	(276)	1,252	457	1,453
August	(503)	1,972	(273)	616	142	391	998
September	1,245	5,172	(499)	1,995	670	1,717	1,836
October	3,221	8,757	2,153	6,283	2,050	4,493	4,190
November	4,682	14,405	3,719	5,179	3,803	6,358	5,842
December	7,210	12,285	4,465	8,286	4,734	7,396	6,388
ANNUAL	64,221	147,609^a	69,760	90,186	68,414	88,038	75,052

^a 2017 was an extremely high flow year, created by record high flows originating upstream of Bear Lake.
Source: PacifiCorp 2021

4.2 PROPOSED TURBINES AND GENERATORS

There are no proposed changes to the Project's existing turbines or generators.

5.0 TRANSMISSION INFORMATION

This section discusses the number, length, voltage, and interconnections of Project transmission features from the Cutler powerhouse to the electrical grid system and defines both Project and non-Project-related transmission features inside the Project Boundary.

5.1 CUTLER POWERHOUSE

The bus bar (the physical connection to the generators) in the Cutler powerhouse, which is part of the Project and included in the Project Boundary, supports powerhouse functions, including the Project's spinning reserve. The Cutler powerhouse bus bar is separated by a disconnect switch that is normally open. Generators No. 1 and No. 2 are each connected to one side of the bus bar.

5.2 PROJECT-RELATED TRANSMISSION LINES

There are two high voltage (7.2 kV and 6.9 kV), three-phase cable sets that are Project transmission lines, approximately 300 feet long, which are part of the Project and are included in the Project Boundary. These Project transmission lines extend from the Cutler powerhouse's bus bar to step-up transformers No. 1 and No. 2, located in the Cutler substation.

5.3 CUTLER SUBSTATION

The Cutler substation is not part of the Project but is located within the Project Boundary. The Cutler substation is the point of interconnection from the Cutler powerhouse to the electrical grid system, and contains:

- Two Westinghouse 3-phase phase step-up transformers:
 - No. 1 is a 138 kV–46 kV–6.6 kV 50 MVA step-up transformer associated with transmission, but not part of the Project.
 - No. 2 is a 46 kV–7.2 kV 20 MVA step-up transformer that is part of the Project.

The primary purpose of the No. 1 step-up transformer is for transmission at 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 Project existence.

5.4 NON-PROJECT-RELATED TRANSMISSION LINES

Transmission from the Project Boundary leaves the Cutler substation by one 138 kV and three 46 kV transmission lines which are not part of the Project, although they do cross through the Cutler Project Boundary.

6.0 APPURTENANT FACILITIES AND EQUIPMENT

This section describes the specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the Project.

6.1 EMERGENCY GENERATORS

A 140-kW emergency generator is located next to the surge tank. This generator provides backup power to the powerhouse and can also power the flowline intake gate and spillway gates in the event of a loss of normal station service to the dam or powerhouse. Additionally, a 100-kW backup propane-fueled generator is located on the wooden deck between the dam and flowline intake structure. This generator provides dedicated power to the intake gate in the event of a loss of normal station service to the dam. A backup propane-fueled motor is located directly on the spillway gate hoist mule to maintain function of the spillway gates in the event station power becomes unavailable.

6.2 SPILLWAY GATE MULE

The spillway gates are operated from the deck bridge by a single moveable, track-mounted, electrically powered hoist (i.e., mule). The mule motor nameplate is rated at 220 V, 25.6 amps. In the event the station loses service power, a 115-kW propane-fueled emergency power unit, located adjacent to the surge tank, starts automatically, and supplies emergency power to the spillway gates, canal gates, intake motor, and lighting circuits. Additionally, the mule includes a propane-powered standby power unit mounted onboard for use in the event station power and emergency power to the hoist is lost.

6.3 BUBBLER SYSTEM AND COMPRESSOR

The gated spillway section of the dam is equipped with a bubbler system upstream of the spillway gates to prevent ice buildup on the gates during freezing conditions. The bubbler system consists of a compressor unit located on the wooden bridge deck between the intake and dam, a conduit manifold system which runs along the top edge of the upstream face of the dam just below the walkway rail, and flexible hoses reaching beneath the water surface to deliver the air to churn the water, preventing the formation of ice.

6.4 GANTRY CRANE

A five-ton rotating gantry crane which services the intake screens and cylindrical head gate is located on the intake deck. The gantry crane also assists in the loading and unloading of equipment from barges floated in from reservoir access upstream of the Project.

7.0 LANDS OF THE UNITED STATES

There are no lands of the United States within the Project Boundary.

8.0 REFERENCES

PacifiCorp. 2021. Tables and data provided by Connely Baldwin. Senior Water Resources Engineer. PacifiCorp.

FINAL LICENSE APPLICATION

EXHIBIT B

PROJECT OPERATION

CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)**

**FINAL LICENSE APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT B
PROJECT OPERATION**

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1.0 PROJECT OPERATION

As specified by 18 CFR § 4.51(c), the following section describes current and proposed Cutler Hydroelectric Project (Project) operations, including how the Project is operated during average, adverse, and high water years.

1.1 EXISTING PROJECT OPERATIONS

The Project is the furthest downstream of the five PacifiCorp hydroelectric 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 hydroelectric plants located within a 3,500-square-mile area of the lower Bear River Basin in Idaho and Utah.

Water is currently diverted from the Bear River into Bear Lake, which is a natural lake, via the Rainbow Canal (the east inlet). Over geologic and historic time periods, the size of Bear Lake has varied in both areal extent and depth, and has periodically (over geologic time periods) been connected to the Bear River when the lake expands to the north as a result of higher water levels. In historic times, Bear Lake was not connected to the Bear River, although as noted, it is now and has been since the early twentieth century by the Rainbow Canal. Since 1911, the upper 21.65 feet of Bear Lake has been used as a storage reservoir. The water diverted from the Bear River 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-year irrigation water storage is possible. This water is then released (pumped) from Bear Lake into the Bear River via the Bear Lake Outlet Canal (the west outlet) 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 also used for power generation as it is conveyed downstream. The river is regulated according to multiple use needs within the basin; primarily for irrigation, flood control, and power generation, as well as recreation, and fish and wildlife enhancements per the Bear River Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 20) license. The pumped storage water from Bear Lake is the major contributing factor to the generation capability of the Bear River system except at the Cutler Project. At Cutler Dam, because the canal headgates are an integral part of the dam, the last diversion of the Bear Lake storage water is made to fulfill Bear River water rights, including

some of the oldest and largest water rights in the system. This diversion occurs before any water goes through the Project intake screens and subsequently the Project turbines. As a result, during the hot and dry part of the irrigation season, typically from July to September and frequently longer, the Cutler Project does not generate electricity as all the inflow to the Project is necessary to fulfill irrigation contracts that are diverted at Cutler Dam, eliminating flows through and downstream of 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 the Project's 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 these southern tributaries (the Logan, Blacksmith Fork, and Little Bear drainage basins) have equaled 70 percent of the total reservoir inflow, although typically flows from the Bear River comprise the largest inflow to the Project.

As noted, typically from mid-June to mid-October annually, 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 United States Geological Survey (USGS) gaging stations are located near the Project: Collinston (Station No. 10118000), Westside Canal (Station No. 10117500), and Eastside (Hammond) 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.

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 PacifiCorp's 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 elevation limits and other operating constraints as discussed below; note that all reservoir elevation measurements in this Final License Application (FLA) refer to elevation as measured at Cutler Dam, unless specifically referenced otherwise. A protective relay scheme automatically shuts the units down should a problem develop.

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 1-1 and approved by the 2002 License Amendment Order of Article 401 (FERC 2002). The current FERC license contains reservoir elevation range restrictions that constrain the operational potential of the reservoir.

TABLE 1-1 CURRENT OPERATING FLOW REGIMES FOR CUTLER RESERVOIR

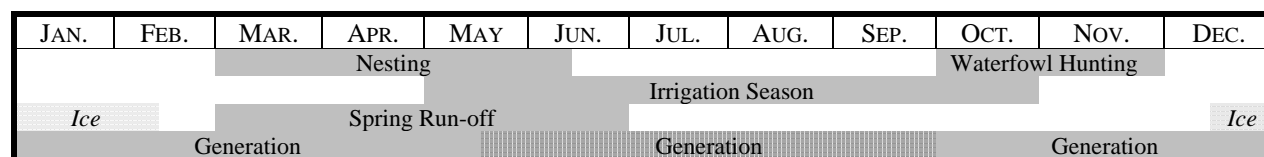
TIME PERIOD	NORMAL RESERVOIR OPERATING RANGE (FEET)	TOLERANCE (FEET)	TOTAL RANGE (OPERATING + TOLERANCE)	TARGET PERCENTAGE
March 1 – Dec. 1	4,407.5 – 4,406.5	± 0.25	1.5 feet	95%
Dec. 2 – Feb. 28	4,407.5 – 4,406.0	+ 0.25 to – 0.5	2.25 feet	90%

Source: FERC 2002

There is currently no minimum flow required or provided in the downstream or bypass reach, nor would one be possible given the irrigation season water rights constraints faced by the Project (i.e., the only water in the system during that time is allocated for irrigation and PacifiCorp does not have rights to send water downstream of the Project). There is also no native or sport fishery managed by the Utah Division of Wildlife Resources (UDWR) in this segment of the river. Flow downstream of the dam during irrigation season is the accumulation of leakage from the dam that flows through uplift drainpipes.

As previously noted, 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 (depending on runoff) to the end of September, unless water is available in higher flow. FERC’s 2002 *Order Modifying and Approving Project Operation Plan per Article 401* (99 FERC ¶ 62,085) (FERC 2002) described

the evaluation of operational limitations as shown below in Figure 1-1. Although spawning¹ has been removed from the constraints for proposed future operations, the remainder of the constraints remain relevant.



Notes:

Potential for Ice
 If Water Available
 Normally Available

Source: PacifiCorp 2021

FIGURE 1-1 CUTLER OPERATING CONSTRAINTS IN 1994 CURRENT LICENSE

1.1.1 IRRIGATION SEASON OPERATIONS

From May 1 to October 31 each year, the reservoir is held to within 1 foot of elevation 4,407.5 feet normal maximum pool plus a tolerance band, 95 percent of the time (the target range or percent of time the goal is met) in order to protect wildlife (primarily nesting avian) use, facilitate direct pumping for irrigation from the reservoir/Bear River, and to accommodate sudden increases or decreases in irrigation demand that can occur due to unexpected weather conditions or unexpected irrigation needs. Any extra inflow greater than what is required for irrigation is stored (to the upper elevation limit) to maintain water elevations in the reservoir, and to permit efficient hydroelectric generation when water is available for release. As noted, 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 rise above or drop below the target range because there is a five-day lag between when upstream release changes are made at Bear Lake, and they are realized at the Project.

¹ The figure has been modified to remove “spawning” since there are no Bonneville/Bear River cutthroat trout (or with the exception of Utah sucker, other native 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. PacifiCorp understands the importance of spawning for the various introduced species in the reservoir (see also Exhibit E for a discussion of fish spawning in Cutler), but as the proposed operations will not affect spawning of these species (due to the timing), spawning has been removed as a limiting factor to reservoir operation as portrayed in this graphic.

1.1.2 WINTER SEASON OPERATIONS

Conditions that cause ice to periodically form on the reservoir and in the river downstream of the Project may occur, most typically between November and mid-February, although unseasonably cold periods may also occur outside this seasonal range. During this period, if extreme ice conditions are present (i.e., ice on the river downstream of the Project), 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 downstream of the Project.

1.1.3 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 phases: when low elevation snow melts, and later when the higher elevation snowpack melts. High flows also occur when there are releases from Bear Lake (often resulting from flood control operations) concurrent with natural runoff upstream or in the other tributaries from the south portion of the Project. The highest recorded flows have most commonly occurred from rapid low-elevation snowmelts associated with heavy rain-on-snow events. During the spring, as much as 70 percent of the inflow into the Project can come 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 cubic feet per second [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 (which is the compliance point for reservoir elevations), 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. From Cutler Dam, high flows move through the lower Bear River in Box Elder County and to the Great Salt Lake, the terminal point of all Bear River flows.

1.1.4 OPERATIONS DURING MAINTENANCE ACTIVITIES

The next two sub-sections describe operations during maintenance activities.

1.1.4.1 TURBINES

Maintenance activities on the turbines, equipment associated with the units, or common plant equipment can involve either one or both of the powerhouse turbines. When work requires only one unit to be taken offline, the turbine isolation valves are used to allow work to proceed on one unit while the other unit remains in operation.

When both units require simultaneous maintenance, the headgate is shut at the intake and all inflow is passed downstream using the spill gates. In either case, all or a portion of the reservoir inflow may be released into the irrigation canals depending on the season.

Annual maintenance typically occurs in the fall and each unit is taken offline sequentially. During this time the inflow is released through the other unit and/or into the irrigation canals or through the spill gates as needed.

1.1.4.2 IMPOUNDMENT DRAWDOWNS

Some maintenance activities, such as spill gate, penstock intake, or irrigation canal headgate work, require a partial or a more substantial drawdown of the reservoir. This is typically done outside of the irrigation and spring runoff periods. When a drawdown is necessary, the reservoir is drawn down slowly using the turbines while still providing any necessary irrigation canal flow (if during the irrigation season); then inflow is passed through the turbines or irrigation headgates to maintain the water level at the required elevation.

Drawdowns for planned maintenance are typically avoided during the irrigation and runoff periods. Maintenance activities that require a drawdown are scheduled to accommodate higher water levels during at least the initial fall waterfowl hunting season as much as feasible.

If the reservoir is drawn down too far during irrigations season, flow in the irrigation canals may fluctuate more than is acceptable to the irrigation company due to the increased sensitivity of the flow to fluctuations in the greatly reduced water level behind the irrigation canal headgates.

1.2 GENERATION AND OUTFLOW RECORDS

The Project has two units with a combined installed generating capacity of 30 megawatts (MW). As noted in Exhibit A, the average (over the most recent 30-year period, 1991 to 2020) annual generation is 75,052 megawatt hours (MWh). The monthly, 5-year, and 30-year average generation for the two periods (2016-2020 and 1991-2020, respectively) is provided in Table 1-2. Generation data for the same five-year time period is presented in Table 1-3.

TABLE 1-2 MONTHLY 5-YEAR AND 30-YEAR AVERAGE GENERATION (MWHs)

MONTH	2016	2017	2018	2019	2020	5-YEAR AVERAGE (2016-2020)	30-YEAR AVERAGE (1991-2020)
January	3,864	8,312	12,657	4,872	8,390	7,619	6,672
February	6,071	15,672	11,386	6,940	8,627	9,739	6,767
March	9,882	22,071	14,377	10,158	16,169	14,531	10,835
April	15,520	21,140	14,270	17,864	11,416	16,042	11,944
May	11,307	21,777	7,852	16,888	7,174	13,000	10,484
June	2,185	13,759	167	11,381	3,987	6,296	7,640
July	(463)	2,287	(514)	(276)	1,252	457	1,453
August	(503)	1,972	(273)	616	142	391	998
September	1,245	5,172	(499)	1,995	670	1,717	1,836
October	3,221	8,757	2,153	6,283	2,050	4,493	4,190
November	4,682	14,405	3,719	5,179	3,803	6,358	5,842
December	7,210	12,285	4,465	8,286	4,734	7,396	6,388
ANNUAL	64,221	147,609^a	69,760	90,186	68,414	88,038	75,052

^a 2017 was an extremely high flow year, created by record high flows originating upstream of Bear Lake.

Source: PacifiCorp 2021

TABLE 1-3 GENERATION DATA FOR THE CUTLER PROJECT DURING THE 5-YEAR PERIOD 2016-2020

MONTH	GENERATION (MWH)	DISCHARGE (CFS)
January	7,619	1,337
February	9,739	2,112
March	14,531	2,587
April	16,042	3,119
May	13,000	2,363
June	6,296	1,224
July	457	227
August	391	218
September	1,717	429
October	4,493	874
November	6,358	1,198
December	7,396	1,276
Annual	88,038	1,409

Source: PacifiCorp 2021

1.3 PROPOSED PROJECT OPERATIONS

PacifiCorp’s current Project operating elevation² ranges are outlined in Table 1-1. For the new license term, PacifiCorp proposes to maintain the same upper operating limit elevation on the reservoir, with a modest expansion to the tolerance. PacifiCorp also proposes expanding the range of the lower operating limit outside the irrigation season, both to increase operational flexibility, and because recent data have shown that reservoir constraints are difficult to maintain during high runoff events such as summer rain and spring runoff (ironically, high water frequently results in elevation readings below the operating limits as the reservoir elevation must be lowered at Cutler Dam, the compliance point, in order to help move high flows through the system). As outlined in the Pre-Application Document, PacifiCorp is seeking operational flexibility within the proposed additional range to support variable (e.g., wind and solar) energy generation needs. PacifiCorp’s proposed operations in the new license would mimic the existing operational range (Table 1-1) from elevation 4,407.5 to 4,406.5 feet at least 85 percent of the time (‘normal’ operations, occurring a minimum of 310 days per year, including the irrigation season) with a tolerance limit of +/-0.5 feet (primarily to accommodate high water events and

² Elevations reported herein are as measured at Cutler Dam (unless otherwise specified), and refer to National Geodetic Vertical Datum of 1929, or NGVD29.

occasional unforecast irrigation variation), and allow a wider operating range from elevation 4,406.5 to 4,405.0 feet up to 15 percent of the time (‘extended’ range operations, up to 55 days per year, outside of the irrigation season and not during high flows) as determined by daily average adjusted elevations at Cutler Dam (Table 1-4). These values (4,407.5 to 4,406.5 feet, at least 85 percent of the time, and 4,407.5 to 4,405.0 feet, up to 15 percent of the time) represent the range PacifiCorp is proposing, for purposes of managing potentially increased daily, weekly, and seasonal reservoir elevation fluctuations to better support variable energy generation needs. The slight expansion in tolerance range is proposed to decrease the number of required operation deviation reports to agency staff, particularly for those events that are relatively small in magnitude, short in duration, and caused by uncontrollable (e.g., weather, or subsequent unforecast changes to irrigation diversion flows) events, rather than due to licensee error.

TABLE 1-4 PROPOSED RESERVOIR ELEVATION OPERATION RANGE

RANGE TYPE	OPERATING RANGE* (ELEVATION IN FEET)	TOLERANCE (FEET)	PERCENT TIME WITHIN TOLERANCE	PERCENTAGE OF CALENDAR DAYS FOR RANGE TYPE
Normal	4,407.5 – 4,406.5	(+0.5 @ 4,408.0)	95%	At least 85% (~310 days)
Extended	4,406.5 – 4,405.0	(-0.5 @ 4,404.5)	95%	15% (~55 days) or less

*Quantified by daily average adjusted reservoir elevations at Cutler Dam.

Source: PacifiCorp 2021

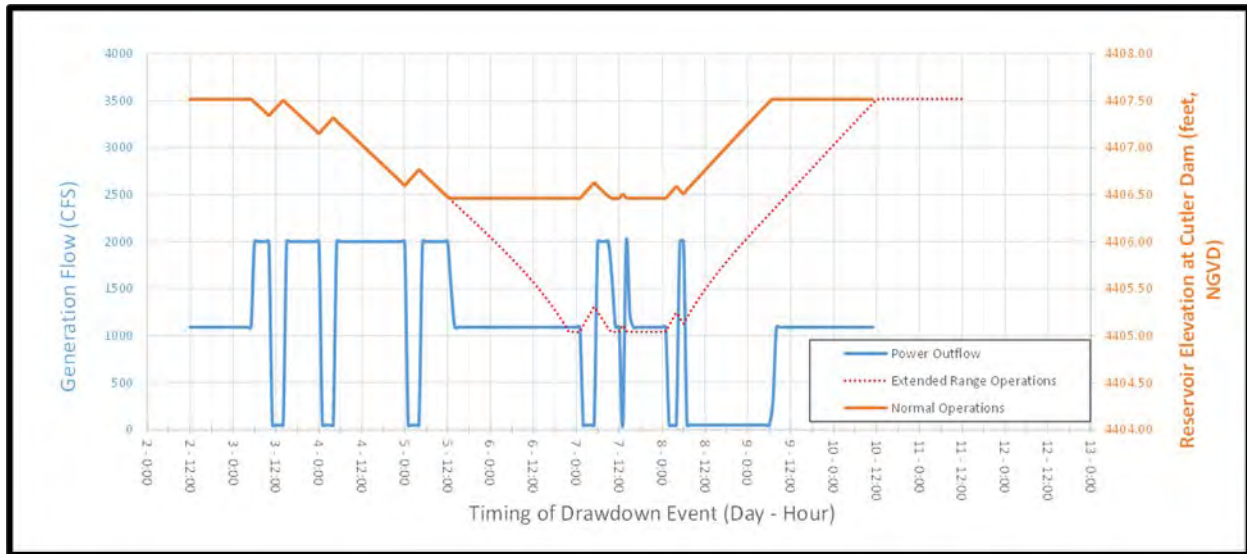
For the narrower 4,406.5- to 4,407.5-foot normal range (proposed for at least 85 percent of the time), a tolerance limit of +/-0.5 feet is proposed to avoid nuisance exceedances observed during the current license period. Generally, FERC has allowed temporary exceedances for these events, occurring as a result of weather or other conditions outside the control of PacifiCorp. This proposal adopts the FERC position already established. Note that during the irrigation season, generally April 15 to October 31, no operational changes to the reservoir limits are proposed.

Increasing the operating range would not increase the volume of water available for energy generation. The removal of Wheelon Dam is no longer being contemplated as the studies demonstrated that Wheelon Dam removal would not change the distribution pattern of sediment deposition, and thus storage volume available, in the reservoir in any meaningful way.

PacifiCorp has identified a seasonal operational range that would allow the Project to be responsive to the short-term generation demands and load changes that have resulted from grid integration of solar and wind generation resources and the challenges of the Energy Imbalance Market (EIM). This will allow the Project to continue to meet daily high electricity demands and use the wider extended operating range (potentially extending down to elevation 4,405.0 feet) over approximately 10-day-long cycles (Figure 1-2), as well as for spinning reserve, which is to optimize for emergency backup reserves which do not effect daily generation or flows, except for the occasional (approximately yearly) event when emergency backup is needed, and the outflow is increased to allow for maximum power generation (30 MW) for typically 2 hours maximum, which has essentially no reservoir impact due to the relatively small volume released.

Figure 1-2 illustrates the typical normal and extended range (i.e., at least 85 percent of the time, 1.5-foot range, and up to 15 percent of the time, 2.5-foot range) operation scenarios. In this example the total inflow into Cutler reservoir is 1,090 cfs, which represents a typical winter flow. The blue line represents the generation flow through Cutler, and the solid orange line and dotted red line show the reservoir elevation during the normal operating and extended operating ranges, respectively. Customer demand forecasts typically guide when stored water would be used for generation. When energy demand is low and/or there is a surplus of energy across grid resources, water is stored (first part of the week), and then when demand becomes high, stored water is then used for generation (second half of the week).

In practice, the economics are rarely this clear, so this pattern is anticipated to be fairly rare (i.e., less than 15 percent of the time, and never during irrigation season, high water flows, or extreme winter ice temperatures). However, when conditions are ideal and when variable operations are possible, the operation elevation range in Table 1-4 would allow the type of operation shown in Figure 1-2 roughly half of the time. This is calculated by determining the fraction of the time the reservoir level would be below elevation 4,406.5 feet, which is approximately 50 percent of the time. Because this mode of operations depends on being able to generate the reservoir down in elevation and then decrease the power flows periodically to refill, the benefits begin to diminish as inflows approach hydraulic capacity, generally starting at around 2,500 cfs, and are eliminated completely as the inflows approach 3,600 cfs, the maximum generation flow for the Project.



Source: Kleinschmidt 2021

FIGURE 1-2 ILLUSTRATION OF TYPICAL 10-DAY PERIOD UNDER EXISTING (SAME AS NORMAL) AND PROPOSED EXTENDED RANGE OPERATION SCENARIOS

In summary, PacifiCorp proposes to keep the same operating range the majority (at least 85 percent) of the time, modify the allowable reservoir elevation range seasonally, modestly increase the tolerance range, and define a target percentage for the length of time in each range type, allowing up to 15 percent of the calendar days within the extended operating range (below 4,406.5 feet, down to 4,405.0 feet), except during the irrigation season and as further detailed below. Elevations are expected to stay within the tolerance zone 95 percent of the time in both normal and extended conditions, with exceptions due to high runoff and unexpected irrigation fluctuations.

The increased (from +/- 0.25 feet to +/-0.5 feet) target for tolerance range will assist in irrigation operations but may also help respond to generation fluctuations during other portions of the year. It will also be useful during high runoff when reservoir sloping creates unusually high reservoir levels in the southern portion of the reservoir, when due to the sloping effect described previously, reservoir levels at Cutler Dam are frequently lower than the lower compliance limit.

As noted above, it is not possible to operate in the extended range during the irrigation season nor when inflows approach and exceed hydraulic capacity, such as during normal-to-high spring runoff years. This is for two reasons: the bathymetry forces the water level higher as flows increase, and there is no room for decreases in power flows when inflows are above hydraulic

capacity. Therefore, the extended range would typically only be utilized during the November-to-March time period and would further exclude periods of extreme low temperature (typically sometime between November and mid-February) if downstream ice-damming concerns are present. Note however, that the proposed operations are intended to be defined by river conditions (primarily flow, including irrigation delivery contract requirements and air temperature), and not by calendar dates.

A Project Operations Compliance Management Plan (OCMP) will be filed with FERC after the issuance of a new license as discussed in Exhibit E.

1.4 ANNUAL PLANT FACTOR

The average annual plant factor is determined using the following equation:

$$\frac{\text{Average Annual Output}}{\text{License Capacity} \times 8,760 \text{ hrs./year}} = \text{Average Annual Plant Factor}$$

EQUATION 1-1 AVERAGE ANNUAL PLANT FACTOR

The Project currently has a gross average annual energy production of approximately 75,052 MWh per year (over a 30-year period of record, 1991 to 2020) and an annual plant factor of approximately 27.6 percent based on its current capacity of 30 MW.

2.0 DEPENDABLE CAPACITY AND AVERAGE ANNUAL ENERGY PRODUCTION

As required in 18 CFR § 4.51(c)(2), the following section describes Project resource utilization, including recorded minimum, mean, and maximum flows, monthly flow duration curves, and plant minimum and maximum capacity.

2.1 PROJECT HYDROLOGY

Monthly minimum, mean, and maximum river flows measured at the USGS Collinston gage over a 30-year record of flow (1991 to 2020) are outlined below in Table 2-1.

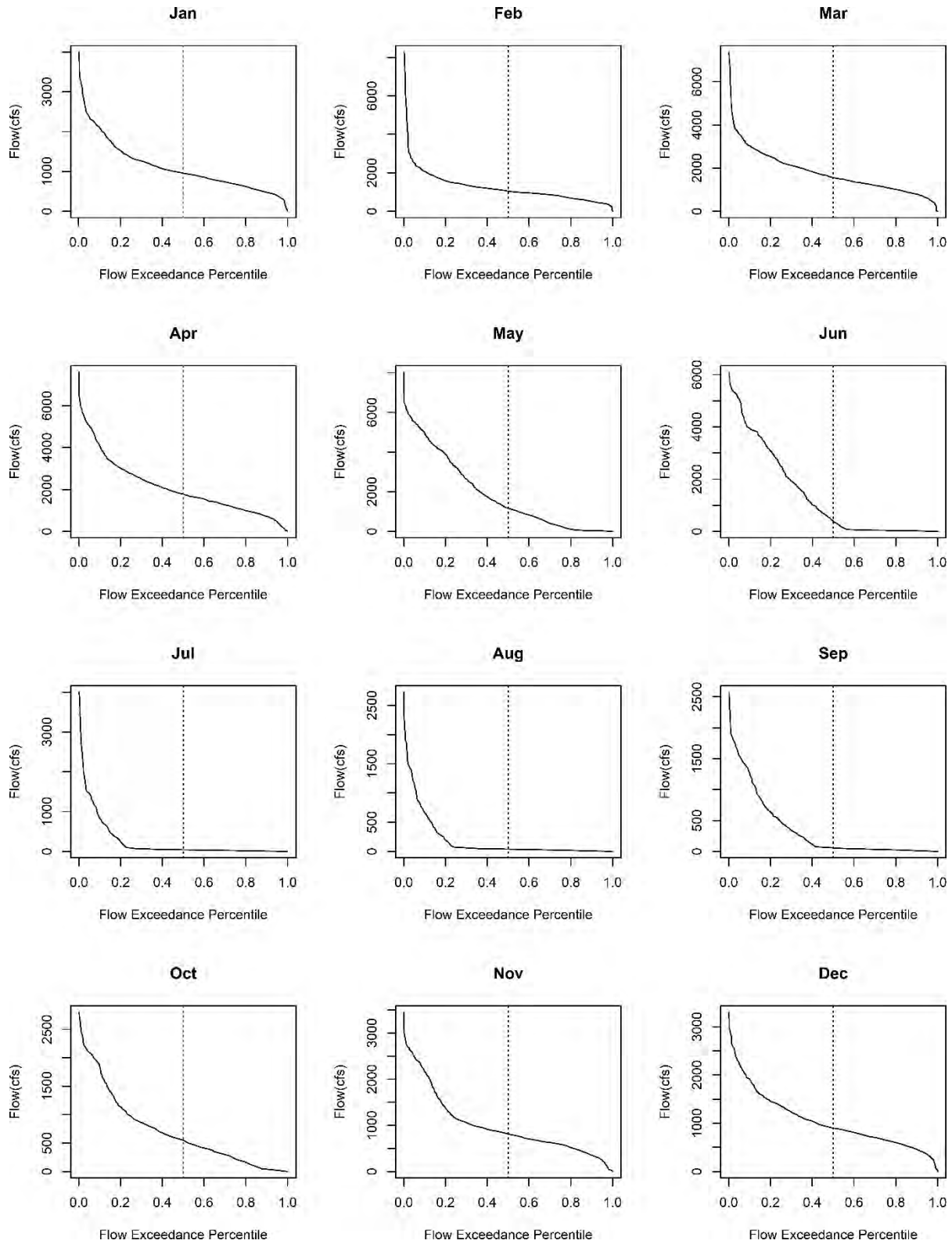
TABLE 2-1 FLOW (CFS) STATISTICS MEASURED AT COLLINSTON GAGE (1991-2020)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MINIMUM	45	47	18	27	23	22	14	9	3	11	9	33
MEAN	1,143	1,299	1,831	2,167	2,025	1,455	272	208	372	766	1,033	1,088
MAXIMUM	4,022	8,280	7,389	7,615	8,046	5,950	3,950	2,740	2,590	2,817	3,461	3,301

Source: PacifiCorp 2021

2.1.1 FLOW DURATION CURVES

Monthly flow duration curves for the Project are shown in Figure 2-1. The period of record for these graphs is October 1, 1991 to September 30, 2020, 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. Due to lack of water during the hotter, drier portions of the irrigation season (as noted previously, all water in the system is allocated for irrigators, per their water rights and contracts), 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.



Source: Kleinschmidt 2021

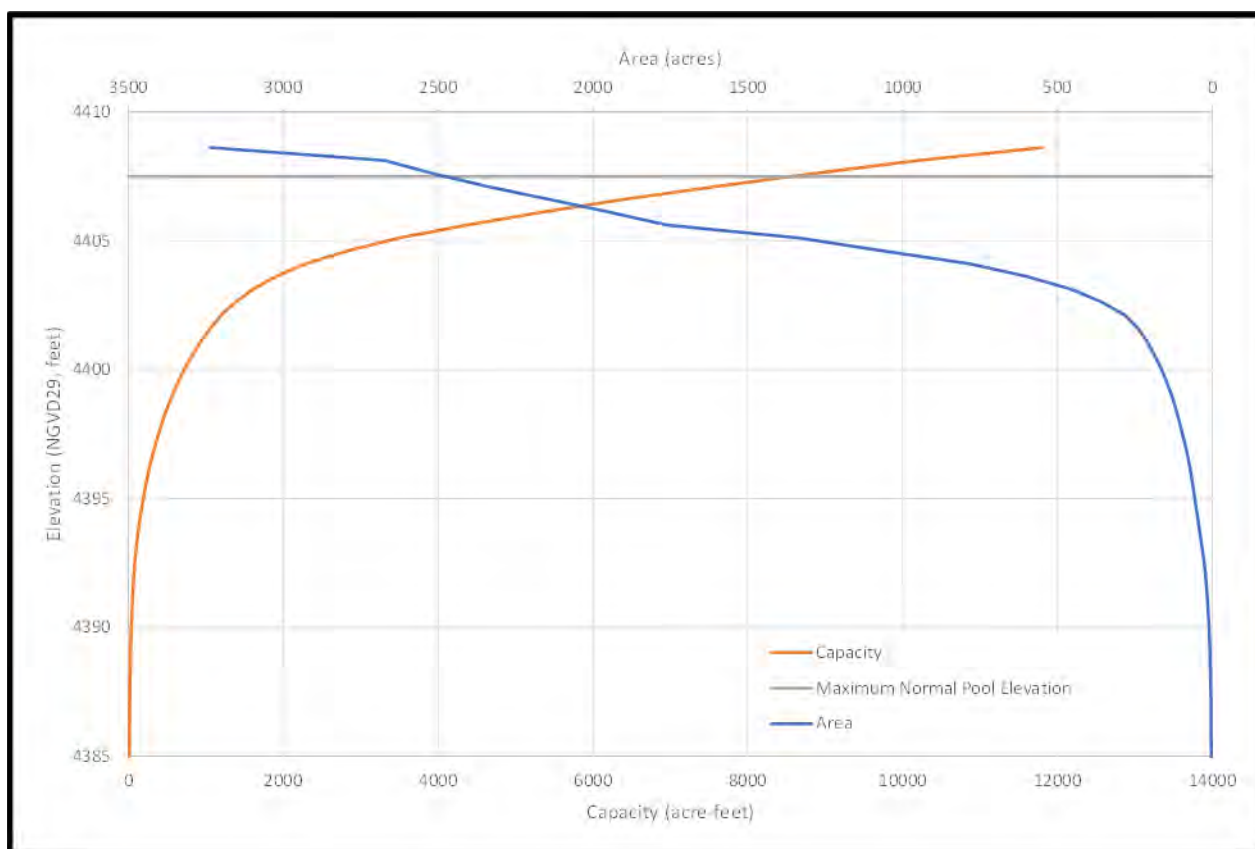
FIGURE 2-1 MONTHLY FLOW DURATION CURVES

2.2 CRITICAL STREAMFLOW FOR DEPENDABLE CAPACITY

Although the Project is almost always offline in July and August due to irrigation withdrawals, the dependable capacity of Cutler is 30 MW. As noted previously, PacifiCorp typically does not 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 upstream of Cutler Dam. During these months, the critical flow is only 33 cfs, which is essentially leakage through the dam. The 1994 License Application Exhibits considered the hydrologic availability and discounted reliance on the Project during low-flow periods and concluded the dependable capacity was 30 MW. FERC does not define dependable capacity, therefore the Project's ability to meet a defined load requirement with consideration of adverse conditions was the criteria used to determine dependable capacity. The critical month method to determine dependable capacity, which is generally reserved for base-load plants, is more of a firm energy approach, and does not apply to this Project.

2.3 AREA-CAPACITY AND RULE CURVE

The gross storage for the Project at the maximum normal pool elevation of 4,407.5 feet NGVD29 is approximately 8,563 acre-feet, with a corresponding surface area of 2,476 acres. The portion of the reservoir extending south from the confluence of the Bear River to the confluences with the Logan, Little Bear, and Spring Creek tributaries is relatively shallow, and is dominated by areas of emergent marsh vegetation islands. Much of this area was eliminated from the most recent calculations of reservoir storage and area due to their shallow, widespread character. Therefore, the usable storage capacity (the storage accessible to flowline intake structure) is equal to the gross storage capacity. The area capacity curves are illustrated in Figure 2-2.



Source: Kleinschmidt 2021

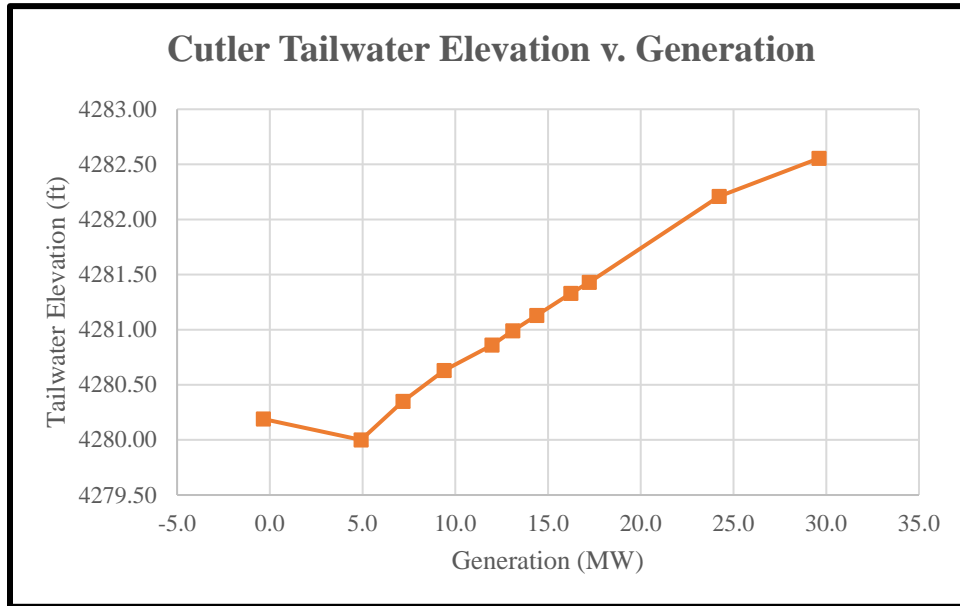
FIGURE 2-2 AREA-CAPACITY CURVES

2.4 ESTIMATED HYDRAULIC CAPACITY

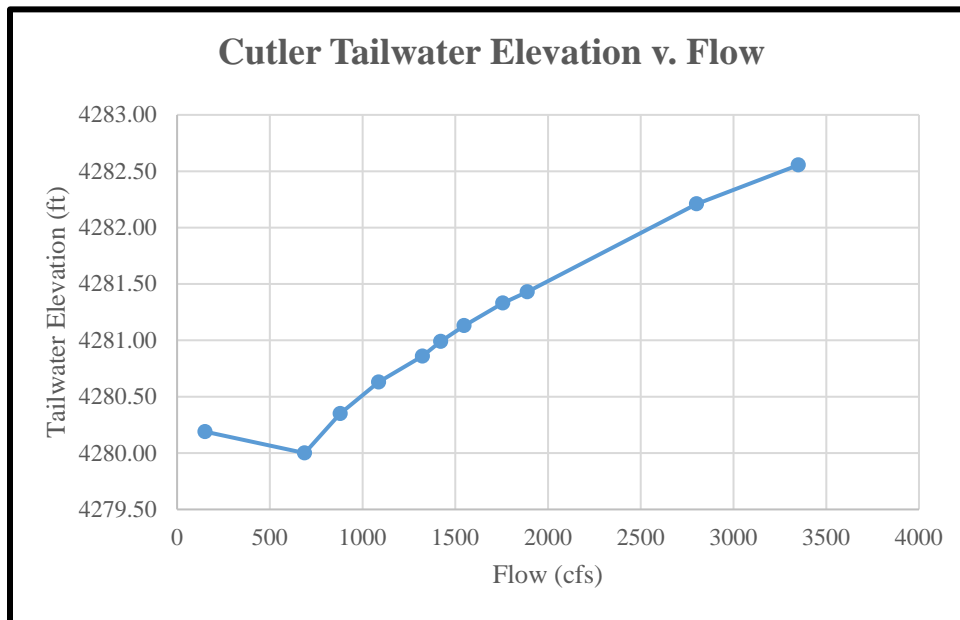
Due to previous Cutler powerhouse equipment upgrades, the efficiency of the Project has increased, which reduced the previous maximum outflow from 3,900 cfs needed to produce 30 MW down to 3,600 cfs for the same energy production of 30 MW. In other words, the Project now requires less water (3,600 cfs) to produce the same amount of MW as before. The Project is also transmission-limited to 30MW. There is no minimum required flow for unit operation; any amount of flow can be used to generate power.

2.5 TAILWATER RATING CURVE

The normal tailwater elevation at the Project is 4,280.0 feet NGVD29. Figure 2-3 and Figure 2-4 illustrate the tailwater rating curve for the Project by generation and by flow.



Source: PacifiCorp 2021

FIGURE 2-3 TAILWATER RATING CURVE BY GENERATION

Source: PacifiCorp 2021

FIGURE 2-4 TAILWATER RATING CURVE BY FLOW

2.6 POWERPLANT CAPABILITY VS. HEAD CURVE

The Project's minimum, normal, and maximum head are shown in Table 2-2.

TABLE 2-2 MINIMUM, NORMAL, AND MAXIMUM HEAD

PARAMETER	VALUE (FT)
Minimum headwater (ft, NGVD29)	4,386.2
Normal headwater (ft, NGVD29)	4,407.5
Maximum headwater (ft, NGVD29)	4,408.3
Normal tailwater (ft, NGVD29)	4,280.0
Minimum gross head (ft)	106.2
Normal gross head (ft)	127.5
Maximum gross head (ft)	128.3

Source: PacifiCorp 2021

3.0 USE OF PROJECT POWER

PacifiCorp serves 2 million retail customers, representing residential, commercial, and industrial sectors, including 1,233,000 retail customers in Utah, Idaho, and Wyoming as Rocky Mountain Power, and an additional 816,000 in Washington, Oregon, and California as Pacific Power. In 2020, the combined load requirements were approximately 60,000,000 MWh.

Power generated at the Project is used to serve PacifiCorp loads in the PacifiCorp East Balancing Area Authority with possible use within the Western EIM administered by the California Independent System Operator (CAISO). The CAISO runs the EIM, dispatches generation resources, and financially settles the real-time market, including generation and load.

4.0 PLANS FOR FUTURE DEVELOPMENT

There are no new proposed facilities planned to increase the generator capacity of the Project, or any new developments proposed within the Cutler Project Boundary.

Expanded upon further in Exhibit C (Section 2.0 and Table 2-1), PacifiCorp plans to make large capital improvements of like-for-like replacement of the spillway gates and flowline supports (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 to the proposed Project operations. Additionally, components may be installed to effect EIM capabilities where these EIM components may result in short-term changes in the proposed Project operations.

PacifiCorp proposes no changes to the existing transmission system of the Project. The transmission system is further described in Exhibit A.

5.0 REFERENCES

Federal Energy Regulatory Commission (FERC). 2002. Order Modifying and Approving Project Operation Plan Per Article 401. Issued April 30, 2002.

Kleinschmidt Associates (Kleinschmidt). 2021. Tables and data produced by Kleinschmidt Associates using PacifiCorp data from Connely Baldwin.

PacifiCorp. 2021. Tables and data provided by Connely Baldwin. Senior Water Resources Engineer. PacifiCorp.

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FINAL LICENSE APPLICATION

EXHIBIT C

CONSTRUCTION HISTORY

CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)**

**FINAL LICENSE APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT C
CONSTRUCTION HISTORY**

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1.0 CONSTRUCTION HISTORY

Under 18 CFR § 4.51(d), this section describes a history of construction and commercial operation, and any proposed construction for the Cutler Hydroelectric Project (Project).

1.1 COMMENCEMENT AND COMPLETION OF CONSTRUCTION

As outlined in 18 CFR § 4.51(d)(1)(i), this section describes the construction of the Project from commencement to completion. The construction of the Project began with the construction of the Hammond Canal (also known as the East Canal) and the West Canal to provide irrigation water to the dry bench and valley lands of the Bear River Valley (SWCA 2020). The larger West Canal serves those bench and valley lands west of the Bear River (as the river turns and runs south along an essentially north-south axis downstream of Cutler Canyon), while the Hammond Canal serves the lands located south of Cutler Canyon on the east bench. Prior to the construction of the Cutler Project, the original diversion dam, called Wheelon Dam, was constructed at the Cache Divide, located in Cutler Canyon just downstream of the point where the Bear River leaves Cache Valley. The Wheelon Dam, which was started in 1889 and completed in 1890, would serve to divert water into the Hammond and West canals initially (SWCA 2020). Construction of the canals began the same year as the dam (1889) but was not completed until 1907. Almost immediately after completion of the canals, controversy erupted over water rights and actual-versus-promised water distributions to farmers whose land was served by the canals (*Box Elder News Journal* 1915). Such controversy continued for many years.

In 1924, in the wake of having successfully completed several hydroelectric plants along the Bear River in southern Idaho, the Utah Power & Light Company (UP&L) started planning a new hydroelectric development along the river to expand the company's power supply and reach additional customers, particularly those on the Wasatch Front. This new development would become the Cutler Hydroelectric Project. In November 1924, UP&L announced they were prepared to begin construction of the Project as soon as the Utah State Engineer granted the permit to use the water from the Bear River (*Box Elder News Journal* 1924). Among the "selling points" for the Project was that the reservoir created by the new dam could impound flood waters and other excess waters not being put to use at the time (1924). Despite UP&L's readiness to commence construction in late 1924, actual construction of the Project did not commence until

March 1925, roughly two months after UP&L received the final certificate of “convenience and necessity” for the Project from the Public Utilities Commission of Utah (*Box Elder News Journal* 1925a). Construction was well underway by early April 1925 with most of the work in the first six months focused on preparatory efforts of establishing the construction camp, the compressed air and hydraulic pump stations necessary to run the excavation equipment, and access roads to work sites (*Box Elder News Journal* 1925b). Construction continued through 1926 with more than 600 workers employed in the effort at various times. The Project was completed in 1927, and the original Wheelon Dam was submerged under the new reservoir (NPS 1989). It originally consisted of a concrete gravity arch dam founded on bedrock, a power intake structure, a flowline, a surge tank, two penstocks, and a powerhouse. Original construction of the concrete gravity arch dam included two non-overflow sections located on the right and left sides of the dam, a centrally located spillway section, and irrigation canal intake structures on the river right (West) and river left (Hammond/East) abutments of the dam.

Historical records indicate the Project operated without major new construction or notable public controversy throughout the remainder of the historic period. Little is stated about the Project in newspapers of the period save for a few articles written between 1941 and 1945, when a study was undertaken to potentially raise the height of the dam by 10 feet as part of a government-backed post-war “stimulus” project to employ returning soldiers and increase the agricultural water storage capacity of Cutler Reservoir. The proposed increase in the dam’s height was never undertaken. Another series of articles in 1942 noted an emergency repair effort was underway when “three 130,000-volt electric transmission lines” associated with the Project snapped due to freezing fog during a late-December cold snap (*Salt Lake Telegram* 1942). A series of historic photos is presented in Attachment C-1. The National Register of Historic Places Registration Form for the Cutler Hydroelectric Power Plant Historic District is presented in Attachment C-2. Historic news article clippings related to the Project are presented in Attachment C-3.

1.2 COMMENCEMENT OF COMMERCIAL OPERATION

The Cutler Dam was placed in commercial operation in January 1927 by UP&L (NPS 1989).

1.3 MODIFICATION OR ADDITIONS TO THE EXISTING PROJECT

As required by 18 CFR § 4.51(d)(1)(iii), Table 1-1 outlines a chronological history of any additions or modifications made to the Project (STID 2021).

TABLE 1-1 CHRONOLOGICAL HISTORY OF MODIFICATIONS TO CUTLER PROJECT

DATE	EVENT
1925–1927	Original Cutler Hydroelectric Project designed and constructed, and Wheelon Dam (predecessor project dam) submerged
1950–1960 (approximate)	Flowline walkway removed
1985	Concrete wall constructed to replace a section of the gabion wall located immediately downstream of the spillway apron that was washed out during high flows in the early 1980s
1985–1986	Original DC exciters for No. 1 unit in powerhouse removed, new exciters installed on top of both units (Unit 1 – 1985; Unit 2 – 1986)
1985	Replaced portion of gabion wall with concrete wall downstream from the spillway along the left side of the spillway chute.
1986	Replaced entire gabion wall and concrete wall (which washed out during February 1986 high flow event) with a counterfort wall downstream from the spillway along the left side of the spillway chute
1986	Original windows in concrete section of west elevation of powerhouse replaced
1987	Switchyard shed destroyed by fire
1987–1989 (approximate)	Switchrack increased in size by one-third
1989	High and low reservoir level alarms installed at the concrete gravity arch dam
1990–1991	Spillway pier reconstruction and rehabilitation of spillway Tainter gates
1991	Chemical grouts injected under high pressure from upstream face of dam to seal leaking joints
1994	Exterior of flowline, surge tank, and penstocks repainted
2000	New roof installed on powerhouse
2007	Runner replacement for Unit No. 2 completed
2008	Runner replacement for Unit No. 1 completed
2011	Portions of the flowline exterior removed and replaced
2011	Modifications made to the manual gear drive assembly bracket on the spillway gate hoist
2011	Additional riprap placed on right side of spillway channel immediately downstream of the dam and along the flowline to protect the flowline from high flows and prevent erosion along the concrete saddles

DATE	EVENT
2013–2014	Rehabilitation of the four spillway Tainter gates to repair structural deterioration and damage
2014	Reapplication of corrosion protection (coatings) to the spillway gates and replacement of the gate bottom seals
2014	Portions of flowline exterior coating removed and replaced
2017	Portions of the flowline exterior coating removed and replaced
2017	Tainter gate lifting hoist (mule) upgraded with new variable frequency drive mule
2019	Rehabilitation of right tailrace wall to repair and protect against erosion
2019	Bubbler system installed on upstream face of dam to prevent ice buildup on upstream face of gates
2020	Spillway apron left gabion basket training wall replacement to protect against erosion during spilling
2020	Portions of flowline exterior coating removed and replaced
2020	Headgate backup power unit installed on the dam bridge deck
2021	Portions of flowline exterior coating removed and replaced
2022*	Surge tank exterior shell anchor upgrades
2023*	Surge tank exterior shell replacement

Note: *To be completed during current license term.

2.0 SCHEDULE OF PROPOSED WORK

Per 18 CFR § 4.51(d)(2), this section discusses any new development proposed, and the schedule for any such work. PacifiCorp is not proposing any new development (e.g., additional generating units) at the Project in this application for a new license. However, PacifiCorp plans to make large capital improvements to improve the safety, reliability, and longevity of the Project, as shown in Table 2-1. Table 2-1 includes major items such as replacement of the spillway gates (with gates that are similar to the existing in form and function) and flowline supports once the Project has obtained a new license. PacifiCorp is currently in the engineering and construction phase of seismic upgrades to the surge tank (included above as this upgrade will be completed during the current license term), which will include new foundation anchors and a visually similar replacement of the exterior shell. Further, PacifiCorp plans to install a new river-right 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 would not result in changes to the proposed Project operation. Additionally, components such as dedicated lifting hoists to enable remote Project operation may be installed to improve EIM capabilities. A number of other component capital upgrades are also listed in Table 2-1. These capital improvements would not result in changes to the proposed Project operations. PacifiCorp proposes no changes to the existing transmission system of the Project.

TABLE 2-1 PROPOSED CAPITAL IMPROVEMENTS PROJECT AND PROPOSED SCHEDULE

PROPOSED CAPITAL IMPROVEMENT PROJECT	PROPOSED COMPLETION DATE
Flowline / Headgate / Surge Tank / Spillway Coating	Ongoing During Current License Period
Bridge Coating or Replacement (3 Bridges)	
Sewer, Water, and Driving Surface Improvements	
Plant Generation Equipment Rehabilitation	
Dedicated Lifting Hoists	2025
Cottage (3 Cottages) and Carport Removal and New Shop/Storage Building	2027
Replace Turbine Isolation Valves	2027
Hydrologic and Seismic Dam Upgrades	2027
Flowline Support Upgrades	2028
Bypass Channel Right Retaining Wall and Access	2028
Cutler Spillway Gates Replacement	2029
Local Distribution Powerline to Dam Replacement	2030
Plant Bridge Crane Upgrades / Replacement	2038

PROPOSED CAPITAL IMPROVEMENT PROJECT	PROPOSED COMPLETION DATE
Intake Screen Replacements	2040
Plant Interior/Exterior Improvements (Roof / Windows / Brick Work)	2040
Plant Transformer Replacement	2044
Canal / Flume Improvements	2044

3.0 REFERENCES

- Box Elder News Journal*. 1915. “The Water Supply in Bear River.” November 25, Brigham City.
- _____. 1924. “Power Company to Build Plant.” November 25, Brigham City.
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- PacifiCorp. 2021. Supporting Technical Information Document. CEII Protected.

ATTACHMENT C-1
HISTORIC PHOTO SERIES



Source: USU 2007

PHOTO 3-1 CUTLER DAM CONSTRUCTION IN BEAR RIVER CANYON, UTAH, 1925-1927



PHOTO 3-2 FLOWLINE CONSTRUCTION IN BEAR RIVER CANYON, UTAH, 1925-1927

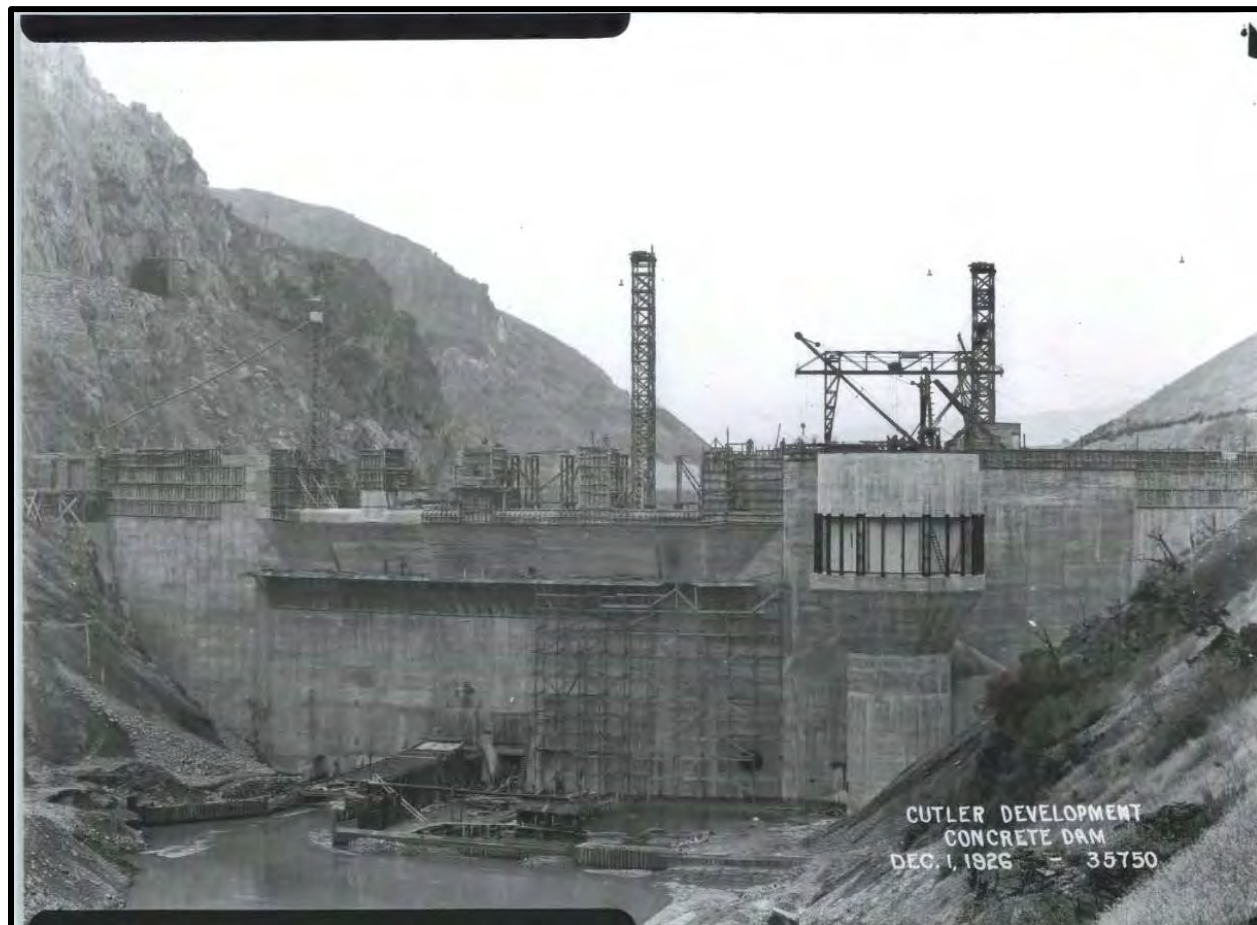


PHOTO 3-3 CUTLER DAM UNDER CONSTRUCTION DEC. 1, 1926

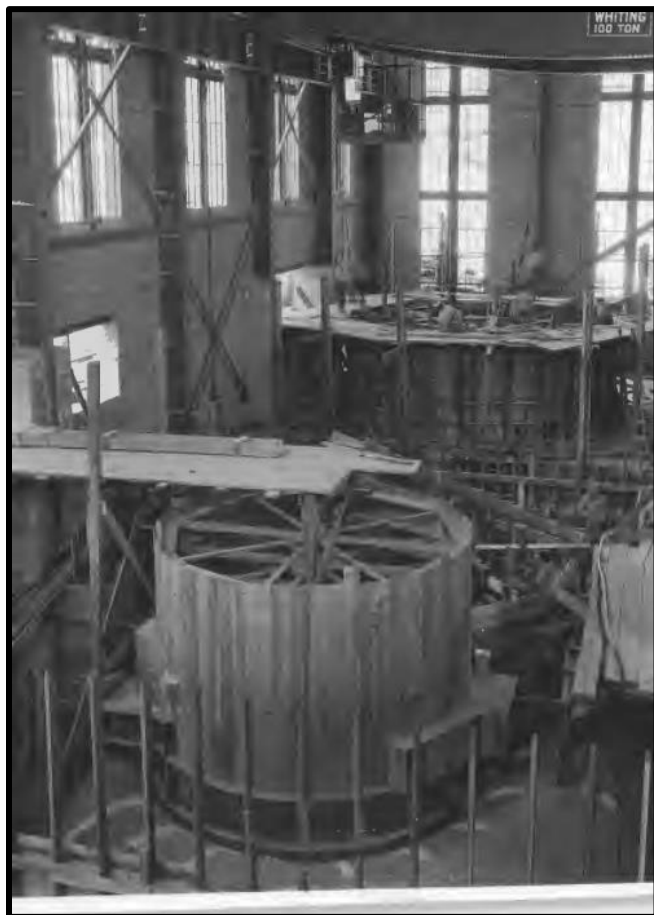


PHOTO 3-4 CUTLER POWERHOUSE UNDER CONSTRUCTION

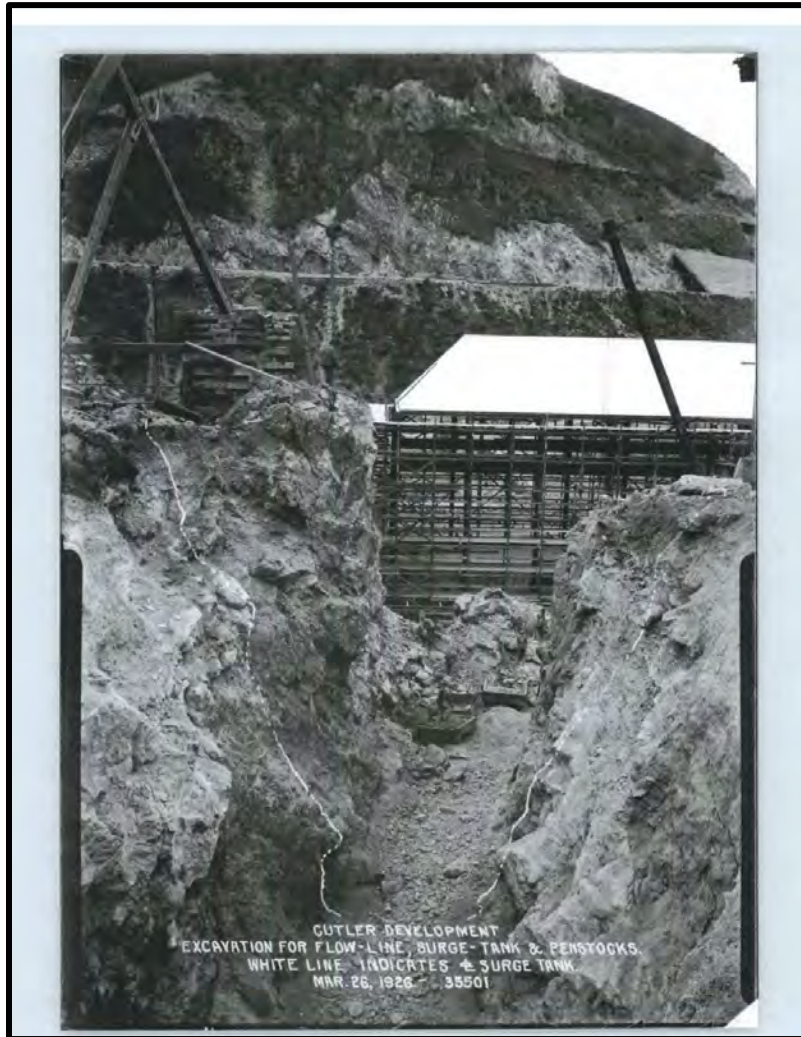
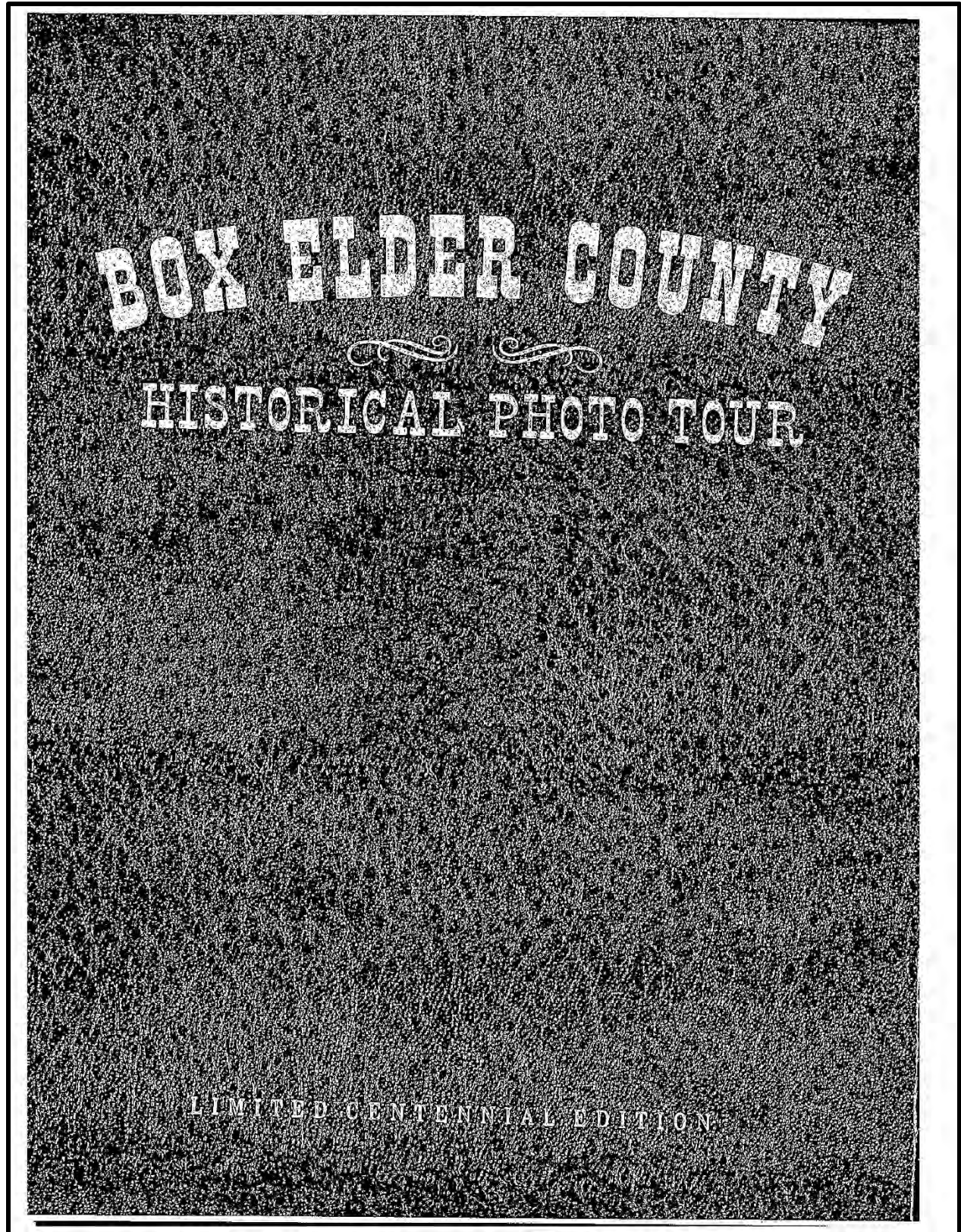


PHOTO 3-5 CUTLER EXCAVATION FOR PENSTOCK, MARCH 26, 1926



CUTLER POWER PLANT



Bird's-eye view of the Bear River Canyon, reservoir, dam, pipeline, surge tank, power plant, east and west canals, and the railroad. Newton, Utah, (top center) and Mollies Nipple (left). By 1927 the Utah Power & Light Company had built a new dam and power plant below the old Wheelon collapsible dam on the Bear River. This dam is 532 feet long at the top and 109 feet high.

Picture of the canyon taken in October 1977 when the water level behind the dam was lowered so Utah Power and Light Company could work on the dam gates. The canyon is slowly filling up with silt.

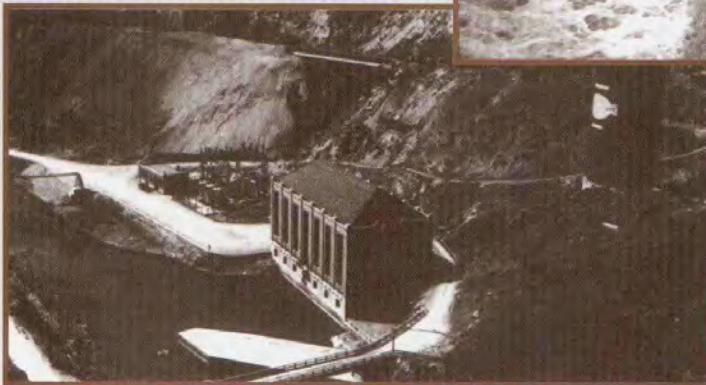


CUTLER POWER PLANT



Scene of Cutler Dam.

Taken in 1991. Exposed the old earth filled dam and Wheelons Collapsible Dam.



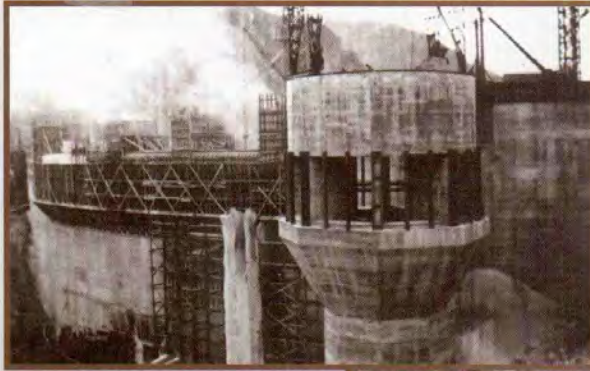
Cutler Power Plant.

Frame work of the Cutler Power Plant, temporary bridge is at lower left.



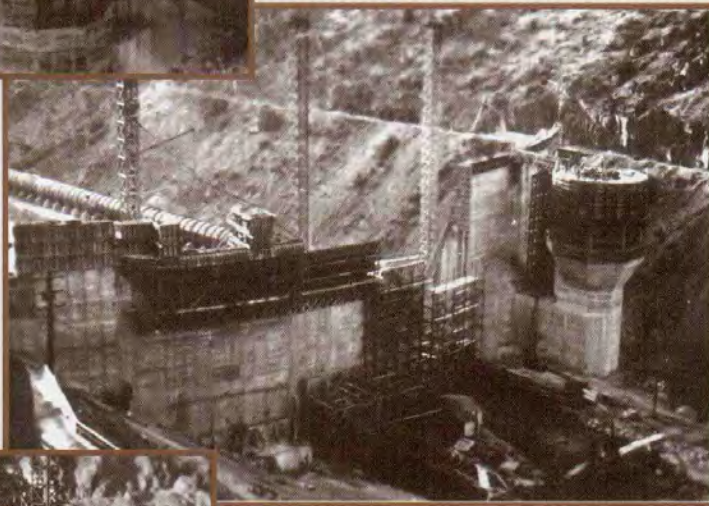
345

CUTLER POWER PLANT



Upstream side of dam starting to close in the center. Water intake for the power plant at right

Upper side of dam, three hoists are being used; dam is poured in sections.



Lower side of dam conveyer is used to transport the cement to the hoists. Water is still being flumed beneath the dam.

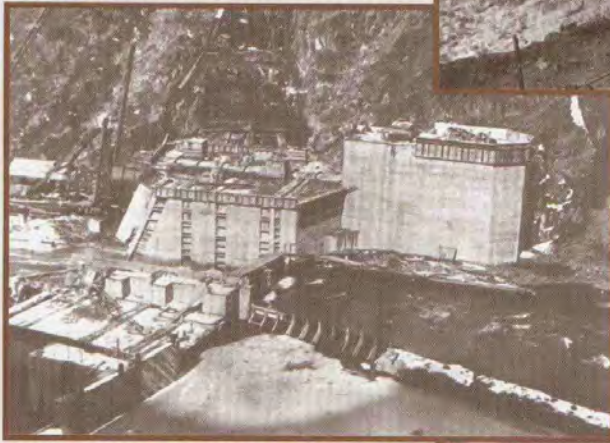


Two cement mixers are under the shed. Sand and gravel are brought in by rail and lowered through pipes to a landing below.



CUTLER POWER PLANT

Picture of Cutler Dam in its construction stages. Built by Utah Power & Light Company to impound the water for power and also for the Bear River Canal system.



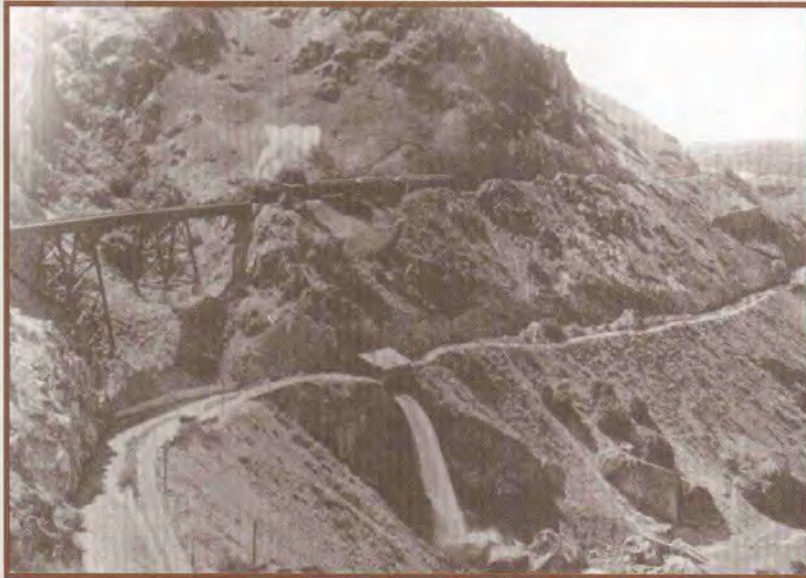
Top of picture shows the cavity that was blasted in the north wall of the canyon to key the dam to the mountain. The river is being flumed through the dam.

In January 1914 the power plant, water rights, dam and waterways to the Wheelon Plant, and transmission and distribution lines were purchased by the Utah Power & Light Company from Utah Idaho Sugar Company and the Utah Power and Railway Company. They built more transmission lines to Ogden and also started to serve other communities in the valley.



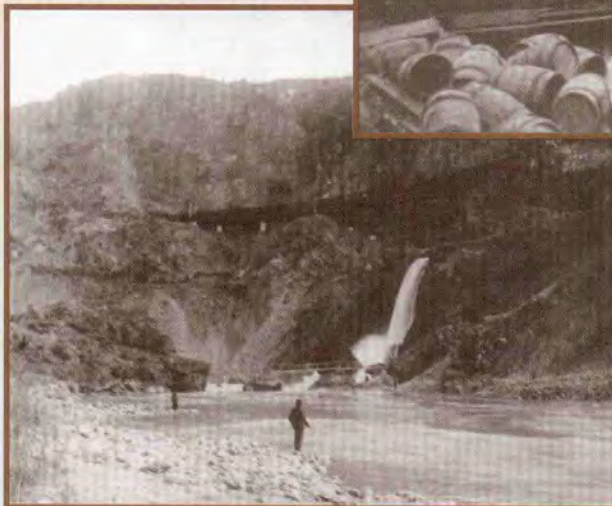
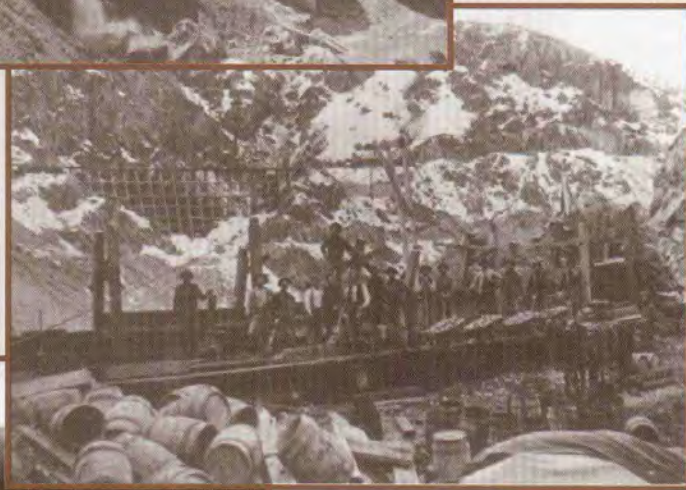
View showing the water line coming from the east side canal.

CUTLER POWER PLANT



Later picture of the lower tressel after it was changed or replaced with steel. Showing the east side of the canal and spillway.

Early picture of the lower tressel (west) on the railroad in the Bear River Canyon, also the East Side Canal and a crew of men working on the West Side Canal.



Water being spilled from the East Side Canal when not being used for power. Robert E. Sainsbury and Hyrum Sainsbury in the picture.

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CUTLER/WHEELON DAM



Wheelon Town - 1925-1927.

First addition - photo taken 1903 (July) - shows building and water supply line under construction. Water is brought from the west side canal. This is the first hydro-electric generating plant in the county; capacity of 2700 horse power, completed in time to deliver power to the sugar factory at Garland in 1903 when the factory cut its first beets in the fall of 1903. Cost was \$240,000.



Second addition - in 1904 the Wheelon Plants were added. The capacity was then increased to 3700 horse power. The foundation that shows in the river today is the foundation of this addition. Mollies Nipple in the back. Superintendents' and operators' houses and privies to the left. West side canal across the center. You can see to the right the flume they used to drain the east side canal. They probably were bringing water from the east side canal at this time also, "Note", the water supply line crossing the river. This is where the bridge is today.

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CUTLER/WHEELON DAM



Third addition - When the Wheelon Plant was increased to 5400 horse power in 1906. Note the supply pipe has a plant deck. It was also used as a bridge.



Fourth addition - making a total of about 950,000 horse power. Old boarding house in lower left corner.

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PHOTO 3-6 BOX ELDER COUNTY HISTORICAL PHOTO BOOK SERIES

ATTACHMENT C-2

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION 1989 FORM

280

NPS Form 10-900
(Rev. 8/86)
Utah Word Processor Format (02731)
(Approved 10/87)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

MAR 08 1989

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

NATIONAL
REGISTER

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries. Use letter quality printer in 12 pitch, using an 85 space line and a 10 space left margin. Use only 25% or greater cotton content bond paper.

1. Name of Property Cutler Hydroelectric Power Plant Historic District

historic name

other names/site number Cutler Plant, Cutler Dam

2. Location

street & number Utah State Highway 30

n/a not for publication

city, town Beaver Dam

x vicinity

state Utah

code UT

county Box Elder

code 003

zip code 84306

3. Classification

Ownership of Property	Category of Property	No. of Resources within Property	
		contributing	noncontributing
<u>x</u> private	<u> </u> building(s)		
<u> </u> public-local	<u>x</u> district	<u> 9 </u>	<u> </u> buildings
<u> </u> public-State	<u> </u> site	<u> </u>	<u> </u> sites
<u> </u> public-Federal	<u> </u> structure	<u> 10 </u>	<u> </u> structures
	<u> </u> object	<u> </u>	<u> </u> objects
		<u> 19 </u>	<u> </u> Total

Name of related multiple property listing:

Electric Power Plants of Utah

No. of contributing resources
previously listed in the
National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this x nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property x meets does not meet the National Register criteria. See continuation sheet.

Max F. E. 1.31.89
Signature of certifying official Date
UTAH STATE HISTORICAL SOCIETY
State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

✓ entered in the National Register. Bruce J. Noble, Jr. 4/20/89
 See continuation sheet
 determined eligible for the National Register. See continuation sheet
 determined not eligible for the National Register.
 removed from the National Register.
 other, (explain:)
for Signature of the Keeper Date

6. Functions or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
<u>Industry/Processing/Extraction:</u> <u>energy facility</u>	<u>Industry/Processing/Extraction:</u> <u>energy facility</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

7. Description

Architectural Classification

(enter categories from instructions)

Materials

(enter categories from instructions)

Art Deco (powerhouse & shop)

Bungalow & Craftsman (residences)

foundation concrete

walls brick, asbestos

roof copper

other n/a

Describe present and historic physical appearance.

(see continuation sheet)

x See continuation sheet

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Cutler Hydroelectric Plant
Historic District, vac. Beaver Dam,
Box Elder County.

Section number 7 Page 2

Built in 1927. Cutler hydroelectric station is located on the Bear River in north central Utah. The plant consists of a dam, conduit, surge tank, penstock, powerhouse, shop, operator's village, and ancillary structures. Since its construction, Cutler has sustained few alterations. Most notably, the operator's houses have been covered with new siding material. Overall, however, Cutler maintains integrity of location, setting, design, materials, workmanship, feeling, and association. Cutler is an outstanding example of a relatively large, low-head hydroelectric plant dating from the late 1920s.

General Setting

Cutler Station is located on the Bear River in northeastern Utah. The Bear originates in the Uinta Mountains of Utah and is about 350 miles long. From the Uintas, the river flows north into Wyoming, curves through Utah again before re-entering Wyoming, and then flows into southeastern Idaho. At Soda Springs, the Bear bends around the northern tip of the Wasatch mountains and heads toward the south, crossing into Utah again before emptying into the Great Salt Lake.

Cutler Station is actually part of a much larger system of hydroelectric power development and water conservation that is concentrated on the Bear River drainage. The facility is one of six hydroelectric plants on the Bear River (one of these is of recent construction), all operated by Utah Power and Light. UP&L's Bear River hydroelectric power system also encompasses Bear Lake, a large body of water about 20 miles long and 7 miles wide, located in northeastern Utah and southeastern Idaho. Although natural, Bear Lake today essentially serves as a reservoir for irrigation and hydroelectric power. Canals from upper Bear River allow spring runoff to be diverted into the lake and stored there. During the dry months, UP&L's Lifton Pumping Station pumps water from the lake back into the Bear River, thereby supplying hydroelectric plants and irrigation systems downstream.

The Cutler Power Plant itself is located approximately 15 miles west of Logan, Utah and 22 miles east of Tremonton, Utah. Access to the site is gained through a county road which leads north from state highway 30. Situated in the Bear River Canyon, the plant

(Rev. 8-86)

Utah Word Processor Format (02741)

Approved 10/87

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Cutler Hydroelectric Plant
Historic District, vac. Beaver Dam,
Box Elder County.

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lies in a steep and narrow gorge formed as the Bear River wends its way from the Cache Valley--about 2 miles east--through the Wasatch Mountains and into the Great Salt Lake, 25 miles west. Here, the Cutler Reservoir retains water for hydroelectric generation. Grass-covered slopes rise sharply from the Bear River. Cut into the southern hillside is the bed and track for the Union Pacific Railroad and below it the East Canal bringing irrigation water from Cutler Reservoir. The West Canal contours the opposite bank of the river above the operators' camp.

The county road which leads to the plant site descends into the canyon, crosses the river directly behind the powerhouse and shop and then continues for about 900 feet to the camp. Nearly identical, the 7 cottages in the camp sit above the river against the hillside. The driveway loops around the rear of the cottages in the hillside and around below the cottages near the river. A rock wall and a line of small fire hydrants extend along the bottom of the embankment adjacent to the lower road. Two rock stairways allow residents of the cottages to descend the slope to the river. At the west end of the camp, the loop joins, crosses the river below the Wheelon Switchyard and ascends the southern bank to the county road.

1. Powerhouse

Approximately 1200 feet below the dam is the Cutler powerhouse. Erected in 1925-27 in the Art Deco architectural style, the powerhouse is rectangular-shaped, two-story, brick structure with a concrete foundation and a hip roof covered with copper shingles on three sides and asphalt shingles on the west side. A concrete capped parapet wall tops all facades. Each facade is divided into bays by pilasters which have concrete decoration and pentagonal parapet caps. Within the bays is a belt course of concrete molding and the south, west and east facade bays are vertical sets of multipaned (one 16-light and two 12-lights or three 18-light) awning windows which open by a hand-crank. Constructed of riveted metal, the windows have a narrow ladder along the center mullion. The north facade contains a garage bay with a metal overhead door, 6-light awning windows and entrance with a 9-light window. The entrances have concrete surrounds.

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The penstock enters the powerhouse through a concrete structure on its east side. Metal exhaust hoods project from the lower east facade. Along the west facade in the foundation wall are 2-light slider windows which replaced the original windows in 1986. Above the windows are two railings that extend along the west and south sides to allow access to the window ladders. The west side also has a central doorway which opens onto a balcony over the river. Below the lower windows on the west side, the tailrace exits into the Bear River.

The technology of the Cutler powerhouse is much larger and more sophisticated than other hydroelectric powerhouses in Utah. The powerhouse in size and design resembles other large hydroelectric installations built in the American West during the 1920s and 1930s. The interior of the powerhouse is divided into several floors, with the space used for different functions. The lowest level contains the butterfly valves used to close the penstocks; oil tanks and pumps for the hydraulic governors; a battery room; a fire pump for pumping water to hydrants around the Cutler powerhouse; a room housing rheostats for regulating the voltage of current produced by the generators; and a room containing cables that lead to the transformers.

The second floor of Cutler powerhouse is the heart of the entire hydroelectric plant. The north half of the second floor, called the generator floor, provides space for the turbine-generator sets. Cutler features two 15,000 kw General Electric a.c. generators attached to Francis reaction turbines with vertical shafts. The manufacturer's plate on each turbine reads as follows: "Designed and Built by Wm. Cramp & Sons, S. & E.B. Co., I.P. Morris Department, Philadelphia, USA 1925." Oil tanks for the governors and governor apparatus are located between the turbine-generator units. Original d.c. exciters for no. 1 unit have been removed, but the old exciters for no. 2 unit are still in place, between the unit and the north wall of the powerhouse. New exciters are located on top of both turbine-generator units. Just west of the generator floor, a few feet lower, is a space used for repair work. Tracks in the floor for a small car lead outside into the adjacent switchyard. The south half of the second floor of the powerhouse includes a room containing oil switches and circuit breakers; a main control room housing gauges

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and regulating equipment; and a room containing circuit breakers for electric lines serving the Cutler plant.

The third floor, which overlooks the generator floor, is located on top of the control and switchrooms described above. The third floor is used as a materials storage and work area.

Besides machinery, one of the prominent features of the interior of Cutler powerhouse is the structural steel frame that supports the roof of the building and against which the brick facade was constructed. The structural steel frame was fabricated by the Pittsburgh-Des Moines Steel Company. Primarily, the steel frame is made of riveted steel beams. At their tops, the beams support steel Fink roof trusses. The structural steel framework also supports two overhead traveling cranes of 25 and 100 ton capacity, manufactured by the Whiting Company.

The Cutler powerhouse is an outstanding example of a large hydroelectric facility dating from the late 1920s. The building, with its Art Deco styling and massive generating equipment, presents a modernistic appearance reminiscent of larger facilities dating from the same period, such as Hoover Dam.

Cutler powerhouse has undergone little change since its completion in 1927. The building and its equipment have undergone minor modifications (e.g., part of the roof has been covered with new shingles), but basically the building is intact. Thus it retains integrity of location, design, setting, materials, workmanship, feeling, and association. The powerhouse contributes to the historic district.

2. Switchyard

On the west side of the powerhouse is the switchyard. This facility includes a steel lattice switchrack, bus bars, switches, and transformers. The Cutler switchyard has undergone some modifications since 1927. Since 1927, the switchrack has been increased in size by about one third. However, this later addition is made of the same material and features the same design as the older switchrack and is slightly lower in height. In addition, some of the older transformers have been replaced,

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and in 1987, a fire destroyed a small shed adjacent to the switchyard, but this building was not in place at the time Cutler station was completed. Despite the alterations to the Cutler switchyard, the facility appears much as it did in 1927. Therefore, the switchyard retains integrity of location, design, setting, materials, workmanship, feeling, and association. It is a contributing element in the historic district.

3. Dam

Cutler Dam is situated about 1,200 ft. upstream from the powerhouse. It is an arch dam of reinforced concrete, 125 ft. in height and about 570 ft. long at the top. At its top the dam is 7 ft. thick; at its base the dam is about 50 ft. wide at the base. The upstream face is vertical and the downstream face is sloped. The spillway is located at the center of the dam. The spillway includes four steel tainter gates 30 ft. long and 15 ft. high, manufactured by the Wausau Iron Works. The tainter gates are supported by concrete buttresses. The tainter gates are raised and lowered by a motor-operated drum-type chain hoist that sits on top of a small car that runs on rails across the top of the dam. At the bottom of the spillway, extending from the toe of the dam, is a concrete apron. At both the north and south abutments of the dam there is an intake for an irrigation canal. These intakes each feature two 8 ft. by 8 ft. steel sluice gates raised and lowered by motor-driven worm gears.

Abutting the dam and adjacent to the irrigation canal that emerges from the north side of the dam, is a small concrete building that houses air compressors. Compressed air from this facility is used to create bubbles in the water around this intake. This helps to prevent ice from forming during the winter. This air compressor house is physically integral to the dam and so is considered as part of the dam, not as a separate structure. At the bottom of the dam, just north of the spillway, is a relatively small concrete structure that houses a 7 ft.- diameter sluiceway for emptying the reservoir. The sluiceway is equipped with a 7 ft. by 7 ft. back-pressure gate. A small building with a gable roof on top of the sluiceway structure houses an air compressor and a motor-driven worm gear for raising and lowering the gate. A tank, presumably for

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compressed air, sits adjacent to this building. The sluiceway structure is physically part of the dam, and so is not considered to be a separate structure.

The intake structure for the Cutler conduit is located on the upstream side of the dam, just north of the spillway. The intake is actually a tower, roughly cylindrical in shape, the bottom of which is connected to the dam. The base of the intake is made of reinforced concrete and is 76 ft. high. At its top, the base of the intake flares to a diameter of 48 ft. Through the center of the intake base is an 18 ft. diameter water passage which curves toward the base of the dam. Where the intake and dam meet, this passage connects to the steel flow line, also 18 ft. in diameter. The flow line passes through the dam and exits just north of the sluiceway. Attached to the top of the intake base, around its outer edge, are screens, about 17 ft. high, through which water enters the intake. Also attached to the top of the intake base, but located on the edge of the 18 ft.-diameter water passage, is a cylinder which guides the intake gate. The intake gate itself is a riveted steel cylinder 18 ft. 6 in. in diameter, which when lowered rests in a seat at the top of the 18 ft.-diameter water passage. Essentially, the intake gate acts as a plug. Resting on top of the intake screens and the gate guide are 15 ft. tall steel supports holding up a floor which is above the water line. Located on the floor is a motor and a 120-ton twin-screw stem hoist for raising and lowering the intake gate. This mechanism is housed in a small corrugated metal shed. Also located on the intake floor is a gantry crane (built by American Crane Co.) which revolves around on a circular track. The gantry crane is used for raising and lowering the intake screens.

Cutler dam is virtually unaltered since its completion in 1927. Some weathering of concrete has occurred, causing minor crumbling on edges. Otherwise, Cutler dam is intact. The dam retains integrity of location, design, setting, materials, workmanship, feeling, and association. It contributes to the historic district.

4. Conduit

The conduit at Cutler consists of a steel pipe, also called flow

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line, 1,165 ft. in length and 18 ft. in diameter. It was fabricated by the Chicago Bridge and Iron Works. The pipeline runs straight from the dam, but about 350 ft. from the surge tank it angles to the southwest before entering the concrete base of the surge tank. The pipeline is made of riveted steel pipe resting on concrete saddles, 3 ft. thick and 25 ft. wide, placed on 16 ft. centers. Surrounding the pipe at each saddle are two 8-in. steel ship channel stiffeners. These stiffeners are covered with 24 in. by 3/8 in. steel plates which extend through an arc of 240 degrees. The space between the plates and the pipe is filled with concrete. Midway between the saddles, surrounding the pipe, there is one 8 in. ship channel stiffener. The pipeline is embedded in a large concrete block at the point where it angles toward the surge tank. Originally, the Cutler flow line had a walkway on top; this has since been removed. Protecting the riverbank on which the flow line sits is a low concrete wall.

Except for the removal of the walkway, the Cutler flow line is virtually unchanged since its original construction. The flow line maintains integrity of location, design, setting, materials, workmanship, feeling, and association. The conduit contributes to the historic district.

5. Surge Tank

The surge tank at the top of the penstock sits on a concrete base imbedded in surrounding bedrock. The surge tank, 81 ft. tall and 45 ft. in diameter, is made of rivetted steel plates. A walkway supported by brackets surrounds the top of the structure.

The surge tank maintains integrity of location, design, setting, materials, workmanship, feeling, and association. It is a contributing element.

6. Penstock

Just below the surge tank are two penstocks, each about 110 ft. in length, which lead to the turbines inside the powerhouse. The penstocks begin just below the concrete base of the surge tank.

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At this point there is a large steel Y, with an 18 ft. inlet and two outlets about 16 ft. in diameter. Each penstock decreases to a 13 ft. diameter. The Y and the penstocks also have 8 in. ship channel stiffeners. The penstocks are closed by huge, 13 ft. Allis-Chalmers butterfly valves located just inside the powerhouse.

The Cutler penstock maintains integrity of location, design, setting, materials, workmanship, feeling, and association. The penstock is a contributing feature in the historic district.

7-13. Operator's Camp

Among the shade trees of the camp are seven cottages, arranged in a roughly lineal pattern contouring the hill. Constructed in 1927, all of the dwellings exhibit the same design, shape, massing, and materials and appear identical. Only closer inspection reveals that the first four homes differ slightly from the last three. The seven houses are all rectangular, one-story, wood-frame buildings with concrete foundations, asphalt shingled hip roofs and broad overhanging eaves. Although originally wood-sided, asbestos shingling now covers the drop siding. Windows are 1/1 double hung and 3-light hoppers in the basements. Each house has two entrances--on the south and west--which have concrete steps and iron railings.

Only minor differences distinguish the first four cottages--#1530 (no. 7), 1550 (no. 8), 1570 (no. 9) and 1580 (no. 10)--from the last four--#1600 (no. 11), 1610 (no. 12) and 1620 (no. 13). The first four have corbelled brick chimneys, one interior and the other exterior. Originally, these may have had some casement windows which remain in #1580 but have been replaced with either fixed or slider windows in #1530, 1550 and 1570. The last three homes have exposed rafter ends under the eaves--the major distinction from the first four. Also #1600, 1610 and 1620 have exterior concrete block chimneys on the west side.

Separating the house are seven carports. These consist of a concrete and asphalt driveway, a corrugated metal roof cover and a three sided wood structure. The structures have two basic designs. Carports for #1530, 1550, 1580 and 1610 have tongue-in-

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groove siding and a fixed 4-light window while those for #1570, 1600 and 1620 have lapped siding and no window.

Although these seven dwellings have sustained minor alterations including some window replacements and asphalt siding, the shape, design, massing or setting of any has not changed. Individually, the cottages retain their historic integrity as does the camp as a whole.

14-19. Ancillary Structures

Cutler features numerous ancillary structures associated either directly or indirectly with the overall operation of the plant. These ancillary structures include a shop building, bridges, irrigation canals, and various transmission towers.

To the north of the powerhouse is the shop (no. 14) which mimics the Art Deco architectural style of the powerhouse. This one-story, rectangular-shaped, brick structure has a concrete foundation and a flat roof with a concrete capped parapet wall extending above the south, west and northern roofline. Below the parapet is a course of concrete molding and brick corbelling. Rafter ends are exposed on the east side. Each facade is divided into bays by pilasters with pentagonal concrete caps. An interior brick chimney with a concrete cap rises out of the roof. Windows are sets of 4/4 double hung sashes with concrete sills. The west facade has several entrances. One garage bay contains a metal door with double wood doors beside it. Above both are two 3-light and one 10-light windows. Double wooden garage doors have a 10-light transom. This facade also contains one 4/4 double hung window. Separating the shop and the powerhouse is a fenced switchyard. Despite some alterations to the entrances, the shop retains integrity of design, materials, and workmanship as well as location, setting, feeling, and association. The shop contributes to the historic district.

Cutler features two automobile bridges. The first of these (no. 15) crosses the Bear River on the east side of the powerhouse. The bridge is made of vertical steel beams resting on concrete footings, which in turn sit on rocks and rock outcroppings. The vertical members of the bridge are strengthened by diagonal

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braces. Steel floor beams support stringers made of steel beams. The bridge deck is made of wood. On either side of the deck is a simple steel railing. The second vehicular bridge (no. 16) at Cutler (built by the Industrial Steel Co.) is essentially the same as the one that crosses the Bear, except that it is smaller. It is located behind the powerhouse and spans the penstock. Both bridges retain integrity of location, design, setting, materials, workmanship, feeling, and association. Both contribute to the historic district.

Cutler dam, besides controlling stream flow for power generation, also collects water for irrigation. As mentioned above, two canals emerge from the dam at its abutments. These canals (identified on a 1935 map as the West Canal and the East Canal) follow the canyon walls downstream from the dam. At some places the canals are lined with concrete; along some stretches the rocky canyon wall forms one side of the canals. The West Canal, which actually lies on the north side of the Bear, crosses two bridges within the Cutler station grounds. Each bridge consists of a flume made of wood planks and a steel framework resting on steel lattice girders anchored in concrete pads. The East Canal (on the south side of the Bear River), about one half mile downstream from the dam, is covered by a shed-like structure made of timbers, concrete, and steel beams that prevents rocks from sliding into the canal. A small shed-roofed gauging station is located along each canal just downstream from the dam. The East and West canals maintain integrity of location, design, setting, materials, feeling, and association. However, the canals are not counted as features in the historic district for two reasons. First, they are unrelated to the Cutler plant's purpose, which is the generation of electricity. Second, the canals were built mainly to furnish water to users downstream who owned water rights at the site of the dam prior to its construction.

The Cutler hydroelectric generating facility also contains various transmission towers and control lines. One control line runs between the powerhouse and the dam and is used to open and close valves and gates at the dam. Most of this control line consists of wood poles of indeterminate age. However, part of the control line consists of a large steel tower (no. 17). This tower is directly adjacent to the powerhouse, the surge tank, the penstock,

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and the bridge that crosses the penstock. This structure dates from 1927 and helps to convey the overall industrial feeling of the Cutler historic district. The structure maintains integrity, and therefore is a contributing element in the historic district. Another control line at Cutler runs between the powerhouse and the Wheelon substation one-half mile downstream from the powerhouse. Like the line running to the dam, this line also largely consists of wood poles of indeterminate age. However, at the point where it crosses the Bear River, the control line consists of two steel towers (nos. 18 and 19), one on each bank, anchored in concrete blocks. These structures, which maintain their integrity, date from 1927 and help to convey the overall industrial feeling of the Cutler historic district. Therefore they are contributing elements in the historic district.

20. Wheelon Substation

About one half mile downstream from Cutler Station is the Wheelon Substation. This facility is located at approximately the same place as the original Wheelon powerhouse. Wheelon Substation includes various storage buildings, transformers, and switchracks. One of the buildings at the site exhibits an Art Deco architectural style similar to the Cutler powerhouse. A steel truss bridge over the Bear River provides access to Wheelon. Adjacent to the south end of this bridge, along the river bank, are what appears to be remains of the old Wheelon generating station. Wheelon Substation is historically significant because it was the location of the first interconnection between Idaho Power and Light Company's hydroelectric plants on the Snake River and UP&L's Bear River plants. The interconnection, which took place in 1927, allowed the transmission of electricity between plants located in two unrelated watersheds. Essentially, the Wheelon interconnection was a major step in UP&L's efforts to master the natural environment through the construction of a huge superpower system. Still, Wheelon Substation is related but not integral to Cutler Station. Moreover, Wheelon represents transmission, not generation, of electricity. For these two reasons Wheelon Substation is not included in the Cutler historic district.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties: nationally x statewide locally

Applicable National Register Criteria x A B x C D

Criteria Considerations (Exceptions) ____A ____B ____C ____D ____E ____F ____G

Areas of Significance

(enter categories from instructions)

Period of Significance

Significant Dates

Industry

1927

1925, 1926, 1927,

Engineering

Cultural Affiliation

n/a

Significant Person

Architect/Builder

n/a

Electric Bond and Share Company, Engineer

Department/Phoenix Utility Company

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

(see continuation sheet)

x See continuation sheet

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Cutler Station historic district is significant under Criteria A and C. Under Criterion C, Cutler is significant because it embodies the distinctive characteristics of a large-scale, technologically sophisticated, low-head hydroelectric power plant dating from the late 1920s. The only hydroelectric plant of its size and type in Utah, Cutler was built in 1927 to utilize waters of the Bear River. With its huge but graceful arch dam, spacious Art Deco-style powerhouse, massive turbine-generator units, and simple but well-planned operator's camp, the facility exhibits technological and engineering features often found in large hydroelectric stations built in the American West during the 1920s. Cutler also has significance under Criterion C because it is an outstanding example of a facility built as part of a larger system of hydroelectric plants. Cutler was built to harness the waters of the lower Bear River drainage, thus allowing hydroelectric stations upstream to store more water in their reservoirs. Under Criteria A, Cutler Station is significant because of its associations with the hydroelectric development of Utah. In contrast to other Utah hydroelectric plants, Cutler represented the work of a large, multi-level corporate organization. Cutler was built for Utah Power and Light. Upon its formation in 1912, UP&L became the dominant utility in Utah. UP&L was also a subsidiary of the Electric Bond and Share Company (EBASCO), a massive firm which owned hundreds of utilities around the nation. Backed by EBASCO's capital and technical expertise, between 1912 and 1927 UP&L upgraded existing hydroelectric facilities and constructed new ones, nearly all of them on the Bear River. By 1924, UP&L's Bear River system included plants at Soda, Grace, Cove, and Oneida (all in Idaho). Cutler Station was the last facility added to the Bear River system and the only

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large hydroelectric plant built in Utah. As such, Cutler represented the culmination of hydroelectric power development in the state.

Hydroelectric development on the Bear River provided the background for the construction of Cutler Station. The Utah Sugar Company, needing electricity for its Garland sugar factory, built the first hydroelectric plant to utilize Bear River water. The Wheelon plant, constructed in 1902 and rated at 4,000 kilowatts, was demolished when Cutler Station was erected in 1927. Wheelon, about one half mile downstream from the Cutler powerhouse, is now the site of Wheelon Substation. Around the turn of the century, other companies besides Utah Sugar were interested in Bear River power. During the late 1890s, entrepreneur L.L. Nunn and an engineer in his employ, E.B. Searle, conceived the idea of using Bear Lake as a reservoir for hydroelectric power plants and irrigation systems downstream. In 1902, Nunn filed appropriations for Bear River water, and in 1907 he received permission from the Department of the Interior to develop Bear Lake. In 1906-1908, Nunn's Telluride Power Company built the Grace (Idaho) hydroelectric plant, rated at 11,000 kw. Nunn never realized his dream of developing the Bear River, as Utah Power and Light took over the Telluride Power Company in 1912.

After its formation in 1912, Utah Power and Light undertook to fully develop the Bear River, including Nunn's plan for Bear Lake. Building plants on the Bear and creating a reservoir out of Bear Lake fit in with UP&L's overall objective of putting together a huge "superpower" system of modern, interconnected electrical generating facilities. UP&L's proposed system required extensive outlays of capital, acquisition of land for plant sites and transmission line right-of-ways, and a corporate organizational structure that could provide professional and technical expertise and new business methods for operating and controlling a widespread, interconnected system. Backed by the resources of the Electric Bond and Share Company, UP&L built several new plants on the Bear River during the 1910s and 1920s. These included Oneida (1915), Cove (1917), Soda (1924), and Cutler (1927). In addition, UP&L constructed the Lifton Pumping Station (1916) and periodically upgraded existing plants. By 1922, UP&L's Bear River plants (including Wheelon and Grace) accounted for one half of the

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company's 224,000 kw capacity.

Cutler Station was an important part of UP&L's Bear River system. The last plant added to the system, Cutler was the most expensive and one of the largest hydroelectric generating stations operated by Utah Power and Light. The facility had an original cost of about \$6.2 million and an installed capacity of 30,000 kw. At the time of its construction, Cutler had a kilowatt rating equal to that of Oneida, but smaller than Grace's 44,000 kw. These latter two plants, however, were upgraded from their original respective ratings of 10,000 and 11,000 kw. With Cutler Station, UP&L intended to utilize runoff from the lower reaches of the Bear River watershed, especially Cache Valley. Prior to the construction of Cutler, Wheelon was the only plant on the lower reaches of the Bear to utilize this runoff. Yet Wheelon was a much smaller plant than Cutler and insufficient for the type of facility needed for the site. Cutler's 21,000 h.p., large-capacity turbines were designed to make use of the heavy springtime runoff which previously had been lost. Cutler's use of water from the lower Bear River allowed the Bear River plants situated upstream to store more water in their reservoirs, thereby increasing the efficiency of the entire Bear River hydroelectric power system.

Like the other Bear River plants erected after 1912, Cutler Station is the product of a modern corporate organization. Utah Power and Light owned Cutler Station, but the Engineering Department of the Electric Bond and Share Company designed the plant and the Phoenix Utility Company, a subsidiary of EBASCO, built all of its major components, including dam, conduit, powerhouse, and operator's camp. By the mid-1920s, EBASCO owned two hundred companies in thirty states, so undoubtedly its Engineering Department and the Phoenix Utility Company designed and built plants other than Cutler and the Bear River system. At the Great Falls of the Missouri River in Montana, for instance, the EBASCO Engineering Department and the Phoenix Utility Company were responsible for Morony hydroelectric project, built in 1928-1930 for the Montana Power Company.

The Engineering Department of EBASCO and the Phoenix Utility Company brought special expertise to the construction of

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hydroelectric plants that differed from earlier, smaller, companies. Hydroelectric power plants in Utah were usually designed by one or two engineers and built by general contractors. EBASCO's operations, on the other hand, employed a team of engineers as well as its own construction company, both of which specialized in power plant construction.

Construction of Cutler Station took place between March, 1925 and January, 1927, when the facility was placed in operation. A substantial amount of materials went into the plant, including 2,635 carloads of gravel. By autumn of 1926, construction had also consumed 300 carloads of cement; 150,000 pounds of reinforcing steel; 400,000 bricks; and 100 carloads of lumber. Meanwhile, 650 workmen and 30 teams of horses were at work. A local booster publication, the Utah Payroll Builder, touted the Cutler development as a "Big Gain to Utah Institutions and Labor," because all construction materials, food, labor, and horse teams were acquired locally. The Payroll Builder claimed that ninety percent of the labor came from the local area and that the horse teams were obtained from farms surrounding the power plant site. As well, the publication stated that by October of 1926 farmers around the plant had received \$75,000 for produce.

When completed, Cutler Station was a modern facility equipped with the latest in hydroelectric power technology. Cutler's characteristics reflected its association with EBASCO and the systematic planning that went into the construction of UP&L's superpower system. First, the large size and sophistication of the facility in many ways was possible only because of the capital and organization that UP&L and EBASCO could bring to the project. Spanning a river with a huge dam and building a power plant for a specific purpose required a great deal of capital, planning, and technical expertise. Second, the features of the plant--for instance, the design of its turbines--also indicated its place in a larger technological system. To a lesser degree, the architectural style of the Cutler powerhouse also indicated its place in the Bear River system. With its Art Deco embellishments, the building closely resembled the other powerhouses on the Bear River, as well as the Lifton pumping station. Third, the Cutler operator's camp also evidenced the overall organizational thrust of UP&L during the 1920s. Probably more than any other group of

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operator's dwellings associated with a Utah hydroelectric plant, the design of the Cutler camp closely adhered to the ideal of a planned company town. With its uniform appearance and attention to landscaping details, the Cutler camp showed UP&L's concern with the well-being and thus stability of its workforce. Creating pleasing environments for workers so as to prevent worker discontent was one of the foundations of welfare capitalism, a concept prevalent during the 1920s.

Since its construction in 1927, the Cutler hydroelectric plant has undergone little alteration. The walkway on top of the flowline conduit has been removed; new shingles have been applied to the powerhouse roof; some new apparatus has been installed inside the powerhouse; the switchyard has been expanded; and the operator's houses have been covered with new siding material. Despite these changes, Cutler still is an outstanding example of a large, low-head hydroelectric plant dating from the late 1920s.

9. Major Bibliographical References

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Previous documentation on file (NPS):

☒ See continuation sheet

☐ preliminary determination of
individual listing (36 CFR 67)
has been requested
☐ previously listed in the National
Register
☐ previously determined eligible by
the National Register
☐ designated a National Historic
Landmark
☐ recorded by Historic American
Buildings Survey # _____
☐ recorded by Historic American
Engineering Record # _____

Primary location of additional data:

☒ State Historic preservation office
☐ Other State agency
☐ Federal agency
☐ Local government
☐ University
☒ Other

Specify repository:

Utah Power and Light Company

10. Geographical Data

Acreage of property 33.5 acres

UTM References

A	<u>1/2</u>	<u>4/1/3/1/0/0</u>	<u>4/6/3/1/9/0/0</u>	B	<u>1/2</u>	<u>4/1/2/8/1/0</u>	<u>4/6/3/1/6/6/0</u>
	Zone	Easting	Northing		Zone	Easting	Northing
C	<u>1/2</u>	<u>4/1/2/5/9/0</u>	<u>4/6/3/1/6/4/0</u>	D	<u>1/2</u>	<u>4/1/2/5/9/0</u>	<u>4/6/3/1/7/6/0</u>

☒ See continuation sheet

Verbal Boundary Description

☒ See continuation sheet

Boundary Justification

☒ See continuation sheet

11. Form Prepared By

name/title Mark Fiege/Janet Ore, Consulting Historians

organization for Utah Power and Light Co. date November 1988

street & number 144 South 900 East #10 telephone (801) 532-5456

city or town Salt Lake City state Utah zip code 84102

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Cutler Hydroelectric Plant
Historic District, vac. Beaver Dam,
Box Elder County.

Section number 9 Page 2

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(Rev. 8-86)

Utah Word Processor Format (02741)

Approved 10/87

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Cutler Hydroelectric Plant
Historic District, vac. Beaver Dam,
Box Elder County.

Section number 10 Page 2

UTM References:

E - 12/412150/4631650

F - 12/412080/4631740

G - 12/412130/4631860

H - 12/412690/4631860

I - 12/412780/4631980

J - 12/413020/4632040

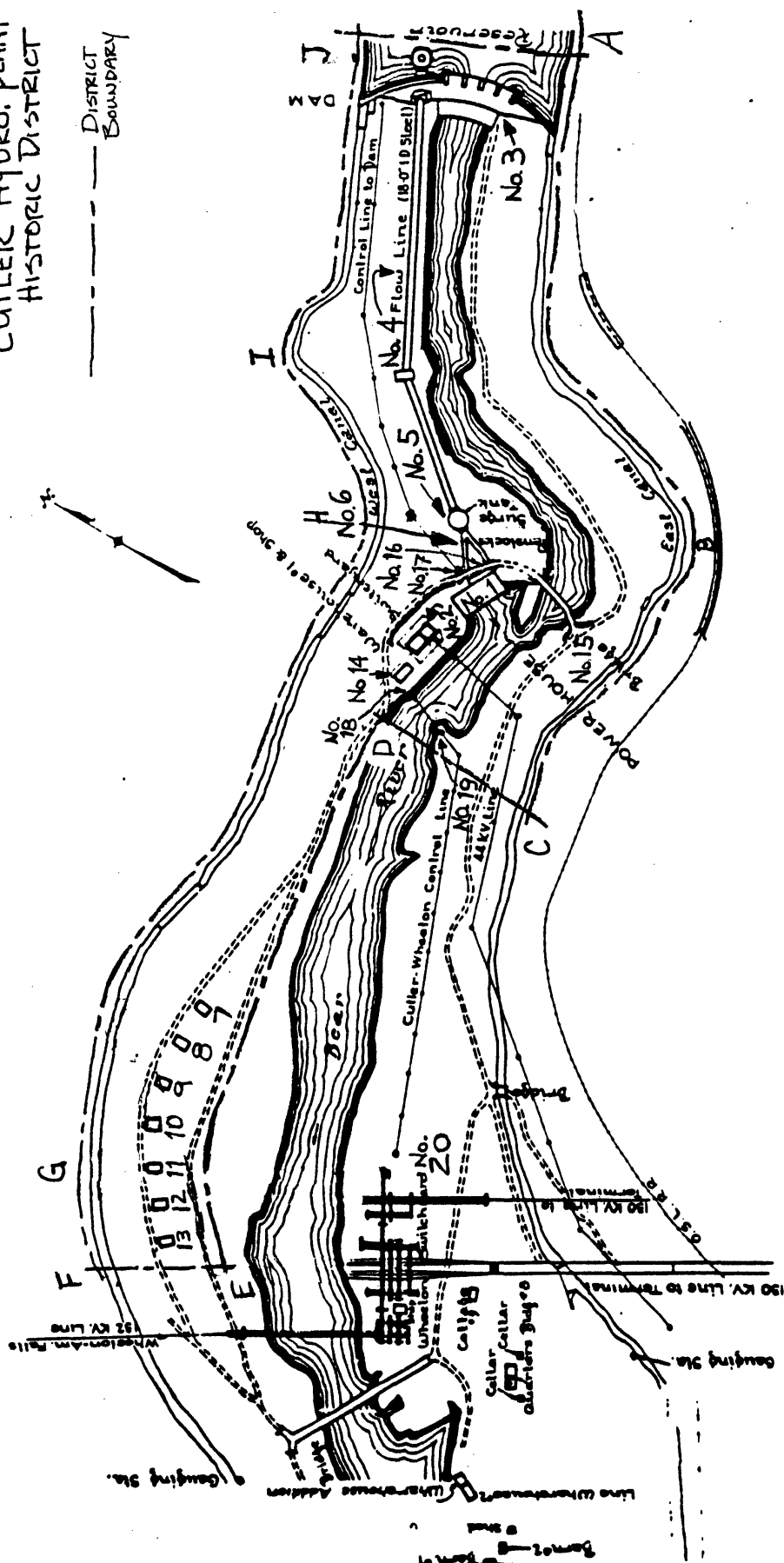
Verbal Boundary Description:

The Cutler Hydroelectric Plant Historic District is located in the SE corner of section 27, T13N, R2W, USGS Quad, Cutler Dam, Utah. The historic district boundary begins at a point 5 ft. N of the northernmost point of Cutler Dam, then follows the northern embankment of the West Canal 3,025 ft. to a point 10 ft. past the garage of the westernmost cottage in the operators' camp. The boundary then proceeds S 225 ft. to the southern side of the lower access road and follows the road for 1,425 ft. to the gate entering the powerhouse yard. The boundary then proceeds due S across the Bear River for 400 ft. to the southern edge of the East Canal (boundary includes the control towers). The district boundary then follows the southern embankment of the East Canal for 2,135 ft.. Five ft. from the southernmost edge of Cutler, it parallels the dam for 225 ft. At that point, the boundary makes a right angle and crosses the reservoir, behind the intake, for 530 ft. NW to the N side of the reservoir. The boundary then proceeds 170 ft. SW to the point of beginning off the northernmost point of the dam.

Boundary Justification:

The boundary of the Cutler Hydroelectric Plant Historic District was drawn so as to include those buildings and structures directly related to the operation of the Cutler plant. Virtually all of these structures date from 1927, and represent the Cutler plant's operations and associations. Buildings and structures outside the Cutler district include the those at Wheelon substation, which is a related but distinct facility.

District Boundary



CUTLER DEVELOPMENT
GENERAL MAP OF GROUNDS
UTAH POWER & LIGHT CO.
SALT LAKE CITY, UTAH
Scale: As shown. Dec. 1935
UB-20121

Cutler Photograph Log:

Cutler Hydroelectric Plant Historic District

Near Beaver Dam, Utah, on Bear River

Mark T. Fiege, photographer

July 1988

Negatives located at Utah SHPO

Photo #:

1. Cutler hydroelectric plant, view to the east, showing (left to right) control line towers (nos. 19 & 18), shop (no. 14), switchyard (no. 2), powerhouse (no. 1), surge tank (no. 5), and dam (no. 3).

2. Cutler powerhouse (no. 1) on left and surge tank (no. 5) on right; view to north.

3. Interior of Cutler powerhouse showing turbine-generator units and overhead travelling crane, view to west.

4. Shop building (no. 14), view to east, with switchrack (no. 2), surge tank (no. 5), and powerhouse (no. 1) on right.

5. Cutler dam (no. 3), and conduit/flowline (no. 4), view to east.

6. Cutler dam (no. 3), showing intake structure on left, spillway section of dam on right, view to southeast.

7. Cutler dam (no. 3) and conduit (no. 4), view to northeast.

8. Cutler operator's village, view to north, looking across Bear River. The cottages, which are distinguished by their hipped roofs (if not obscured by foliage), are numbered from right to left as follows: 7, 8 (obscured by trees), 9, 10, 11, 12, 13 (at far left, obscured by trees).

9. Operator's cottage (no. 7), view to southeast.

10. Operator's cottage (no. 8), view to southeast.

11. Operator's cottage (no. 12), view to southeast.

ATTACHMENT C-3

HISTORIC NEWS ARTICLES 1915–1945

BOX ELDER NEWS JOURNAL ARTICLES:

THE WATER SUPPLY IN BEAR RIVER

Referring to the article in Friday's News, giving the views of T. R. Cutler, general manager of the Utah Idaho Sugar Company, on the question of a shortage of water in Bear River for the land owners on the east side, Geo. I. Cannon, cashier of the Salt Lake Security & Trust Co. has sent the following communication:

Salt Lake City.

Dear Sir:

We feel that the article in your issue of yesterday concerning the water rights proposed to be offered for sale to the farmers of Bear River valley on the east side of said river, is calculated to injure the owners of the Hammond canal and all farmers under its laterals who have not already bought a water-right therefrom. Briefly stated, the attitude of the Hammond canal owners is:

First: We are glad the Sugar company has expressed the intention to make all water rights on the east side (about 6,500 acres) heretofore regarded as surplus rights, primary water rights. So long as there is hereafter any water at the dam, these farmers are therefore entitled to their full share.

Second: The Sugar company, in 1907 contracted to sell to the Hammond Canal company any waters it then owned or might thereafter acquire, not required for use of the lands under the West Side canal, as then located.

Third: The sugar company has since acquired from the Power company a right to such quantities of water to be maintained at the dam for use in the Bear River canals, as "shall equal in actual available and continuous flow nine hundred second feet between May 1 and October 31 of each year, perpetually hereafter," etc. The most that can be lawfully used or needed for the lands under said West Side canal is less than 600 second feet; thus leaving available for use of the Hammond canal 300 second feet; about three times the amount ever heretofore used. Both East and West Side canals, together, have never used more than 700 second feet of the 900 second feet hereafter to be kept at the dam and available for farmers' use.

Fourth: The Hammond canal company is entitled to sell this available water-right and feels it owes a duty to every East side farmer who wishes to buy water-right to do so

The letter from the sugar company which your paper quotes liberally from, was answered the same day, but the reply held pending a promised interview with Manager T. R. Cutler. A note received from latter explains that he has been called to Nampa and will be back Monday; and inasmuch as he has given the bulk of his letter to you in his interview, I submit our reply herewith:

Utah-Idaho Sugar Company, Salt Lake City, Utah:

Gentlemen—We have received your communication of even date herewith to the Hammond Canal company, in our care, and note its contents, including the fact that you deem the supply of water in the Bear River, "In such quantities and with such continuous flow" as to justify the disposal under primary right of a sufficient quantity thereof to irrigate the lands now supplied with surplus waters by the Hammond Canal company through the East Side canal; and that "beginning with the irrigation season 1916" these water right will be converted into primary rights under terms and conditions provided in contract between the Sugar company and Canal company, dated Sept. 10, 1903.

We are surprised at the portion of your communication that follows the notification above referred to. I have read with some care a copy of the contract between the Sugar company and Canal company, and see no justification for limitation of waters to be used by the Hammond Canal company to the natural flow of Bear River. On the contrary, section III of said contract expressly provides that the Canal company should "proceed forthwith to construct its canal" . . . "and shall extend the same as rapidly as circumstances will permit and as the demand for water therefrom will justify; and that said canal shall have a carrying capacity sufficient to convey water for the irrigation of not less than 10,000 acres of land." . . . The contract evidently contemplated that said Hammond Canal company should do what its present owners contemplate, viz: Build and enlarge the canal as more land is brought under cultivation; and clearly that this enlargement should be to a capacity of not less than 10,000 acres. In line with this view is section VII of said contract: "In case the Sugar company should at any future time or times acquire or possess the right to use and appropriate such quantities of water as will enable it to supply through its east side canal, either as surplus or in primary right or both,

(Continued on page Three.)

THE WATER SUPPLY IN BEAR RIVER

(Continued from Page Two)

more than sufficient water to irrigate 10,000 acres of land, then the Canal company will, upon not less than 12 months' prior notice from the Sugar company, increase the capacity of the canal and laterals and extend the same so that they will carry all of the water which the Sugar company is prepared to deliver, and which land owners are desirous of contracting for; and will, within such period, extend such canal and laterals so as to convey such water within reach of persons occupying lands which are or may be made adjacent to the Canal company's irrigating system, and who may be desirous of contracting for water. Such additional water shall be paid for by the said Canal company, when sold by it, upon the terms and conditions hereinbefore stipulated." Failure to so enlarge and extend the canal beyond even the 10,000 acres as above provided, was to entitle the Sugar company, after due notice, etc., to ownership of the entire system.

In view of these clear provisions of said contract, we are surprised at the suggested caution against unwisely encouraging the farmers to buy additional "surplus" water rights. Certainly the supply is now greater and prospects for its "continuity of flow" better than in 1903. And certainly neither the water supply nor the prospects for its maintenance have been lessened by the contract between the Sugar company and the "Power company" containing the grant by the latter to the "Sugar company, its successors and assigns and the grantees or its predecessors" (including, of course, the Hammond Canal Company,) to "such quantities of the water of Bear river and Bear lake, whether naturally flowing or impounded, or at any time hereafter to flow or to be impounded or pumped as added to that part of the water of Bear river hereinbefore served and expected to the Sugar company, and actually available at and flowing into the aforesaid dam or dams in Bear River canyon between the counties of Box Elder and Cache, Utah, shall equal at the said dam and in the said canals in actual available and continuous flow, 900 second feet between May and October 31 of each year, perpetually hereafter," etc.

In regard to reference to water allowed the East Side farmers by courtesy of the West Side farmers in 1911, we understand that until your letter of today the East Side farmers in using water were subject to "The legal demands and necessities of such lands lying under and irrigable from the Bear River canal system on the west side of Bear River" as the Sugar company has contracted or might from time to time contract to supply with water for irrigation and for culinary and domestic purposes. But all lands under said canal are already amply supplied with such water; and scientific farming will, in the future, demonstrate (according to your own chief engineer) that too much, rather than too little, water is being supplied for best results to follow; and any increase in acreage under said West Side canal as located at time of execution of said contract, can properly be more than made up by the decreased amount needed for proper irrigation of lands already under said water system.

And as to "certain reservoired waters which you had purchased at a large expense," we respectfully call attention to Section II (of contract of Sept. 10, 1903) which reads: "That, if, at any future time, the Sugar company shall require the right to use and shall actually receive water in its Bear River canal system, over and above the then legal demands and necessities of the west side, as hereinbefore expressed, in such quantities and with such continuity of flow from year to year as will, in the judgment of the Sugar company justify the disposal thereof under primary rights, then the Sugar company agrees to sell and deliver the same to the canal company and the latter agrees to receive

and pay the same, as hereinafter stipulated."

From the sections first above quoted, it was clearly the intent of both parties to the original contract (of Sept. 10, 1903) that the acreage for which water right should be sold would gradually be developed to at least 10,000 acres with the right of either party to insist on an expansion to a larger acreage.

The purchase of our interest in the Hammond canal was based on both the letter and the spirit of its contract with the Sugar company. The spirit of that contract we desire to carry out. We desire your friendly and hearty co-operation in doing so.

Yours truly,

GEO. M. CANNON, Cashier.

—Deseret News

PHOTO 3-7 THE WATER SUPPLY IN BEAR RIVER – SEPT. 16, 1915

POWER COMPANY TO BUILD PLANT

Project Calls for Expenditure of \$5,500,000 Within Year; Awaits Word.

The Utah Power & Light company is "ready to go" on construction of a hydroelectric power plant, just above the Wheelon plant, in Bear River canyon, Box Elder county, that will entail expenditure within the next year of \$5,500,000.

The plant is to have a maximum capacity of 40,000 horsepower, under acceptance plans, and will be second only to the big Grace plant of the home company in capacity of its power output. The Grace plant has a capacity of about 53,000 horsepower.

Construction of the new plant will entail the employment of 1000 workmen for about a year. Practically every detail of construction work has been planned in advance, and has been worked out and approved by the expert engineering force of the Electric Bond and Share company, the big holding company which controls the Utah Power and Light and other public utility hydroelectric corporations. The finances are ready. Requisitions for equipment are in and the contract is awarded.

The one thing remaining before construction starts is the granting by the state engineer of the application of the power company for permit to use the waters of the Bear river at this point now going to waste. This application was protested by the Utah water storage commission, but, as was indicated at a meeting held Friday, an agreement probably will be reached in the near future which will set the construction machinery in motion.

Recommendation Made

A special committee of the water storage commission, studying the situation entirely from the point of view of the public interest, suggested that the commission, instead of protesting the granting of the application, recommend that it be granted with certain restrictions. These restrictions it is asserted by power company officials, are in line with the operating program and policy of the power company. Matter of detail, it is thought, can be worked out, and the attitude of both the power company and the water storage commission is one of cooperation, rather than of opposition.

D. C. Green, vice president and general manager of the power company, pointed out that the agricultural development of Utah is one of the things most earnestly sought by the power company, since it will be followed by huge increases in the market of the commodity the company sells, electric energy.

The proposed power plant covered by the latest project of the Utah Power and Light company would have an operating head of 123 feet, with capacity for a maximum discharge of 3500 second-feet of water through the turbines, developing 40,000 horsepower. This power development would be used at the maximum during the flood periods only. The water would be controlled to some extent by a reservoir with a storage capacity of 30,000 acre-feet. The site for this reservoir is owned by the Utah Power and Light company, and consists of marsh lands, so affected by seepage as to be of little use for any ordinary agricultural purpose. The proposed dam would be 100 feet to the crest of the structure, from bedrock, and 400 feet long.

Whereas the Bear river system of the Utah Power and Light company, with the exception of the comparatively small plant at Wheelon, is in Idaho, the Cutler site plant would be in Utah. This would add the cost of the plant, \$5,500,000, directly to the assessed valuation of the state and of Box Elder county. This is independent of the much larger value of property which will utilize the power to be developed.

Power Market Assured

The market for the power is assured, inasmuch as the electrical energy now being produced is being used. Moreover, until powersites in the Colorado River basin can be used, there is no other important powersite within the state of Utah awaiting development, according to company officials. The Colorado River basin projects are tied up for the present by the fact that Arizona has failed to ratify the Colorado river compact, and there is no assurance that it will do so in the near future. In any event, the nearness of the Cutler site to the center of the open market in Utah is of itself an advantage no other large site has.

The reservoir planned in connection with the proposed plant is only regulatory, impounding a total capacity of about 30,000 acre-feet at any one time, and possibly 75,000 acre-feet during the flood season. All surplus water during the flood season would be run through the plant, making possible the shutting down for that period of other plants on the system and storing the waters thus saved for use later in the year. For the remainder of the year the plant would operate on the stream flow of the Bear River, increasing the power supply of the state considerably.

Runoff Not Utilized

According to power company officials, the annual flood runoff of the Bear is around 1,000,000 acre-feet, which is not now utilized for any purpose, and the present outlook is that much of it never will be utilized. Practicable storage facilities for that volume of water are lacking and therefore much of it must pass down stream, sufficient for the purposes of the power company. The company's plan of operation, it is said, parallels the suggested restriction of the special committee of the water storage commission, and it is asserted that the development of the powersite will result in no loss of present or future water rights for other development, inasmuch as the power development is still possible after all restrictions necessary to protect any feasible irrigation development in the future have been imposed and observed.

The company is eager to have the construction work started, in view of the fact that there is now no other important source for power, immediately available, and the market will demand an increased supply of hydroelectric power by the time the proposed plant can be finished.—Tribune.

PHOTO 3-8 POWER COMPANY TO BUILD PLANT — NOV. 25, 1924

UTAH P. AND L. BEGINS BEAR RIVER PROJECT

**Actual Construction Starts
March 1st, When 1000
Men Will Be Employed.**

It was announced yesterday that the Utah Power & Light company will start immediately with an actual construction program, and that bids for two big 21,000-horsepower turbines and generators are already in. Within a day or two the contracts will be awarded for equipment that is the very latest word in hydro-electric machinery. The machinery is all specially designed and delivery is called for within twelve months, it is said.

In the meantime, while plans are already complete for the work in sufficient detail to permit of plans and specifications being drawn and accurate computations made on the cost, detail working plans are to be evolved. Construction equipment in the possession of the Utah Power & Light company, and its ally, the Phoenix Utility company, will be overhauled and placed in condition, and arrangements will be made for active field work.

It was stated Wednesday by Markham Cheever, chief engineer and superintendent of the company, that dirt will begin to fly about March 1st. From that time on, about 1,000 men will be kept busy until the plant is completed.

Beginning of this phase of the operations was made possible by the action of Lloyd Garrison, state engineer, in approving the application of the company for the water rights for this plant.

Following the conclusion of the conference, D. C. Green, vice president and general manager of the power company, and Mr. Cheever, told some of the details of the plans of the new plant which have already been worked out.

The power plant will be placed on a bend in the river just above the Wheelon plant. It will consist of two units, each including a turbine wheel of the largest type and a generator with a capacity of 15,000 kilowatts of electric energy, which is equivalent to about 21,000 horsepower for each unit, or 42,000 horsepower of electric energy when the plant is operating at capacity. At such times about 3,500 second-feet of water will pass through the turbines under a head of 123 feet.

The dam will be located a short distance above the plant. It will be of cement concrete construction, of a type described as combination gravity and arch dam. The crest of the dam will have a maximum height of 110 feet above bedrock, which at this point in the stream is close to the surface. The length of the dam over all will be about 500 feet.

The dam will hold back about 20,000 acre-feet of water, which will be enough, in case of emergency, to operate the power plant at capacity for about two and a half days. To do this would reduce the head of water at the power plant from 123 to about 120 feet. Below that level the reservoir is in the narrow canyon and stores but little water, while of course, the head would be reduced with great rapidity if attempt were made to keep the turbines going.

Leading from the lower part of the dam will be a huge steel pipe, 1,000 feet long and eighteen feet in diameter. This will conduct the water to a "surge tank," a steel water tower forty feet in diameter and 100 feet high, or high enough to overtop the water in the dam by ten or fifteen feet. From the surge tank the water is conducted toward the power plant and turbines, the pipe branching into two "penstocks," one for each wheel.

The generators, with rated capacity of 15,000 kilowatts, will generate power at 6600 volts. This will be transformed at the plant to 130,000 volts, in which shape it will be transmitted to the terminal plant, west of Salt Lake City, over a new single-circuit transmission line.

Some 75,000 cubic yards of cement concrete will be used in the new plant, nearly all of it in the dam. The plant will be the largest hydroelectric plant in the state, and will be second, in the company's system, to the 60,000 horsepower plant at Grace. The Grace plant has four generating units, so that the turbines and generators at

(Continued on Page Two)

UTAH P. & L. BEGINS BEAR RIVER PROJECT

(Continued from First Page)

the Cutler plant will develop more power per unit.

The Utah Power & Light company is just completing a new hydroelectric plant at Soda, Idaho, and the Jordan steam plant, in Salt Lake. With these completed, the company will have an aggregate rated generating capacity of 274,000 horsepower.

"It is necessary," said Mr. Green, "for a public service company such as ours to anticipate the demand, to be made on it for electric energy. The demand has been increasing at the rate of 8000 kilowatts, or around 11000 horsepower, annually, and the rate of increase appears to be accelerating. Since two years is required in the construction of the Cutler plant, we must look forward at least two years in our construction program. The addition of the Soda and the Jordan steam plant leaves us, of course, in condition to supply the present demand. But installed capacity must always keep ahead of the growth of the demand. Because, in a case of overload, it is not only the late comer who suffers, but all of the patrons of the system."

"The increase in demand is, in part, due to the natural growth of the state, and in part due to the industrial growth of the state, which is perhaps somewhat more rapid than its growth in population. On top of this combined increase in demand is the growth in the use of electric energy for all sorts of purposes. Electric appliances are daily becoming more popular."

It is because the Cutler plant will tie in with the Utah Power & Light system, it was explained, that it becomes an economically feasible proposition. The stream flow of the Bear river at this point is highly erratic. It would be much more so without the advantages of the storage reservoir in Bear Lake. During flood season, when a vast amount of water is now running to waste past the Wheelon plant, the Cutler plant will be operated to capacity. Energy developed here will be used in place of energy from power plants higher up on the Bear river, in Idaho, and all possible flood waters of the upper Bear river will be turned into Bear lake, to be turned down the river again during low water season, as demand may arise. At such low water seasons the Cutler plant will be operated as a peak plant, joggling along at perhaps one-third capacity with most of the flow of the Bear at such times passing through its turbines for the great part of the day; but in the event of a sudden demand arising, as, for example, the evening streetcar traffic in Salt Lake, drawing on its reserve water in the reservoir, and operating up to capacity for so long as the peak exists. The fact that company, and that a reservoir, sufficient plant is nearest to the Salt Lake terminal of all the larger plants of the company, and that the reservoir, sufficient to carry the plant for a few hours at capacity, is available, make it an economical plant for the system.

Construction work, once begun, will be prosecuted with comparatively steady force until the work is completed. Supplies will be purchased on the local market wherever possible, this being the policy of the company. Local men and their teams have the preference when labor is being hired and farmers of Box Elder county will find a market at the construction camp for their products, and also for their spare time next winter and at off seasons during the next two summers.

Company officials designate the Cutler reservoir as a regulating reservoir merely. What they mean by a storage reservoir is illustrated in Bear Lake, where it is said, there is winter enough, should the Bear River run dry entirely, to keep the power system in operation for 500 days. This and the power system on the Niagara river are said to be the only two plants in the world that could operate more than a year on their reserves, in case of an absolute drought.

PHOTO 3-9 UTAH P AND L BEGINS BEAR RIVER PROJECT - DEC. 5, 1924



PHOTO 3-10 UTAH POWER AND LIGHT CO. IS GRANTED PERMIT – JAN. 9, 1925

Cutler Development Project Discussed at Housewarming

Representatives of the Utah Power & Light Company and Local Speakers Predict Bright Future For Box Elder County

The annual housewarming of the Box Elder commercial club, held at the club rooms last evening was a very successful affair, and largely attended. Present from Salt Lake, representing the Utah Power & Light company, were P. M. Parry, commercial manager, Col. E. L. Bourne, advertising manager, and C. W. Lundquist, secretary to the vice-president.

President W. L. Smith presided, and after welcoming the guests, commented on the favorable prospects for a bright future for Box Elder county, with a splendid outlook for a large harvest, and the impetus that will be given business and conditions generally through the building by the Utah Power & Light company of the Cutler Development project in Bear River canyon.

E. W. Dunn was introduced as the first speaker. He said the morale of the people was much greater at the present time than in many years past, and the outlook for prosperity in Box Elder county was exceptionally bright, especially so since assurance was given of the erection of the large hydro-electric plant in Bear River canyon. "We want the Utah Power & Light company to know that if they are in need of any community interest and help," he stated, "they need go no further than Box Elder county." He discussed the proposed improvement of the road from this city north to Beaver Dam, and spoke of the growing demand for electric power among the farmers of the county.

A motion, made by Atty. LeRoy B. Young, to the effect that we get behind the proposed road movement, was unanimously carried. A resolution, read by Secretary J. Wesley Horsley, proposing that the name of the club be changed to the "Box Elder Commercial club and Chamber of Commerce," was given unanimous support by all present.

Colonel Bourne was the principal speaker of the evening, and in an interesting address, said:

"I read this afternoon of an occasion during the heat of last summer's political campaigns when Governor Al Smith of New York was invited to make an address at Sing Sing prison. He began his address by saluting the inmates as 'My fellow citizens.' Then he remembered that when his listeners entered Sing Sing they left their citizenship outside, so he started again and said, 'Fellow criminals.' For a candidate for the presidential nomination to say that, he realized, would give his political opponents a good measure of material for witty campaign speeches—so he finally started off by saying, 'I am glad to see so many of you here.'"

"Well, gentlemen, I can with propriety repeat the governor's last remark. I am glad to see so many here, and I would like to add that I am very glad to be here myself. I am not so hard put as Smith was to find the correct salutation with which to greet this gathering of northern Utah business-men—and so I say—Fellow stockholders.

"I am invited to say a few words about the new development of the Utah Power & Light Co., about to be started at what is known as the Cutler power site. But before doing so, permit me to make it clear just why you all many be regarded as stockholders in a public utility—whether you happen to own shares of stock in such a corporate organization or not. I am sure you will appreciate, more even than you do now, how much more personal is your interest in the Cutler development when the appropriateness of the word (stockholders) is pointed out as applicable to any gathering of businessmen.

"There are about 4,000,000 people in this country who own public utility securities—there are 6500 customers of the Utah Power & Light Co., in this section of the country who own its stock. But whether one is an actual shareholder or not, he has a certain proprietary interest in all of the country's utilities by reason of the fact that he is a depositor in a savings bank or a holder of life or fire insurance policies, or both. These institutions have put a considerable amount of the money you have deposited or have paid as insurance premiums into public utility securities as a safe and profitable investment and therefore the physical properties and the good will of these public utilities stands as a part of the security behind your savings deposits and the policies which safeguard your property from fire loss and assure your heirs material well being in the event of your death.

"Gentlemen, we hear much these days about propaganda. I want to assure you that I am not attempting to violate your hospitality and inject propaganda into this discussion. My sole purpose is to show that each of us, whether a shareholder in a public utility or not, has a close personal interest in them nevertheless and is concerned to the extent that we wish them to be sound and prosperous and efficient in order that our investments, our bank deposits, our property and the well-being of our kinfolks may be safeguarded. If I may I will further establish that I am not a propagandist by saying that the company I am privileged to represent has no stock to put upon the market—all of its issued stock is sold—and a lot of it hereabouts—and no more will be offered by the company for a long time to come.

"I know that you will be glad to know that the proceeds of the sale of Utah Power & Light Co. preferred stock goes into the improvement and development of the company's system. The money of the people of the communities served by the company stays at home for investments that greatly increase the value of the property. A large part of the money returns as wages to the men engaged in this enlargement program, and for the purchase locally of materials and supplies. Not only that, but the interest payments which run close to \$550,000 a year remain here among our own people. We are proud of this practical community service, gentlemen, and I would not have asked you to let me tell you these things if I did not believe that you would be glad to learn of the fact.

"Before dealing directly with the Cutler development, let me say just a few words descriptive of the Utah Power & Light company's interconnected hydro-electric system and the conditions which have brought about the need for the new plant at Cutler. The system serves 225 communities. Exclusive of the Wyoming and western Colorado territory, the system extends in a generally north and south line from Ashton, Idaho, to Huntington, Utah. Its customers number more than 85,000. There are 40 hydro stations operated, located chiefly on the Snake and Bear rivers and on streams in the vicinity of Logan, Ogden, Salt Lake City and Provo. A distinctive feature of the system is the Bear Lake storage development with its mammoth pumping plant at Liffon. It was the use of water stored there last year at the flood season that saved Utah and Idaho from a serious power shortage during the drouth of last year. Most of you are familiar also with the part Bear Lake storage played in saving the thirsty crops as well. This stored water did the same in 1919, when, according to government figures, instead of a total loss of fall crops, water pumped from Bear Lake saved \$5,000,000 worth of produce in Bear River valley.

"There were a great many sections of the country last fall that suffered greatly from power shortage—notably in southern California. Imperial Valley farming was almost totally crippled in consequence. This situation can never come about here because Bear Lake will always hold enough stored water to take care of this section one year in advance and if the run off in a given spring should be so low as to reach the danger point, the water that will already be in the great reservoir will last while steam plants are built and put in commission to tide over the emergency. It is difficult to estimate the practical value of Bear Lake water storage.

"The plants comprising the Utah Power & Light company system may roughly be divided into two types—those on unregulated streams and those on regulated streams. From the plants on the unregulated streams is taken the year round the maximum amount of power they can produce—naturally this is greater in the com-

(Continued on Page 2, Column 3.)

Continued on next page...

CUTLER DEVELOPMENT PROJECT DISCUSSED

(Continued From First Page)

paratively short season of high water than when the water runs low. These plants, though, never produce the amount of power required by the system load, so the plants on the regulated streams are called upon to produce just the amount required to make up the deficiency. No more is produced, because it is important to conserve water.

"When the water is low and when the unregulated streams are clogged with ice in winter time, the big plants on the regulated streams are called upon to do their best. When this is insufficient, the big reserve steam plant at Salt Lake City is called upon to supply the deficiency.

"Now as to the need for the new Cutler plant—in the 12 years since the Utah Power & Light company was formed, the population of the territory served has grown 52.1 per cent. The number of customers has increased 124.1 per cent. The connected load has increased 332.9 per cent. The system output of power has increased 219.5 per cent. The number of communities served has increased 61.5 per cent. The installed generating capacity has increased 86.8 per cent. The number of miles of line has increased 98.3 per cent. There has been over a period of years a steady increase in demand for power approximating 8,000 kilowatts or roughly 12,000 horsepower per year.

"Gentlemen, without light and power service, telephone service, steam and electric railways and other public utility service, communities do not grow. Manufacturers will not locate their plants where there is not adequate and dependable service from these utilities. We all want our communities to grow and prosper in order that we may share in the increased prosperity, which brings with it greater opportunities for enlarging upon the comfort and pleasure of living and keeps our sons and daughters at home instead of being forced to seek the larger centers for their careers.

"We could not await the outbreak of a great fire before we organized our city fire departments—neither can a public utility await the arrival of a demand for its service before constructing facilities for rendering it. The public service corporations must anticipate the future and build to meet it.

"Let me say here that the purpose of manufacturing power is the sale of power. Based on expertly calculated estimates, the Utah Power & Light company is certain that activity in all lines in this territory will continue to increase. [This is not merely optimism founded on hoping and wishing; it is confidence founded on research, investigation and mathematical calculation.] It should be very heartening to the people of Utah to know that this company has started, in its Cutler development, the investment of \$5,500,000 to meet the demands it is certain will have arrived two years hence.

A large part of this investment will be spent in this vicinity for labor, teams, foodstuffs, tools, construction equipment, cement and other necessary supplies—in fact, everything that can be supplied locally will be bought locally. The good people of Soda and Alexander will tell you that this is merely history's repeating itself.

"As to the Cutler plant itself, it can be described sufficiently in a few words. The Cutler power site is approximately eleven miles west and six miles north of Logan on a bend in the lower Bear River not far above the Wheelon plant. The plant will have a rated generating capacity of approximately 40,000 horsepower—the first large hydroelectric generating plant to be built in the state and second only to the company's big plant at Grace, Idaho, the largest on the system. There will be a regulating dam 110 feet high and 500 feet across at its widest point. It will be of the gravity type with a slight curve upstream for additional strength. The sides of the canyon are very sheer at this point and the useful water that will be stored will be that in the top ten feet of the pond. The reservoir will impound about 20,000 acre feet of water and when full will provide an operating head of 123 feet, sufficient to operate the plant at full capacity, all other water supply failing, for about two and one-half days. It will have, however, the benefit of Bear Lake storage and regulation as do the other plants of the Bear River system. The Cutler reservoir is not a storage reservoir, but is planned for stream regulation only.

"A feature of this plant will be the huge steel pipeline that will convey the water to the penstocks. This pipeline, taking water from the lower part of the reservoir, will be 1,100 feet long and 18 feet in diameter—large enough to drive a streetcar through comfortably. The water will be conveyed to two penstocks and then to the water turbines, driving two 1500 kilowatt, or 21,000 horsepower, generators, producing current at 6500 volts. This will be transformed at the station to 130,000 volts and conveyed to Terminal—the big substation west of Salt Lake City—over a new transmission line 50 miles long.

"The plant will contain 75,000 yards of concrete. A working force averaging 1,000 men will be employed for approximately two years, furnishing a labor market for all locally available labor. Work will commence at the powersite as soon as the break-up of winter permits. A veritable village will be built at the powersite as soon as the construction forces get on the ground and the region thereabouts will see activity on a scale that never before has been experienced there.

Mr. Parry stated that work on the Cutler Development project will commence as soon as spring breaks. He expressed appreciation of the support given this movement by the people of Brigham City and Box Elder county. The prosperity of the power company, he said, depends on the prosperity of its patrons, and we must work untidily together for mutual benefit. He gave an interesting account of the growth and development of electrical energy and its uses, during the past forty-five years, and said that the prospects for a remarkable growth were just as great, or more so, in the future, as they have been in the past. He gave figures to show that the electrical industry in the United States was greater than in other parts of the world, and said we are just as advanced in this line in the west as anywhere in this country. He assured the club members that the Utah Power & Light company is vitally interested in our community and in its development.

Mr. Lundquist, who was a resident of Brigham some 25 years ago, expressed pleasure in being present and in meeting his many old friends. He commented on the growth of Brigham City, and was pleased to know that the great hydro-electric project was to be built in this community.

R. Kaiser gave some interesting reminiscences of the boyhood days of "Chawley" Lundquist in this city, and of his associations with him. Musical numbers were furnished by Messrs. W. H. Griffiths, C. E. Baker and LeRoy Roskelley, and by Misses Dorothy and Willa Baker. Following the program, a buffet luncheon was served, under the direction of R. Kaiser.

PHOTO 3-11 CUTLER PROJECT DISCUSSED AT HOUSEWARMING – FEB. 13, 1925

City Officials Visit Cutler Dam Project.

Yesterday afternoon, Mayor and Mrs. Hervin Bunderson, Mr. and Mrs. Orson A. Christensen, James Jensen, C. O. Roskelley, N. C. Simonsen, Mrs. Jessie B. Jensen, Miss Trieste Box and Miss Hortense Holst of this city drove to the Cutler dam project of the Utah Power & Light company in Bear River canyon, where they joined with the auto excursionists from the Municipal convention, now being held at Smithfield, in a sight-seeing trip of inspection of the dam. At the project they were guests of the company, and after a trip through the workings, they were entertained at a big banquet, at which Owen A. Owens, presided as toastmaster.

Musical numbers were rendered consisted of duets and quartets by the Smithfield visitors, and community singing. During the serving of the banquet, interesting addresses were made by Mr. Owen A. Owens, Mr. Green, vice-president and manager of the Utah Power & Light company, and Mayor Clarence Neslen of Salt Lake City.

The visiting party inspected all the developments at the big dam, including the eleven-foot steel pipe line now nearing completion. The buildings have been completed and the machinery is now being set in place. Work on the concrete dam and intake is progressing favorably, under the direction of Mr. Fuller, and 600 men are employed on the project. An effort will be made to have the plant in operation by the middle of November.

Mayor Bunderson, Manager Roskelley and a number of the city officials went to Smithfield today to attend the closing session of the Municipal convention.

**PHOTO 3-12 CITY OFFICIALS
VISIT CUTLER DAM PROJECT -
SEPT. 3, 1926**

Civic Clubs Endorse Dam Projects

PHOSPHATE CITED AS FUTURE INDUSTRY

Urge Increases In Water Storage Facilities of Area

SODA SPRINGS—The industrial development of southeastern Idaho is contingent on the construction of water storage facilities and power plants in this area it was stated at a meeting of Southeastern Idaho Associated Civic clubs in a meeting here Friday evening.

Delegates from all sections of southeastern Idaho endorsed a resolution to that effect and urged that Cutler dam on Bear river be raised at least 10 feet to provide additional water supply.

They endorsed the construction of Snake river upper South Fork dam as another step toward industrial development.

John Norris, manager of the Conda Mining company, spoke on mining development in this area, pointing out that the deposits of phosphates will become one of the major industries of the intermountain west.

President Elmer G. Peterson of the USAC reviewed the resources of southeastern Idaho, urging the development of phosphate deposits which he said were potentially the richest in the west as a major industrial development.

Attending the meeting from Preston were Ben Johnson, president of the organization, Commissioner Frank Shrives, Jed Lewis, president of the Preston Chamber of Commerce, Secretary M. M. Reeves, T. R. Bowden and R. R. Rowell.

**PHOTO 3-13 CACHE VALLEY
CLARION: CIVIC CLUBS
ENDORSE DAM PROJECTS -
MAY 29, 1941**

FIGURES GIVEN ON BIG DAM AT CLUB MEETING

OGDEN, April 21.—Some ideas of the immensity of the Cutler dam, to be built by the Utah Power and Light company in Bear River canyon, were given today by J. R. Jarvis, division engineer for the company, in an address before the Exchange club.

Mr. Jarvis said that 1500 tons of cement, ninety tons of reinforcing steel 1500 tons of lacework steel, 900 tons of brick, and about 1,000,000 feet of lumber would be used in the building of the dam. The dam will be 125 feet high and 500 feet long, forming a reservoir of 6300 acres and backing up the water for about fifteen miles, the speaker reported.

About 200 men are now working on the project and no larger force will be employed until July, Mr. Jarvis stated.

C. R. Hollingsworth, president of the club, presided, and Marcellus Smith gave two violin selections, accompanied on the piano by D. Sterling Wheelwright, club pianist.—Tribune.

**PHOTO 3-14 BIG DAM AT
CLUB MEETING - APRIL 24,
1925**

NORTH CACHE NEWS ARTICLES:

<p>CACHE COUNTY URGED FOR STORAGE POND</p> <p>Civic Group at Soda Springs Interested in Cutler Dam Project to Help Irrigators.</p> <p>SODA SPRINGS, Idaho — Industrial development of southeastern Idaho—"potentially the richest area in the intermountain west" contingent upon construction of water storage facilities and power plants.</p> <p>Such was the opinion of 100 members of southeastern Idaho Associated civic clubs, who Saturday were on record in a pledge to cooperate with Utah groups in efforts toward raising Cutler dam on Bear River about 10 feet as the initial step in development of water facilities.</p>	<p>It was pointed out in a unanimously adopted resolution suggested by the association agricultural development committee, headed by Moroni Lowe of Grace, that rising the dam would assure lower Bear river valley water users a sufficient supply to fill their requirements and release a goodly portion of the upper Bear river flow for storage in several suggested dam sites for production of electric power and extension of irrigation farming in southeastern Idaho.</p> <p>President Elmer G. Peterson of Utah State Agricultural college principal speaker at the association banquet meeting Friday night in Soda Springs, declared the "excellent gesture by Southeastern Idaho civic club members in support of this out-of-state project is one of the most constructive yet recorded—and definitely foretells a new area of cooperative development of the Intermountain west and southeastern, Idaho.</p>	<p>The association also unanimously adopted a resolution by the agricultural committee that construction of the proposed Snake river Upper South Fork dam is imperative if the state is to have proper and adequate electric power to develop the state's enormous phosphate deposits.</p> <p>Eventual development of the phosphate deposits is "definitely certain," Dr. Peterson, chairman of the National Committee on Phosphate Resources of the Association of American Land Grant College and Universities, told the association delegates Friday night.</p> <p>"The phosphate beds of southeastern Idaho and northeastern Utah make the areas potentially the richest in the intermountain west," said Dr. Peterson.</p> <p>Eventually the phosphate beds will provide the same amount of employment the same amount of wealth and income as the mining industry of the entire intermountain west provides at present," he added.</p> <p>The two states also have an additional source for a tremendous income in scenic Bear lake and in the several mineral springs of the area, Dr. Peterson continued. "These priceless resources need only development and advertising to bring added tourist produced in the southeastern revenue to the two states, and without doubt, these attractions will come into their own as wealth producers in the not too distant future."</p>	<p>Touching upon other resources of southeastern Idaho, Dr. Peterson pointed out that 30 per cent of Idaho's agricultural income is counties, and 30 percent of the states livestock industry is in the section.</p> <p>John Norris general manager of the Conda Mining company at Conda, reported 1940 was a record year for production of phosphate fertilizer from the Idaho deposits and predicted a new high will be established this year.</p> <p>Ben B. Johnson of Preston, association president, was toastmaster at the banquet.</p> <p>Committee reports, all showing progress, included those by Max D. Cone of Arimo, roads; Rulon R. Bartehi of Montpelier, advertising and publicity, Albert Allmond of Downey, irrigation developments, and L. W. Nye and W. B. Hunt of Lava Hot Springs on the development of the state-sponsored spa.</p>
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PHOTO 3-15 CACHE COUNTY URGED FOR STORAGE POND – MAY 30, 1941

Irrigation Projects Planned for Bear River Basin Would Provide Work

An inventory of eight potential irrigation and multiple purpose projects in Utah and Idaho which could be included in a postwar public works program of the Bureau of Reclamation, was listed today by E. K. Thomas, project engineer in charge for the Bear River basin.

The projects are part of 236 outlined by Secretary of the Interior Harold L. Ickes when he met recently before the senate committee on postwar economic planning and policy, Mr. Thomas said.

Major objectives of the projects would be employment and permanent settlement on irrigated land for returning servicemen and demobilized industrial workers.

He explained that according to the report made to the senate, the entire country would benefit from construction activities. The greater part of the construction work would be done in the first three or four years.

"Although the figures have not been broken down for Utah or this area, more than 135,000 irrigated farms would be created and a population of 125,000, persons would be supported by the new agricultural operations", Mr. Thomas said, quoting the report.

The list of potential projects are preliminary and subject to revision as basin and project field reports now underway may reveal other projects more feasible or desirable, he said.

The projects in the Bear River basin were listed as follows:

Cutler dam on Bear River, improvement of existing and installation of new pumps and canals, 33,000 acres served; Malad valley, dams and canals, 4900 acres; Montpelier, Idaho, dams and canals, 26,000 acres; Paris, Idaho, dam and canal, 5000 acres; Oneida (Bear and Green river basins), dam, powerplant, and canals, 74,000 acres in Utah, Idaho and Wyoming; Evanston, Wyo., dams and canals, 25,000 acres; Woodruff narrows, dams and canals, 37,000 acres in Wyoming and Utah; South Cache project, Hyrum, 10,000 acres in southern Cache valley, dams and canals.

ALIAS SUMMONS

In the District Court of the First Judicial District of the State of Utah, in and for the County of Cache.

ADELIA OLSEN, Plaintiff, vs. Edna Davidson, as administratrix of the Estate of Thomas Davidson, deceased, A. B. Nyman, as administrator of the Estate of Swen Carlson, deceased, Magdalena Edlefsen, Mrs. E. B. Edlefsen, Noah C. Edlefsen, James Edlefsen, Victor Edlefsen, and wife Jane Doe Edlefsen, Lee Bunce and wife Jane Doe Bunce, Frank Haskill and wife Jane Doe Haskill and William Haskill and wife Jane Doe Haskill, heirs at law of Neils C. Edlefsen, deceased, and all other persons unknown, claiming any right, title, interest or estate or lein upon the real estate hereinafter described in the complaint, adverse to the plaintiff's ownership or clouding plaintiff's title thereto. Defendants.

THE STATE OF UTAH TO SAID DEFENDANTS:

You are hereby summoned to appear within twenty days after service of this summons upon you if served within the county in which this action is brought, otherwise within thirty days after service, and defend the above entitled action, and in case of your failure so to do, judgment will be rendered against you according to the demand of the complaint.

This action is brought to quiet the title to the following described land in Cache County, Utah, to-wit:

The South eight-tenths (8/10th) of Lot 2, Block 14, Plat "A", Logan Farm Land Survey, containing 8 acres more or less, and situated in the Northeast quarter of Section 22, and the Southeast quarter of Section 15, Township 12 North of Range 1 East of the Salt Lake Meridian.

NEWEL G. DAINES, Attorney for Plaintiff.

Post Office Address
211 Cache Valley Bank Bldg.
Logan, Utah.

PHOTO 3-16 IRRIGATION PROJECTS PLANNED FOR BEAR RIVER BASIN WOULD PROVIDE WORK - JUL. 21, 1944

ELECTRICITY IN UTAH

Describing the electrical power development by the Utah Power and Light company the Wall Street Journal says:

"There are 40 generating stations, one of them a steam station in Salt Lake City with 36,000-kilowatt capacity. The water power possibilities of the Utah Power and Light company is 225,575 kilowatts. At Cutler station in Bear River canyon, water is stored behind a dam, 110 feet high, 510 feet long and 50 feet thick at the base, and with a capacity for electrical development of 30,000 k. w. This dam impounds 17,000 acre-feet of water and it has a head against the plant of 156 feet. The largest station of the Utah Power and Light company is that at Grace with an output of 44,000 k. w. The water storage in Bear lake is 140 square miles and 100,010,000 acre-feet, sufficient to run the generating plants which it feeds at full capacity for two years should no water be run into this gigantic basin in that time. Power is drawn from take-off of Bear lake through Bear river. Among the customers of the Utah Power and Light company are farmers who use 17,300 horsepower for pumping water for irrigation purposes; 200 communities which secure power and light from Utah Power and Light company, and 7000 electric stove users. The development is the sixth largest in the United States and Canada and it has 5000 miles of high tension and distributing lines. At Flaming gorge on the Colorado river, the Utah Power and Light company has a power site which developed will be 875 feet long, 270 feet high and 60 miles long with a generating capacity of 63,000 horsepower."

Utah is keeping up with the electrical development of the country.

PHOTO 3-18 ELECTRICITY
IN UTAH - MAR. 15, 1927

SALT LAKE TELEGRAM ARTICLES:

Logan Men Inspect Cutler Dam Project

LOGAN, June 12.—Directors of the Logan chamber of commerce and leading citizens, on the suggestion of Robert Anderson, president of the chamber, visited the Cutler dam project and the hydro-electric plant in Bear River canyon last Wednesday. E. R. Owen of the Utah Power and Light company played host.

To make room for the power house, they were told, it was necessary to remove 8500 cubic yards of rock and thousands of yards of earth. A large crane at the top of the structure can lift 100 tons. Each of the two water wheels weigh 200 tons and has a capacity of 20,000 horsepower. The copper pipeline is of huge proportions and 12,000 cubic yards of rock and 10,000 yards of earth were displaced for it. The pipe is eighteen feet in diameter and weighs 2,000,000 pounds.

The dam will extend across the canyon, the work being pushed vigorously. More than 50,000 cubic yards of cement will be used in its construction. The height will be 113 feet and its length 545 feet.

Miles of roadway had to be built to give access to the scene before work could start. Then a boarding house, office, homes and other building had to be built.

Before the dam could be put into operation, since it will flood a good portion of the lowlands of the valley as far up as Smithfield, it was necessary to purchase the lands that would be inundated and to construct new country roads. The estimated cost of the project is more than \$5,000,000.

A banquet followed the inspection. Professor William Peterson of the Utah Agricultural college told how the valley was once covered by a lake, great swamps and peat beds, and how a great upheaval raised the general level and created mountain peaks.

PHOTO 3-19 LOGAN MEN
INSPECT CUTLER DAM
PROJECT - JUN. 13, 1926

POWER CREWS PATROL LINES

Working in freezing weather, hardy line crews Monday continued to battle the forces of old man winter to prevent a recurrence of Saturday's power failure when heavy ice broke three 130,000-volt electric transmission lines to throw the northern part of the state into a 30-minute "unscheduled blackout."

The lines were repaired and full service restored Saturday afternoon, but danger still exists in the mountain pass area north and east of Cutler, Utah Power and Light company officials reported.

"We are out of trouble now but as long as present weather conditions continue, there will be a hazard," George M. Gadsby, president and general manager of the Utah Power and Light company, said.

Fog Still Freezing

Fog is still freezing on the lines, but crews totaling approximately 100 men are at work removing the ice rings from a 21-mile section of the transmission lines by sawing off the accumulations with ropes, power company officials explained.

The danger area stretches from 12 miles north to nine miles south of Cutler, and with the three lines to be kept free of ice, crews have a total of 63 miles of transmission line to patrol.

Each of the three lines is "killed" in turn as the crews work back and forth sawing off the ice rings, they explained.

Unusual Breakdown

The breakdown was unusual in that it was the first time in the history of the power company that all three lines broke at the same time. In an emergency one line can carry the necessary load, officials said.

Mr. Gadsby praised cooperation of families, business and industrial concerns who cooperated in curtailing the use of electric power while repairs were being made Saturday.

Abnormal demands on small hydroelectric and steam plants in the state, which were called into increased production to provide partial restoration of power Saturday, caused several minor damages to lines in the company's system, but these were repaired Sunday.

PHOTO 3-20 POWER CREWS
PATROL LINES - DEC. 21,
1942

<p>\$181,472,000 Projects Planned for Utah</p> <p>WASHINGTON, April 12 (AP)—A postwar construction program totaling \$181,472,000 has been prepared for Utah, Secretary of Interior Harold L. Ickes reported Thursday to the house irrigation and reclamation committee.</p> <p>The projects, some already under construction and some only under study, include the following:</p> <p>Under construction:</p> <p>Provo river—Earth dike, canals, (See Page Five. Column Three)</p>	<p>FDR Urges West Reclamation</p> <p>(Continued From Page One)</p> <p>pumps, Provo river; municipal water supply and supplemental irrigation for 100,000 acres; \$9,000,000.</p> <p>Scofield — Earth dam, Price river; flood control and supplemental irrigation for 13,869 acres; \$500,000.</p> <p>Under study:</p> <p>Gooseberry—Earth dam, tunnel, canals, Price river; supplemental irrigation for 20,000 acres; \$1,440,000.</p> <p>Ogden river extension — Earth dam, canals, pumps, Ogden river; municipal water supply, irrigation for 2000 acres; \$1,878,000.</p> <p>Weber delta—Pump plant, wells, canals, Weber river; irrigation for 6000 acres; \$927,000.</p> <p>Santa Clara—Earth dam, canals, Santa Clara creek; irrigation for 2000 acres, supplemental irrigation for 1700 acres; \$1,700,000.</p> <p>Emery county — Earth dam, canals, Cottonwood creek; irrigation for 3300 acres, supplemental irrigation for 20,000 acres; \$2,500,000.</p>	<p>Brush Creek Project</p> <p>Jensen — Earth dam, Brush creek; irrigation for 800 acres, supplemental irrigation for 3600 acres; \$300,000.</p> <p>Hurricane—Concrete dam, tunnels, canals, Virgin river; power, irrigation for 11,000 acres, supplemental irrigation for 7500 acres; \$9,700,000.</p> <p>Vernal — Earth dam, canals, Ashley creek; irrigation for 1900 acres; supplemental irrigation for 22,300 acres; \$1,500,000.</p> <p>Ouray valley and miscellaneous —Earth dam, canals; irrigation for 4000 acres, supplemental irrigation for 7000 acres; \$5,000,000.</p> <p>Strawberry extension, Diamond fork—Earth dams, power plant, Sixth Water creek; power, flood control, irrigation; \$4,990,000.</p>	<p>Green River Power</p> <p>Uintah-Echo park unit — Concrete dam, power plant, Green river; power; \$46,000,000.</p> <p>Provo river extension — Earth dam, tunnels, canals, Provo river; irrigation for 6000 acres, supplemental irrigation for 5000 acres; \$10,000,000.</p> <p>Manila — Earth dikes, canals, Henry's fork; irrigation for 21,000 acres, supplemental irrigation for 9000 acres; \$1,462,000.</p> <p>South Cache—Two earth dams, canals, Little Bear river; irrigation for 9260 acres, supplemental irrigation for 5000 acres; \$2,200,000.</p> <p>Cutler — Concrete dam, pumps, canals, Bear river; irrigation for 3000 acres, supplemental irrigation for 30,000 acres; \$5,000,000.</p> <p>Dewey reservoir — Earth dam, power plant, Colorado river; power, flood control (estimated to be capable of generating 75,000 kilowatts); \$41,000,000.</p> <p>Duchesne Water</p> <p>Moon lake extension — Earth dam, canals, Duchesne river; municipal water supply, irrigation for 13,500 acres; \$4,500,000.</p> <p>Woodruff — Earth dam, canals, Bear river; irrigation for 12,000 acres, supplemental irrigation for 25,000 acres; \$3,000,000.</p> <p>Bluff—Concrete dam, San Juan river; power, flood control; \$16,000,000.</p> <p>Transmission lines—\$9,000,000.</p>
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PHOTO 3-21 PROJECTS PLANNED FOR UTAH – APR. 12, 1945

FINAL LICENSE APPLICATION

EXHIBIT D

STATEMENT OF COSTS AND FINANCING

CUTLER HYDROELECTRIC PROJECT

(FERC No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC No. 2420)**

**FINAL APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT D
STATEMENT OF COSTS AND FINANCING**

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1.0 ORIGINAL COST OF EXISTING UNLICENSED FACILITIES

PacifiCorp is applying for a new license. This application is not for an initial license; therefore, a statement of the original cost of Cutler Hydroelectric Project (Project) land or water rights, structures, or facilities is not applicable under 18 CFR § 4.51(e).

2.0 ESTIMATED AMOUNT PAYABLE UPON TAKEOVER PURSUANT TO SECTION 14 OF THE FEDERAL POWER ACT

Under Section 14(a) of the Federal Power Act (FPA), the Federal government may take over any project licensed by the FERC upon the expiration of the original license. FERC may also issue a new license in accordance with Section 15(a) of the FPA. If such a takeover were to occur upon expiration of the current license, PacifiCorp would have to be reimbursed for the net investment, not to exceed fair value, of the property taken, plus severance damages. To date, no agency or interested party has recommended a federal takeover of the Project pursuant to Section 14 of the FPA.

2.1 FAIR VALUE

The fair value of the Project is dependent on prevailing power values and license conditions, both of which are currently subject to change. The best approximation of fair value would likely be the cost to construct and operate a comparable power generating facility. Because of the high capital costs involved with constructing new facilities and the increase in fuel costs associated with operation of such new facilities (assuming a fossil fuel replacement), the fair value would be considerably higher than the net investment amount. If a takeover of the Cutler Hydroelectric Project were to be proposed, PacifiCorp would calculate fair value based on then-current conditions.

2.2 NET INVESTMENT, ACCUMULATED DEPRECIATION, AND BOOK VALUE

This section outlines the net investment for the Project for the most recently available year. The net book investment for the Project is approximately \$14,852,718 as of the end of 2020 (PacifiCorp 2020). Table 2-1 shows original costs, accumulated depreciation, and net investment, under FERC's Uniform System of Accounts from 2016 to 2020.

TABLE 2-1 CALCULATION OF NET INVESTMENT 2016 TO 2020 PERIOD

ACCOUNT	PLANT BALANCE FOR YEAR ENDING DECEMBER 31				
	2016	2017	2018	2019	2020
(1)	(2)	(3)	(4)	(5)	(6)
ORIGINAL COST					
330 Land and Land Rights	3,511,105	3,511,105	3,511,105	3,511,105	3,511,105
331 Structures and Improvements	3,985,318	4,006,226	4,042,960	4,712,789	4,812,876
332 Reservoirs, Dams, and Waterways	9,177,687	10,610,438	10,073,946	10,043,511	9,980,722
333 Water Wheels, Turbines, and Generators	11,999,276	11,999,353	12,075,670	12,075,557	12,071,695
334 Accessory Electric Equipment	2,687,956	2,688,253	2,950,968	2,952,280	2,923,519
335 Misc. Power Plant Equipment	11,124	11,124	11,124	11,124	11,124
336 Roads, Railroads, and Bridges	572,059	570,519	569,655	590,232	1,086,176
Total	31,944,525	33,397,019	33,235,428	33,896,598	34,397,218
BOOK DEPRECIATION RESERVE					
330 Land and Land Rights	(67,381)	(72,243)	(74,460)	(78,561)	(81,661)
331 Structures and Improvements	(2,228,698)	(2,443,858)	(2,574,537)	(2,747,904)	(2,944,032)
332 Reservoirs, Dams, and Waterways	(4,472,980)	(4,901,572)	(5,191,718)	(5,619,682)	(5,938,997)
333 Water Wheels, Turbines, and Generators	(5,050,678)	(5,897,665)	(6,546,030)	(7,414,530)	(8,217,498)
334 Accessory Electric Equipment	(1,180,097)	(1,366,781)	(1,524,287)	(1,716,648)	(1,899,262)
335 Misc. Power Plant Equipment	(8,022)	(8,724)	(9,116)	(9,747)	(10,138)
336 Roads, Railroads, and Bridges	(356,764)	(387,795)	(405,735)	(437,075)	(452,912)
Total	(13,364,620)	(15,078,638)	(16,325,884)	(18,024,147)	(19,544,500)
NET BOOK VALUE					
330 Land and Land Rights	3,443,724	3,438,862	3,436,645	3,432,544	3,429,444
331 Structures and Improvements	1,756,620	1,562,367	1,468,423	1,964,885	1,868,845
332 Reservoirs, Dams, and Waterways	4,704,707	5,708,866	4,882,227	4,423,829	4,041,725
333 Water Wheels, Turbines, and Generators	6,948,598	6,101,688	5,529,640	4,661,027	3,854,197
334 Accessory Electric Equipment	1,507,859	1,321,472	1,426,680	1,235,632	1,024,257
335 Misc. Power Plant Equipment	3,102	2,400	2,008	1,377	986
336 Roads, Railroads, and Bridges	215,295	182,725	163,920	153,158	633,264
Total	18,579,905	18,318,381	16,909,544	15,872,451	14,852,718

Source: PacifiCorp 2021

2.3 SEVERANCE DAMAGES

Severance damages are determined either by the cost of replacing (retiring) equipment that is “dependent for its usefulness upon the continuance of the License” (Section 14, FPA), or the cost of obtaining an amount of power equivalent to that generated by the Project from the least expensive alternative source, plus the capital cost of constructing any facilities that would be needed to transmit the power to the grid, minus the cost savings that would be realized by not operating the Project. These values would be calculated based on power values and license conditions at the time of Project takeover.

3.0 ESTIMATED COST OF NEW DEVELOPMENT

Under 18 CFR § 4.51(e)(3), this section will describe any proposals for new development, including a detailed statement of estimated costs and any land or water rights necessary for the new development.

3.1 LAND AND WATER RIGHTS

PacifiCorp is not proposing the expansion of any of its land or water rights as a consequence of this license application. As described in Exhibit E, PacifiCorp is proposing a modest change to the Project's operational water elevation ranges; however, this operational change would not require PacifiCorp to modify its water or land rights.

3.2 COST OF NEW DEVELOPMENT WORK

PacifiCorp does not propose to include additional power generation facilities to the Project as part of the application; therefore, a statement of estimated cost of new development is not applicable.

4.0 ESTIMATED AVERAGE ANNUAL COST OF PROJECT

This section is a statement of the estimated average annual cost of the total Project as proposed, specifying any projected changes in the costs (life-cycle costs) over the estimated financing or licensing period if the applicant takes such changes into account. The estimated average annual operation and maintenance (O&M) costs of the Project over the period of 2016 to 2020 was \$1,952,039 as shown in Table 4-2.

4.1 CAPITAL COSTS

Actual capital expenditures are based on a combination of funding mechanisms that includes stock issues, debt issues, revolving credit lines, and cash from operations. PacifiCorp plans to make large capital improvements of like-for-like replacement of the spillway gates and flowline supports (as needed) once the Project has obtained a new license. Additional detail regarding these and similar upgrade projects, including a new retaining wall between the flowline and the river, are included in Exhibit A and Section 4.0 of Exhibit E. Additionally, components such as dedicated lifting hoists to enable remote Project operation, may be installed to effect Energy Imbalance Market (EIM) capabilities.

Capital and annual cost estimates for the proposed Protection, Mitigation, and Enhancement (PM&E) measure proposals are provided in Table 4-1. For further details on these proposed PM&E measures, see Exhibit E, Table 4-3, of this FLA.

TABLE 4-1 COST OF PROPOSED PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

PROPOSED PM&E MEASURES	CAPITAL COSTS (2022\$)	ANNUAL COSTS (2022\$)
GEO-1	\$25,000	\$35,000
GEO-2	\$1,800,000	\$0 – Included in GEO-1 O&M cost
GEO-3	\$N/A	\$0 – Included in GEO-1 O&M cost
GEO-4	\$N/A	\$0 N/A - ongoing Project Operations cost
GEO-5	\$12,000	\$ N/A
WR-1	\$N/A	\$ N/A - ongoing Project Operations costs
WR-2	\$N/A	\$1,000
WR-3	\$12,000	\$100,000 every 5 years; annual cost averages to \$20,000
BOT-1	\$25,000	\$15,000
BOT-2	\$250,000	\$60,000
WILD-1	\$175,000	\$40,000
WILD-2	\$25,000	\$8,000 additional to the GEO-1 O&M costs
SS-1	\$10,000	\$2,000
TE-1	\$20,000	\$8,000
TE-2	\$N/A	\$0 – Included with BOT-1, BOT-2, and LU-1 O&M costs
REC-1	\$15,000	\$N/A
REC-2	\$25,000	\$25,000
REC-3	\$10,000/year; starting in 2032	\$150,000
REC-4	\$350,000	\$0 – Included in REC-3 O&M costs
REC-5	\$250,000	\$0 – Included in REC-3 O&M costs
REC-6	\$Included in REC-1 and REC-4 capital costs	\$0 – Included in REC-3 O&M costs
REC-7	\$Included in REC-1 and REC-4 capital costs	\$0 – Included in REC-3 O&M costs
REC-8	\$15,000	\$0 – Included in REC-3 O&M costs
REC-9	\$100,000	\$0 – Included in REC-3 O&M costs
REC-10	\$10,000	\$10,000
REC-11	\$300,000	\$10,000 (additional to REC-3 O&M costs)
CUL-1	\$5,000	\$7,000
CUL-2	\$10,000	\$2,000
LU-1	\$40,000	\$40,000
LU-2	\$4,500,000	\$30,000

PROPOSED PM&E MEASURES	CAPITAL COSTS (2022\$)	ANNUAL COSTS (2022\$)
LU-3	\$25,000	\$Included in LU-2 O&M costs
LU-4	\$30,000	\$20,000
LU-5	\$110,000	\$0 – Included in LU-2 O&M costs
LU-6	\$20,000	\$N/A
TOTAL:	\$8,169,000	\$483,000

Source: PacifiCorp 2022

4.2 LOCAL, STATE, AND FEDERAL TAXES

PacifiCorp paid approximately \$202,000 in city, county, state, and federal property taxes for the Project in 2020.

4.3 DEPRECIATION AND AMORTIZATION

The annualized composite rate of depreciation for the Project was 6.20 percent through December 31, 2020. Beginning January 1, 2021, the annualized composite rate of depreciation for the Project is 1.00 percent.

4.4 OPERATION AND MAINTENANCE EXPENSES

The estimated average annual O&M costs of the Project’s power production as of the end of 2020 was \$1,952,039 as outlined in Table 4-2. This estimate includes costs associated with existing Project operations and maintenance, as well as local property and real estate taxes, but excludes income taxes, depreciation, and costs of financing. Other, non-production O&M costs are outlined in Table 4-3.

TABLE 4-2 ANNUAL O&M PRODUCTION EXPENSES 2016 TO 2020

DESCRIPTION	2016	2017	2018	2019	2020	5-YEAR AVERAGE
Operation Supervision and Engineering	141,833	120,721	114,749	129,376	127,719	126,880
Water for Power	0	0	0	0	0	0
Hydraulic Expenses	113,412	107,672	118,394	114,728	132,447	117,331
Electric Expenses	0	0	0	0	0	0
Miscellaneous Hydraulic Power Generation Expenses	1,224,554	1,250,710	1,318,206	1,428,546	1,233,177	1,291,039
Rents	20,286	45,766	(11,112)	18,011	48,865	24,363

DESCRIPTION	2016	2017	2018	2019	2020	5-YEAR AVERAGE
Maintenance Supervision and Engineering	0	0	0	0	0	0
Maintenance of Structures	13	3,203	0	0	0	643
Maintenance of Reservoirs, Dams, and Waterways	33,001	12,593	26,358	5,682	744	15,676
Maintenance of Electric Plant	26,634	16,582	5,835	16,407	0	13,092
Maintenance of Miscellaneous Hydraulic Plant	326,270	341,873	446,423	334,104	366,412	363,016
TOTAL PRODUCTION EXPENSES	1,886,003	1,899,120	2,018,853	2,046,854	1,909,364	1,952,039

Source: PacifiCorp 2021

TABLE 4-3 OTHER NON-POWER PRODUCTION O&M COSTS 2016 TO 2020

DESCRIPTION OF OTHER O&M COSTS	2016	2017	2018	2019	2020
Recreation Maintenance and Contractor Costs	285,158	272,063	355,842	297,579	293,038
Employee Labor	57,377	62,292	83,924	44,664	78,382
Employee Expenses	1,664	1,696	1,698	1,439	1,704
Relicensing Costs*	N/A	N/A	N/A	N/A	N/A
Other	0	0	0	0	0

Note: *Relicensing costs are categorized as capital expenditures; see details in Exhibit E, Table 4-3.

Source: PacifiCorp 2022

4.5 CAPITAL FOR PROPOSED ENVIRONMENTAL MEASURES

Table 4-1 lists the proposed environmental PM&E measures, which are further detailed in Exhibit E of this Final License Application.

5.0 ESTIMATED ANNUAL VALUE OF PROJECT POWER

Section 5.0 describes the estimated annual value of Project power, based on the contract price for sale of power or the estimated average annual cost of obtaining an equivalent amount of power (capacity and energy) from the lowest cost alternative source, specifying any projected changes in the cost of power from that source over the estimated financing or licensing period if PacifiCorp takes such changes into account.

PacifiCorp estimates a 30-year average (over the most recent period, 1991 to 2020) annual generation of 75,052 megawatt hours (MWh). PacifiCorp serves 2 million retail customers, representing residential, commercial, and industrial sectors, including 1,233,000 in Utah, Idaho, and Wyoming as Rocky Mountain Power, and an additional 816,000 in Washington, Oregon, and California as Pacific Power. In 2020, the combined load requirements for all locations were approximately 60,000,000 MWh.

Power generated at the Project is used to serve PacifiCorp loads in the PacifiCorp East Balancing Area Authority with possible use within the Western EIM administered by the California Independent System Operator (CAISO). The CAISO runs the Western EIM, dispatches generation resources, and financially settles the real-time market, including generation and load. For more information on the value of Project power, please see Section 8.0.

The net book value of the Project through December 31, 2020, is presented in Table 2-1.

6.0 SOURCES AND EXTENT OF FINANCING

PacifiCorp's current financing needs are generated from internal funds. PacifiCorp is likely to finance major enhancements through earnings retention, equity contributions, and loans made by the corporate parent or some combination of those mechanisms. PacifiCorp has ample annual revenues and financing options to meet its cost of operation for the term of a new license.

7.0 COST TO DEVELOP LICENSE APPLICATION

The cost for PacifiCorp to relicense the Project under the Integrated Licensing Process through the filing of the FLA is outlined in Table 4-3, and is further detailed in Exhibit E of this FLA.

8.0 ON-PEAK AND OFF-PEAK VALUES OF PROJECT POWER

This section provides the on-peak and off-peak values of Project power, and the basis for estimating the values, for projects which are proposed to operate in a mode other than run-of-river.

The Project is a PacifiCorp asset and is under the oversight of the State of Utah Public Service Commission. As shown in Table 8-1, the estimated previous 5-year average (2016 to 2020) annual value of on-peak generation and off-peak generation is \$1,257,315, and \$830,796, respectively. The average combined value of both on-peak and off-peak use is \$23.90 per MWh. Values of on-peak and off-peak generation are based on average historical data from 2016 to 2020. Values can vary depending upon market conditions, and therefore should only be used as an approximation of the value of power. Further, the table does not include the ancillary services benefit of approximately \$4,101,766 that is derived from the number of hours (approximately 171,622 over the five-year period indicated) that the Project is declared available for spinning reserves (although typically only called-out once a year to meet short-term demand; spinning reserve episodes last a few hours at most).

TABLE 8-1 CUTLER PROJECT ESTIMATED PREVIOUS 5-YEAR AVERAGE GROSS REVENUE FROM ON-PEAK AND OFF-PEAK GENERATION (2016-2020)

DESCRIPTION	ENERGY (MWH)	NOMINAL MARKET PRICE (\$/MWH)	AVERAGE GROSS ANNUAL REVENUE (\$)
Average Annual On-Peak Generation	49,593	25.55	1,257,315
Average Annual Off-Peak Generation	38,445	21.78	830,796
Average Combined On-Peak and Off-Peak Generation	88,038	23.90	2,088,111

Note: See Exhibit E, Table 4-2 for additional information regarding the existing (No Action) and Proposed Action costs and revenues.

Source: PacifiCorp 2021

9.0 ESTIMATED AVERAGE ANNUAL INCREASE OR DECREASE IN PROJECT GENERATION

As outlined in Exhibit B, PacifiCorp is proposing minor operational fluctuations in Cutler reservoir elevations; however, the proposed changes in the operational regime are negligible and short-term and would not result in any changes to the annual Project generation amount, although the estimated annual value of Project power could increase with the small potential shift in timing of some Project generation.

10.0 REFERENCES

PacifiCorp. 2021 and 2022. Financial information provided by PacifiCorp.

FINAL LICENSE APPLICATION

EXHIBIT E

ENVIRONMENTAL REPORT

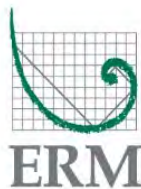
CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT NO. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)**

**FINAL APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT E
ENVIRONMENTAL REPORT**

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LIST OF ATTACHMENTS

ATTACHMENT A	DRAFT LICENSE APPLICATION RESPONSE-TO-COMMENTS MATRIX
ATTACHMENT B	CUTLER RESERVOIR 2019 EXPERIMENTAL DRAWDOWN AERIAL IMAGERY

LIST OF APPENDICES

APPENDIX HPMP	HISTORIC PROPERTIES MANAGEMENT PLAN
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ACRONYMS AND ABBREVIATIONS

A

ADA	Americans with Disabilities Act of 1990
Advisory Council	Advisory Council on Historic Preservation
af	acre-feet
AFUDC	allowances for funds used during construction
AIS	aquatic invasive species
APE	Area of Potential Effects
AU	assessment unit

B

BLM	Bureau of Land Management
BMP	best management practice
BMI	Benthic Macroinvertebrate Index
BRCC	Bear River Canal Company
BRLC	Bear River Land Conservancy

C

°C	Celsius
CAFO	Concentrated (or Confined) Animal Feeding Operation
CESCP	Construction Erosion and Sediment Control Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act

D

DFFSL	Division of Forestry, Fire, and State Lands
DLA	Draft License Application
DO	Dissolved Oxygen
DTPsed	dissolved total phosphorus from water in the interstitial voids of the sediment

E

EA	Environmental Assessment
eDNA	environmental deoxyribonucleic acid
EFH	Essential Fish Habitat
EPT [taxa]	Ephemeroptera, Plecoptera, and Trichoptera
ESA	Endangered Species Act
ERI	Ecosystem Research Institute

F

°F	Fahrenheit
FAA	Federal Aviation Administration

FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FPA	Federal Power Act
ft/s	foot per second
FTU	Formazin Turbidity Unit

H

hp	horsepower
HPMP	Historic Properties Management Plan

I

IBA	Important Bird Area
ILP	Integrated Licensing Process
IPaC	Information for Planning and Conservation
ISR	Initial Study Report

L

LiDAR	Light Detection and Ranging
-------	-----------------------------

M

mg/kg	milligram per kilogram
mg/L	milligrams per liter
mL	milliliter
msl	Mean Sea Level
MW	Megawatt
MWh	Megawatt-hour
Mya	Million years ago

N

N/A	not applicable
NAS	Non-indigenous Aquatic Species
NGVD 29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTS	National Trails System Act
NTU	Nephelometric Turbidity Unit
NWI	National Wetland Inventory

O

OHV	off-highway vehicle
OHWL	Ordinary High-Water Line

P

PAD	Pre-Application Document
Part 12	18 CFR § 12 Subpart D
PM&E	Protection, Mitigation, and Enhancement
Project	Cutler Hydroelectric Project (FERC Project No. 2420)
psi	pounds per square inch
PSP	Proposed Study Plan
PSPs	Public Safety Plans

R

RMP	Resource Management Plan
RSP	Revised Study Plan
RV	recreational vehicle

S

SCORP	Statewide Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SHPO	State Historic Preservation Office
SPD	Study Plan Determination
SMS	Scenery Management System
SWCA	SWCA Environmental Consultants

T

T&E	threatened and endangered
TCPs	traditional cultural properties
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TP	total phosphorus
TPsed	total phosphorus bound to bed sediments
TSS	total suspended solids

U

U.P.	Union Pacific
UDEQ	Utah Division of Environmental Quality
UDWR	Utah Division of Wildlife Resources
UDWRi	Utah Division of Water Rights
UDWQ	Utah Division of Water Quality (a division within UDEQ)
UHSF	Utah Historic Site Form
U.S.	United States
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

USR	Updated Study Report
USU	Utah State University
W	
WMA	Wildlife Management Area
WQC	Water Quality Certification
WSE	Water Surface Elevation
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

PacifiCorp is filing this Exhibit E with the Federal Energy Regulatory Commission (FERC) as part of the Final License Application (FLA) for the Cutler Hydroelectric Project (FERC Project No. 2420) (Project). FERC issued the Project a 30-year license on April 29, 1994, which is set to expire on March 31, 2024. On March 29, 2019, PacifiCorp filed a Preliminary Application Document (PAD) and Notice of Intent (NOI) with FERC for a new Project license. PacifiCorp is using FERC's default relicensing process, the Integrated Licensing Process (ILP).

PacifiCorp subsequently hosted public meetings, workshops, FERC's scoping meeting, and a site visit to which adjoining, members of the public, federal and state agencies, non-governmental organizations (NGOs), Native American tribes, and tribal organizations were invited. PacifiCorp began some preliminary studies in November 2019. In February 2020, FERC issued its final Study Plan Determination (SPD), and PacifiCorp began the first year of studies (the second year of studies started in November of 2020 and was completed by April of 2021). PacifiCorp filed the Initial Study Report (ISR) on February 8, 2021, which included the results on seven of the nine resources studies specified in the SPD and noted that the completed results on two remaining studies (Shoreline Habitat Characterization and Land Use) would be submitted later in 2021 as part of the Updated Study Report (USR). On August 18, 2021, PacifiCorp submitted a request to FERC to modify the Process Plan and Schedule to allow for early submittal of the USR and expedite the USR meeting. On August 20, 2021, FERC approved the request; on August 31, 2021, PacifiCorp held a public in-person USR meeting.

On October 29, 2021, PacifiCorp filed the Draft License Application (DLA). Exhibit E of the DLA summarized data and analysis from both the ISR and USR. This Exhibit E of the FLA incorporates revisions to the DLA in response to comments on the DLA (DLA comments and responses included as Attachment A of this Exhibit E).

FERC will use this Exhibit E in preparing a separate and independent Environmental Assessment (EA); FERC may adopt all or parts of this Exhibit E based on its review and analysis of the data and information herein. This FLA was prepared pursuant to the requirements of FERC regulations in the Code of Federal Regulations (CFR), Title 18, Section 5 (18 CFR § 5) and

FERC’s guidance document *Preparing Environmental Documents, Guidelines for Applicants, Contractors, and Staff* (FERC 2008).

As noted, this Exhibit E has been prepared using information from the PAD as well as two technical study reports: the ISR (PacifiCorp 2021a) and the USR (PacifiCorp 2021b), both of which were developed with input from stakeholders. This exhibit follows the EA outline proposed in FERC’s Scoping Document 2 (SD2; FERC 2019b) with some minor modifications.

This Exhibit E is organized as follows:

- *Section 1.0, Introduction:* presents the purpose and need for power; regulatory requirements that the Project and relicensing process is subject to; and the public review and comment process to date, including scoping activities and any interventions.
- *Section 2.0, Proposed Action and Action Alternatives:* describes the No-Action Alternative (existing Project facilities, operations, and existing environmental measures); the Proposed Action (approval of proposed Project facilities, operations, and proposed environmental measures); and alternatives considered but eliminated.
- *Section 3.0, Environmental Analysis Report:* presents the general Project setting; the scope of cumulative effects for the analysis; the affected environment and analysis of potential effects of the Project on environmental resources, and Protection, Mitigation, and Enhancement (PM&E) measures proposed to avoid or minimize environmental effects.
- *Section 4.0, Developmental Analysis:* provides the cost of development and implementation of all applicant-proposed PM&E measures and Project management plans.
- *Section 5.0, Consistency with Comprehensive Plans:* includes an assessment of compliance of the Proposed Action with comprehensive management plans.
- *Section 6.0, Literature Cited:* contains all materials cited throughout Exhibit E.
- *Section 7.0, List of Preparers:* lists the preparers of this Exhibit E.
- *Section 8.0, Consultation Documentation:* describes where the consultation record can be found and presents a brief description of what the consultation record contains.

1.1 APPLICATION

PacifiCorp is applying to FERC for a new Project license. The 30-megawatt (MW) Project is located on the Bear River in Cache and Box Elder counties, Utah, approximately 13 miles west of Logan, Utah (Figure 1-1). The proposed FERC Project Boundary is inclusive of Cutler Dam, Cutler Reservoir, main tributary streams upstream of their confluence with the reservoir, and PacifiCorp lands adjacent to the reservoir, and covers 9,277 acres. There are no federal lands within the Project Boundary. PacifiCorp is not proposing to increase capacity or construct any new facilities for the Project.

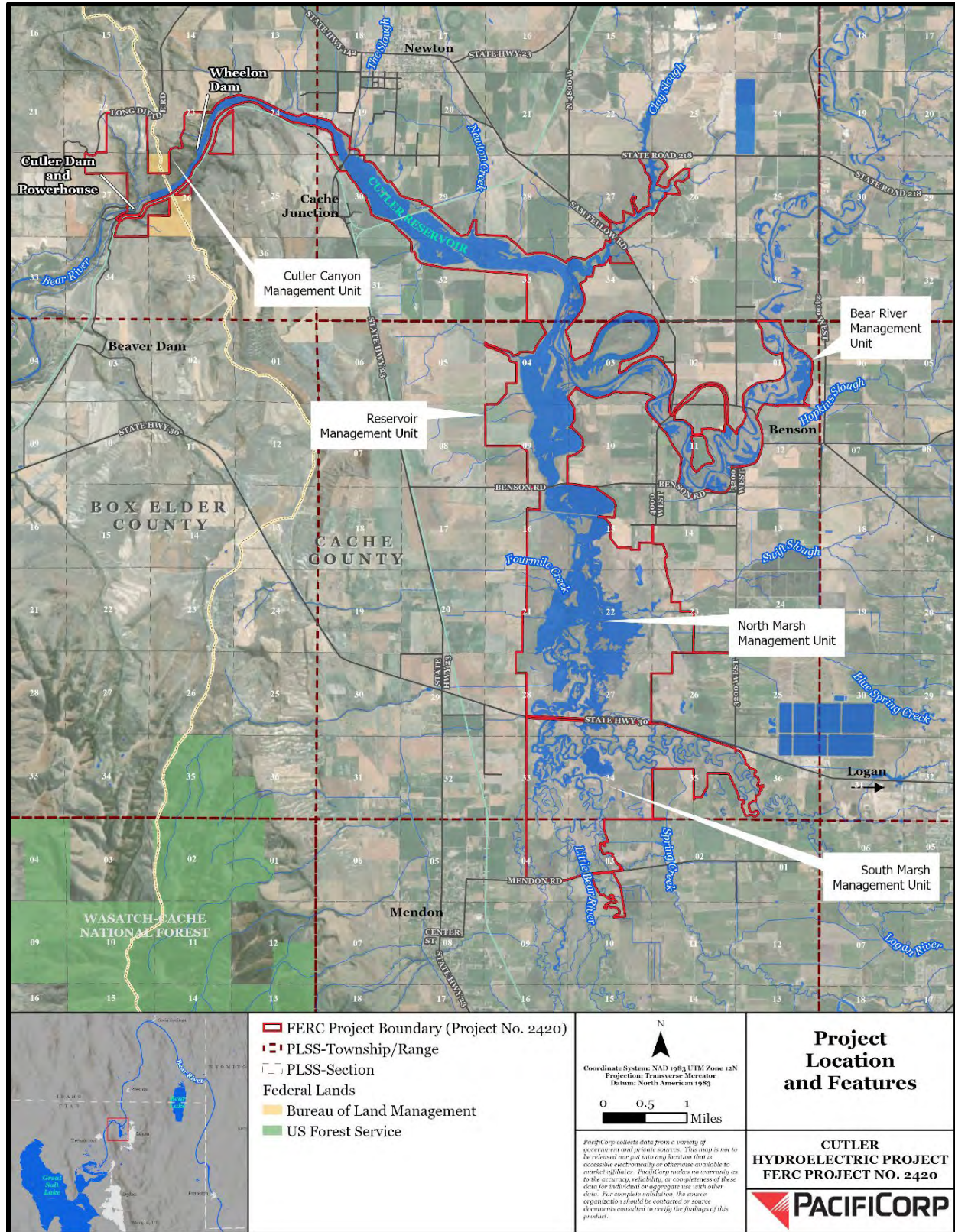


FIGURE 1-1 PROJECT LOCATION AND EXISTING FERC PROJECT BOUNDARY

1.2 PURPOSE OF ACTION

PacifiCorp is applying to FERC for a new Project license using the ILP. For the purposes of this document, the term “Proposed Action” refers to the approval process of PacifiCorp’s proposal to gain a new license for the Cutler Hydroelectric Project (FERC Project No. 2420). The purpose of the Proposed Action is to continue to provide a source of renewable hydroelectric power to meet the region’s power needs. Under provisions of the Federal Power Act (FPA), FERC must decide whether to issue PacifiCorp a license for the Project and what conditions should be placed on any license issued.

In deciding whether to issue a license for a hydroelectric project, FERC must determine that the Project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), and under Section 4(e) of the FPA, FERC must give equal consideration to the purposes of: 1) energy conservation; 2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; 3) the protection of recreational opportunities; and 4) the preservation of other aspects of environmental quality.

Issuing a new license for the Project would allow PacifiCorp to generate electricity for the term of a new license, making electrical power from a renewable and non-carbon resource available to its customers.

1.3 NEED FOR POWER

The Project is an important and renewable component of the local electrical grid supplying 30 MW of installed capacity to meet local demand. Based on the 30-year average from 1991 to 2020, the Project produces approximately 75,052 megawatt-hours (MWh) of electric energy annually serving residential and commercial customers.

The Project resides within the Western Electricity Coordinating Council 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 Project is a component of PacifiCorp’s generation portfolio used to balance supply and demand in conjunction with other resources such as renewable but

variable resources such as wind and solar, as well as geothermal (also a renewable resource), and fossil-fuel powered coal-fueled and natural gas-fueled steam generation plants. As part of their commitment to renewable energy, PacifiCorp was a founding member of the Energy Imbalance Market in 2014, which uses technology to balance energy demand with the lowest cost energy available across the combined grid, thereby helping to integrate renewable variable generation resources with energy demand in different geographic areas.

According to the North American Electric Reliability Corporation's 2020 Long-Term Reliability Assessment (NERC 2020), energy demand in the Cutler Hydroelectric assessment area¹ is expected to increase over the next 10-year period (between 2022 and 2031) by more than 7.2 percent (from 64,258 MW to 69,063 MW).² Electricity from the Project would help meet this increased demand for power in both the short- and long-term and would provide additional Energy Imbalance Market and grid support. Should a new license for the Project not be granted, the electrical services that the Project provides would need to be provided by other sources.

1.4 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Project is subject to regulatory requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described below.

1.4.1 FEDERAL POWER ACT

Consistent with the FPA, FERC is the lead federal agency for regulating the Project relicensing and the Proposed Action as outlined in this FLA.

1.4.1.1 SECTION 18 FISHWAY PRESCRIPTIONS

Section 18 of the FPA states that FERC is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce. In this relicensing, the United States Fish and Wildlife Service (USFWS) as the designee of the Secretary of Interior has jurisdiction over relevant fish species in the Bear River

¹ The Project falls within the Western Energy Coordinating Council Northwest Power Pool and Rocky Mountain Reserve Sharing Group assessment area, and includes projects located in Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming, and parts of California, Nebraska, Nevada, and South Dakota.

² NERC annually forecasts electrical supply and demand nationally and regionally for 10-year periods.

(in this case, relevant means federally listed threatened or endangered fish species, of which there are none; Utah Division of Wildlife Resources (UDWR) has jurisdiction over non-listed wildlife of the state).

Thus far in the relicensing process, neither the USFWS nor the UDWR have identified the need for a fishway prescription at Cutler Dam. There are no federally listed threatened or endangered fish species present in the Bear River downstream of Cutler Dam or in the Reservoir (UDWR 2019a). Further, there are no native fish species present in the Bear River downstream of Cutler Dam, and only a single native species (the Utah sucker) is present in the reservoir.

1.4.1.2 SECTION 10(J) RECOMMENDATIONS

Under Section 10(j) of the FPA, each hydroelectric license issued by FERC must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the Project. FERC is required to include these conditions unless it determines they are inconsistent with the purposes and requirements of the FPA or other applicable laws. Before rejecting or modifying an agency recommendation, FERC is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

The USFWS and UDWR have been engaged in the stakeholder engagement process for the Project since the relicensing process began in spring 2019. Throughout the relicensing process, these stakeholders may provide input on PM&E measures to avoid or reduce impacts to fish and wildlife resources potentially affected by the Project. This input is reflected in the proposed environmental measures described in relevant resource subsections of Section 3.3.

1.4.2 CLEAN WATER ACT

1.4.2.1 SECTION 303 OF THE CLEAN WATER ACT

Section 303(d) of the Clean Water Act (CWA) requires states to identify waterbodies that do not attain water quality standards or that do not support their designated beneficial uses; these waterbodies are then classified as impaired with respect to water quality. Waters within the

Project Boundary are listed on the State of Utah Section 303(d) lists of waterbodies with water quality impairments. As such, the Utah Division of Water Quality (UDWQ) developed the *Middle Bear River and Cutler Reservoir Total Maximum Daily Load* in 2010 (UDWQ 2010). PacifiCorp works voluntarily with the UDWQ towards implementation of the Total Maximum Daily Load (TMDL) and improving water quality throughout the basin. Details regarding the TMDL and CWA Section 303(d) are provided in Exhibit E Section 3.3.4, Water Resources.

1.4.2.2 SECTION 401 OF THE CLEAN WATER ACT

Under Section 401 of the CWA, activities that may result in any discharge into navigable waters require a Water Quality Certification (WQC) from the appropriate state pollution control agency verifying compliance with the CWA. In Utah, the UDWQ is a division within the Utah Department of Environmental Quality (UDEQ) that manages Section 401 WQC. A new license cannot be granted for the Project until the Section 401 WQC has been obtained from UDWQ. If a WQC is issued, the conditions set forth are binding upon FERC, and FERC must include them in their final license order.

PacifiCorp will submit a 401 WQC application to the UDWQ following submittal of this FLA. PacifiCorp must meet with UDWQ no less than 30 days prior to the submittal of the WQC application, currently planned for the second quarter of 2022.

1.4.2.3 SECTION 10 OF THE RIVERS AND HARBORS APPROPRIATION ACT OF 1899

Section 10 of the Rivers and Harbors Appropriation Act of 1899 prohibits the obstruction or alteration of navigable waters without a permit from the United States Army Corps of Engineers (USACE). The Bear River and its tributaries downstream of Bear Lake are not considered navigable waters pertinent to this regulatory definition (USACE 2021); as such, the Bear River and Cutler Reservoir within the Project Boundary would not be subject to Section 10 of the Rivers and Harbors Appropriation Act of 1899.

1.4.3 ENDANGERED SPECIES ACT OF 1973

The Endangered Species Act (ESA) of 1973, as amended (United States Code, Title 16, Section 1531 [16 USC § 1531 et seq.]), provides a program for the conservation of threatened and endangered (T&E) plants and animals and the habitats in which they are found. The ESA defines an “endangered” species in part as a “species which is in danger of extinction throughout all or a significant portion of its range” and a “threatened” species as one “which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 USC § 1532(6)(20)). The ESA is administered by the Secretary of the Interior through the United States Department of the Interior, USFWS for most terrestrial species, and by the Secretary of the United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) for marine and anadromous species. As the Project has neither marine nor anadromous species, the USFWS provides the regulatory oversight for any Project ESA issues.

Consultation is required under Section 7 of the ESA as part of the FERC process. Federal agencies must consult with the USFWS and NMFS to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat for these listed species. Jeopardy exists when an action would “reduce appreciably the likelihood of both the survival and recovery of a listed species...” (50 CFR § 402.02).

ESA-listed species are addressed in Exhibit E Section 3.3.8, Threatened and Endangered Species. The Ute ladies’-tresses orchid is the only ESA-listed species identified within the Project Boundary; further, no potentially suitable habitat was identified for other ESA-listed species.

1.4.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires FERC to 1) take into account the effect of licensing a hydropower project on any historic properties and 2) allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the Proposed Action. “Historic properties” are defined as any district, site, building,

structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP).

Pursuant to Section 106 of NHPA, a formal cultural resources inventory was conducted in 2020 to identify the presence of cultural resources within the Project Boundary and to assess potential Project effects on these resources. The inventory identified 21 archaeological sites, seven historical buildings, one historic district (the Cutler Hydroelectric Power Plant Historic District), and one historical structural complex (the Wheelon Hydroelectric Complex). Wheelon Hydroelectric Complex was documented as both an archaeological site and a structural complex. Of these, nine archaeological sites, one historical building, the Cutler Hydroelectric Power Plant Historic District, and the Wheelon Hydroelectric Complex have been determined eligible for listing on the NRHP or are already listed—as in the case of the historic district—by FERC in consultation with PacifiCorp and the Utah State Historic Preservation Office (SHPO). Therefore, these resources qualify as historic properties in the Section 106 process and are subject to management planning over the course of any new operational license for the Project.

PacifiCorp has developed a Historic Properties Management Plan (HPMP) to avoid, reduce, or mitigate any potential effects on historic properties. During development of the HPMP, PacifiCorp consulted with FERC, the SHPO, and Native American tribes. Frequently, the HPMP would be implemented by execution of a Programmatic Agreement that would be signed by FERC, the Advisory Council, the SHPO, and any other consulting parties. Historic and cultural resources are described in detail in Section 3.3.10, Cultural Resources; the HPMP is included with this document as Appendix HPMP to Exhibit E.

1.4.4.1 NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT

The Native American Graves Protection and Repatriation Act may apply when sacred areas or burial sites of Native American tribes have been identified. These and other cultural resources that possess religious or cultural significance to a Native American tribe, if eligible, can be considered as historic properties and treated through the Section 106 process. Such historic properties are called traditional cultural properties (TCPs). As part of efforts to identify resources of tribal concern that could be affected by continued Project operations under the new license, FERC and PacifiCorp consulted initially with all eight Native American tribes with current or

historic lands or ties in Utah, and later with the four that have asserted cultural patrimony over the area: the Shoshone–Bannock Tribe, the Northwestern Band of Shoshone Nation, the Skull Valley Band of Goshute Indians, and the Ute Tribe of the Uintah and Ouray Reservation. No sacred areas or burial sites were identified within the Project Boundary that would be subject to Native American Graves Protection and Repatriation Act authority (as discussed further in Section 3.3.10, Cultural Resources).

1.4.5 STATE OF UTAH REGULATIONS

The Utah Division of Water Rights (UDWRi) under the Utah Department of Natural Resources is responsible for the appropriation and distribution of water, including water in Cutler Reservoir. As described in Section 3.3.2.1, [Affected Environment] Water Use, Cutler Reservoir provides water allocations under existing water rights for numerous irrigators. However, proposed operations would not change flow timing or water use by the Project, nor is the Project proposing any changes to water rights.

The two state water quality programs applicable to the Project—Clean Water Act Section 303 (non-point pollution) and Section 401 (WQC)—are described above in Sections 1.4.2.1 and 1.4.2.2. These are both federal programs, which UDWQ has been granted primacy to manage. For the term of the current license, PacifiCorp has worked directly with the UDWQ on water quality issues within the Project Boundary. PM&E measures related to water quality proposed for the new license are described in Section 2.2.3 Proposed Environmental Measures.

1.5 PUBLIC REVIEW AND COMMENT

FERC regulations (18 CFR §§ 5.1–5.16) require applicants to consult with appropriate resource agencies, tribes, and other entities before filing a license application. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the ESA, the NHPA, and other federal statutes. Pre-filing consultation must be completed and documented according to FERC regulations. Appendix A of this FLA (not to be confused with Attachment A to this Exhibit E, which identifies comments received on the DLA) contains the Cutler Relicensing Consultation Record, including links to all meeting agendas, presentations, posters, and meeting summaries that include attendee lists, as well as similar material for workshops and meetings conducted outside, but in parallel to, the formal relicensing process.

1.5.1 SCOPING

As part of the preparation of this FLA, a public and agency scoping process was conducted to determine what issues and alternatives should be addressed in the analysis. PacifiCorp initiated early contact with stakeholders, as described in the PAD (PacifiCorp 2019) and the Revised Study Plan (RSP; PacifiCorp 2020b). PacifiCorp invited federal and state agencies, NGOs, Native American tribes and tribal organizations, adjoining landowners, elected officials, and other stakeholders to participate in the various public meetings, workshops, scoping meeting, and site visits.

Key stakeholder engagement related to scoping documents and the study plans are listed below.

- February 13, 2019: PacifiCorp held an open house/workshop to inform the public about the Project and upcoming opportunities to participate in the relicensing process.
- March 2019: PacifiCorp filed the PAD.
- May 28, 2019: FERC issued Scoping Document 1 (SD1; FERC 2019a).
- June 25, 2019: PacifiCorp hosted an additional workshop (in parallel with the FERC relicensing process) to create opportunities for stakeholders to identify questions and potential issues that would be appropriate for the relicensing process and provide comments on the Proposed Study Plan (PSP) annotated outlines.
- June 26 and 27, 2019: FERC hosted two scoping meetings and a Project site visit. Stakeholders provided input on draft PSP annotated outlines that were developed in response to the previous workshops and other stakeholder input. Stakeholders were invited to provide comments on the PAD and SD1 and to propose any additional studies.
- September 11, 2019: PacifiCorp filed the PSP pursuant to 18 CFR § 5.12, detailing the study objectives, Study Area, methods, and schedule for each study.
- September 13, 2019: FERC issued Scoping Document 2 (SD2; FERC 2019b), which revised SD1 to incorporate oral and written comments received at the scoping meetings and throughout the scoping process.
- October 8, 2019: PacifiCorp hosted the required study plan meeting in Logan, Utah, pursuant to 18 CFR § 5.11(e). Stakeholders and FERC were invited to discuss study plan

requests and comments submitted by July 29, 2019, on SD1, the study plans filed in the PSP, as well as PacifiCorp's responses to comments.

- October 28 through November 30, 2019: PacifiCorp hosted a number of supplemental stakeholder-specific meetings with the Bear River Canal Company (BRCC), Utah Department of Agriculture and Food, UDWQ, Logan City, Bear Lake Watch, and the Bridgerland Audubon Society. PacifiCorp and these respective stakeholders discussed concerns and requests, ultimately agreeing on multiple study requests and revisions to the PSP.
- December 10, 2019: PacifiCorp filed response-to-comment letters and associated meeting summaries.
- January 10, 2020: PacifiCorp filed the RSP pursuant to 18 CFR § 5.12 and 5.13.6.
- February 7, 2020: FERC issued the SPD pursuant to 18 CFR § 5.13(c). FERC approved the RSP with minor revisions in its SPD. The determination was based on criteria set in 18 CFR § 5.9(b) of FERC's regulations. The FERC SPD identified the studies to be completed as part of relicensing.
- March 3, 2021: PacifiCorp filed the ISR (PacifiCorp 2021a).
- February 23, 2021: PacifiCorp hosted a virtual ISR presentation to stakeholders.
- May 5, 2021: PacifiCorp filed an ISR Comment Response (PacifiCorp 2021c), responding to stakeholder comments on the ISR.
- August 17, 2021: PacifiCorp filed the USR (PacifiCorp 2021b).
- August 31, 2021: PacifiCorp hosted an in-person presentation and workshop for stakeholders regarding the USR and proposed PM&E measures.
- October 29, 2021: PacifiCorp filed the Draft License Application (DLA).
- January 26, 2022: PacifiCorp hosted a virtual meeting with representatives of Bridgerland Audubon Society to discuss their comments on the DLA.

Comments provided at the scoping meetings and on the ISR and USR, and PacifiCorp's response to comments, are documented in SD1 (FERC 2019a), SD2 (FERC 2019b), ISR Comment Response (PacifiCorp 2021c), and USR Comment Response (PacifiCorp 2021d), and are therefore not provided as part of Appendix A to the FLA. DLA comments, and PacifiCorp's response to comments, are included as Attachment A to this Exhibit E.

1.5.2 INTERVENTIONS

As of the filing of this FLA three parties have filed motions to intervene with FERC, as listed in Table 1-1.

TABLE 1-1 PARTIES FILING INTERVENTIONS WITH FERC ON THE CUTLER PROJECT

PARTY	PRIMARY PERSON OR COUNSEL OF RECORD TO BE SERVED	OTHER CONTACT TO BE SERVED
American Whitewater	Kevin Colburn National Stewardship Director American Whitewater 1035 Van Buren Street Missoula, MT 59802 kevin@amwhitewater.org	
Bear River Canal Company	**D. Brent Rose Clyde Snow Sessions & Swenson, P. C. One Utah Center, Suite 1300 201 S Main St Salt Lake City, UT 84111	275 N 1600 E Tremonton, UT 843378826 Box Elder
PacifiCorp	Todd Olson, Director of Compliance PacifiCorp 825 NE Multnomah Suite 1800 Portland, OR 97232 todd.olson@pacificorp.com	

Contacts marked ** must be postal served.

1.5.3 COMMENTS ON THE APPLICATION

Comments on the DLA, and PacifiCorp's response to comments, are presented in Attachment A of this Exhibit E. Consultation that occurred prior to the filing of this FLA is presented in Section 8.0, Consultation Documentation.

2.0 PROPOSED ACTION AND ACTION ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative is the baseline of comparison for the Proposed Action alternative. Under the No-Action Alternative, the Project would continue to operate under the terms and conditions of the current license. Thus, the No-Action Alternative would include the existing Project Boundary, existing facilities, current Project operation, and existing environmental measures.

2.1.1 EXISTING PROJECT FACILITIES

The Project is located on the Bear River in Cache Valley, Utah, between the Wasatch and the Wellsville Mountains (Figure 1-1). While the Cutler Dam is located in Box Elder County, most of the reservoir and adjacent Project lands lie within Cache County. The reservoir is formed at the confluence of the Bear, Logan, Spring Creek, and Little Bear rivers. The Project has been in operation since 1927, although an earlier predecessor dam, the Wheelon Dam, created a smaller reservoir beginning around 1889. The Wheelon Dam was inundated by construction of the Cutler Project in 1927 and remains submerged in place approximately 1 mile upstream of the Cutler Dam. The Bear River drains into the Great Salt Lake, which is the fourth largest terminal lake in the world.

In addition to the Cutler Project, PacifiCorp owns and operates four other hydroelectric developments on the Bear River, all of which are located further north and upriver in Idaho. Additionally, there are seven other hydroelectric developments located on the Logan River, Blacksmith Fork, Mink Creek, and Paris Creek, which are all Bear River tributaries. PacifiCorp owns the hydroelectric development on Paris Creek, but not the other six developments.

Project facilities consist of a reservoir with a surface area of approximately 2,476 acres, with storage of approximately 8,563 acre-feet (af) at a normal maximum operating elevation of 4,407.5 feet mean sea level (msl)^{3,4}; a concrete gravity arch dam with a crest length of 545 feet,

³ All elevations reported in this FLA refer to the USGS National Geodetic Vertical Datum of 1929, or NGVD29.

⁴ Areas of Cutler Reservoir that do not contribute to the usable storage capacity (e.g., areas of emergent marsh vegetation) have been excluded from the reservoir surface area calculation.

including two non-Project irrigation canal intakes at the top of the abutments; a gated-overflow spillway; an intake tower; a 1,157-foot-long steel flowline; an 81-foot-high Johnson Differential surge tank; two steel penstocks that bifurcate from the surge tank into the powerhouse; a brick powerhouse; two generating units with a total installed capacity of 30 MW; two Francis turbines; and other appurtenant facilities (Figure 2-1). More details about existing Project structures, including dimensions and capacities, are described in Exhibit A of this application.

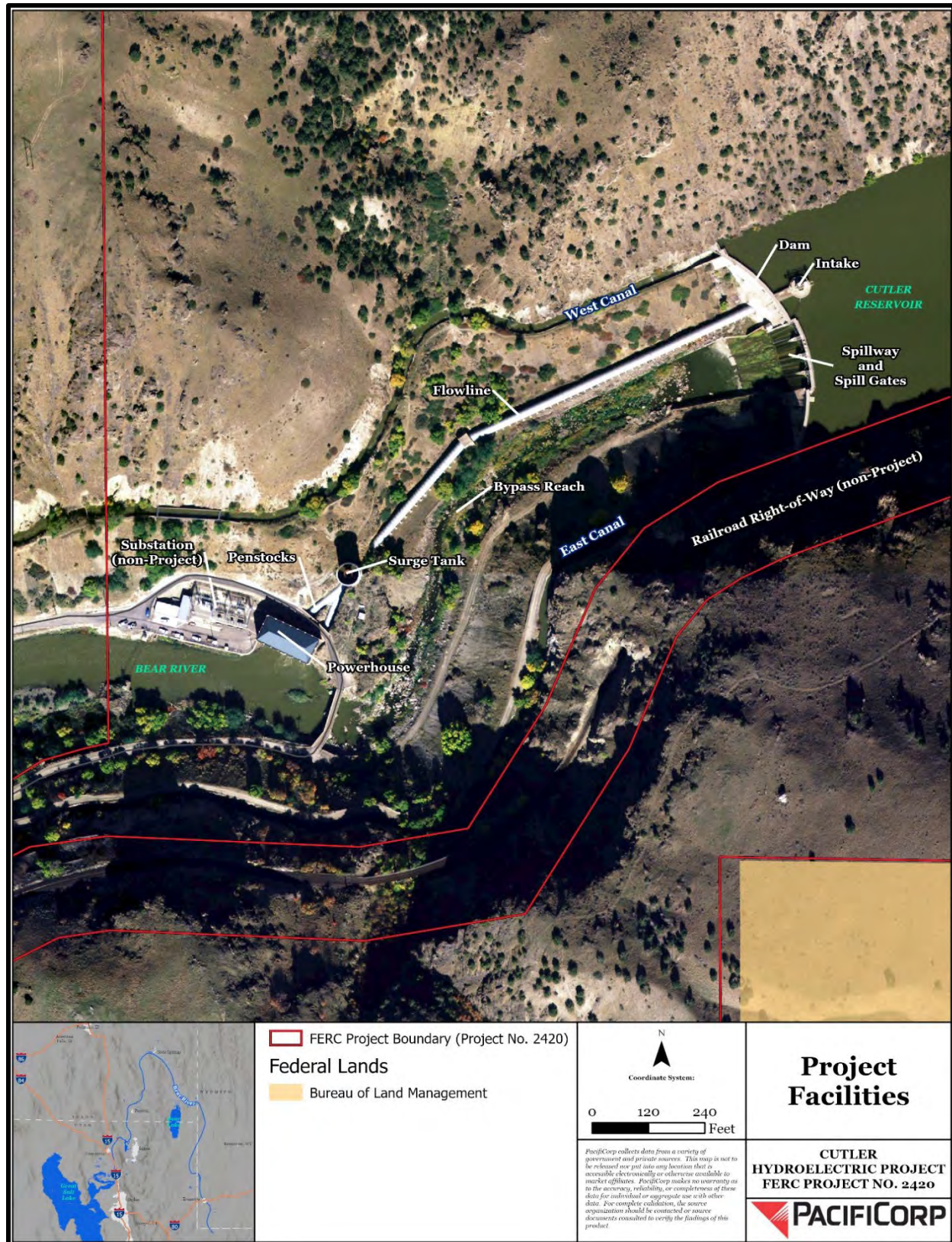


FIGURE 2-1 CUTLER PROJECT FACILITY DETAILS

2.1.2 PROJECT SAFETY

Project safety measures related to safe Project management, safety inspections, and public health and safety are detailed in Exhibit H of this FLA and are summarized here. The Project has been operating since 1927 and for more than 27 years under the existing FERC license granted in 1994. During this time, FERC staff has conducted operational inspections focusing on the continued safety, durability, and reliability of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with license terms, and proper and ongoing maintenance. Per FERC 18 CFR § 12 Subpart D (Part 12) requirements, the Project has been inspected and evaluated every five years by an independent consultant, and a consultant's safety report has been submitted for FERC review for each of the five-year review periods. All Part 12 five-year reports are limited to review by those with Critical Energy Infrastructure Information (CEII) clearance on the FERC e-Library (FERC 2021b).

The current license requirements also include measures to assure public safety. PacifiCorp maintains an Emergency Action Plan and filed its *2021 Annual Emergency Action Plan Status Report* on December 27, 2021. PacifiCorp also maintains and implements Public Safety Plans (PSPs) for all developed recreation sites for the Project and evaluates and maintains all recreation sites to ensure public safety. Lastly, to ensure public safety downstream of Cutler Dam on the Bear River, 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 downstream of Cutler Dam.

As part of the relicensing process, FERC staff will evaluate the continued adequacy of the proposed Project facilities and public safety measures under a new license. Special articles relating to specific or unique Project conditions would be included in a license issued, as appropriate. FERC staff would continue to inspect the Project during the new license term to assure continued adherence to approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.3 EXISTING PROJECT OPERATIONS

PacifiCorp operates the current Project by impounding flows from the Bear River and the other Project tributaries. Although the Project has typically been operated in a run-of-river mode for the last 10 to 12 years, previously in this license period some of the 8,563-acre-foot storage capability of the reservoir was utilized for minor load-following generation purposes when sufficient inflows were available; the proposed operations could also operate in this same mode.

Current Project operations and elevation ranges are outlined below in Table 2-1 and are presented in detail in Exhibit B of this application. Throughout this document, elevations listed are as measured at Cutler Dam unless noted differently. Reservoir elevations fluctuate approximately 1 foot or less during the spring through fall season; additional fluctuations may occur up to 1.5 feet during the winter (December to March) non-irrigation season.

TABLE 2-1 EXISTING RESERVOIR ELEVATION OPERATING RANGE TABLE

TIME PERIOD	NORMAL RESERVOIR OPERATING RANGE (FEET)	TOLERANCE (FEET)	TOTAL RANGE (OPERATING + TOLERANCE)	TARGET PERCENTAGE
March 1 – Dec. 1	4,407.5 – 4,406.5	± 0.25	1.5 feet	95%
Dec. 2 – Feb. 28	4,407.5 – 4,406.0	+ 0.25 to – 0.5	2.25 feet	90%

Source: FERC 2002a

2.1.4 EXISTING ENVIRONMENTAL MEASURES

The current FERC license for the Project stipulates a number of environmental measures to be implemented as conditions of license issuance. These PM&E measures are detailed in the sections below related to measures in the license articles, and current management plans.

2.1.4.1 CURRENT LICENSE ARTICLES

The following 1994 license articles specify PM&E measures that were implemented during the current license term:

- Standard License Article 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.
- License Article 401: Cutler Project Operational Plan (approved by FERC [FERC 2002a]). Sets operating range and compliance limits in order to balance the needs of wildlife, recreation, irrigation, and power generation.
- License Article 402: Develop a Resource Management Plan (RMP). Details are provided in Section 2.1.4.2, below.
- License Article 403: Consult with SHPO to develop and implement a Cultural Resources Management Plan (CRMP).
- License Article 404: If archeological or historic sites are discovered during operation, consult with SHPO, prepare a CRMP, file plan, protect the sites from impact.

2.1.4.2 CUTLER OPERATIONAL PLAN

The Cutler Project Operational Plan (FERC 2002a) guides Project operations under the current license with regards to flow timing, reservoir fluctuations, and general operations of the dam and reservoir. As such, the Operational Plan in turn protects Project water resources as it relates to water use and water quantity, as well as protecting aquatic and wildlife resources through limitations in reservoir elevation changes.

2.1.4.3 CUTLER RESOURCE MANAGEMENT PLAN

As noted above, Article 402 of the current license required PacifiCorp to develop a Project RMP (PacifiCorp 1995a). Details on existing resource protection, mitigation, and monitoring are presented in the relevant resource sections in Section 3.3 of this Exhibit E and summarized here.

Five goals were documented in the Cutler RMP:

- Improve water quality
- Improve wildlife habitat
- Improve scenic resources
- Retain and improve traditional agricultural uses
- Improve recreational access

The Cutler RMP laid out the following seven programs that were developed to meet these goals. Programs or sub-components marked with an asterisk (*) are proposed to be maintained under the new license based on the current resource condition as documented in the five-year monitoring reports (described below), although monitoring methods may change.

1. Vegetation enhancement program, with the following program sub-components:
 - Shoreline buffer establishment*
 - Shrub planting (woody vegetation pockets and buffer shrub plots)*
 - Bank stabilization*
 - Fencing (buffer/boundary fencing)*
 - Erosion control sediment basins*
 - Sensitive/unique wildlife habitats*
2. Agricultural lease program, with the following program sub-components
 - Grazing leases*
 - Farming leases*
 - Wildlife food/cover plots
 - Cattle management fences*
 - Property coordination*
3. Recreation site development program*
4. Wetland mitigation area program
5. Fish habitat structure program
6. Water quality monitoring program*
7. Water level monitoring program*

The Cutler RMP requires annual monitoring to gage the success and stability of the seven programs implemented. A monitoring plan was developed during the initial reporting period, and monitoring is reported on five-year cycles, with reports submitted initially in 2002 and subsequently in 2008, 2013, and 2018; the final monitoring report submittal is planned for 2023. Cutler RMP details including actions required under the license and implemented measures are summarized in Table 2-2, as per the most recent 2018 Cutler RMP five-year monitoring report (PacifiCorp 2018).

TABLE 2-2 EXISTING CUTLER RESOURCE MANAGEMENT PLAN MEASURES

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
Vegetation Enhancement		
Shoreline Buffer	Establish 125 acres of shoreline buffer. Of this, a minimum of 50 acres should be converted from tilled land to permanent grass buffer.	Approximately 1,440 acres of buffer covering 51.7 miles of shoreline have been established, including 610 acres of tilled land converted to permanent grass buffer (necessary to improve water quality and improve wildlife habitat). Implementation complete.
Woody Vegetation Pockets	Establish 10–15 pockets 0.5–2 acres in size.	Planted 15 pockets at a density of 5,000 shrubs/acre. Goal is at least 10 sites established. (Note: to date, four are rated as failed/abandoned.) Implementation complete.
Bank Stabilization	Stabilize 3.5 miles of shoreline.	Stabilized 4.44 miles of shoreline (one site expanded by 70 feet in 2011, increasing bank stabilization linear length total by 0.02 miles). An additional 1.1 miles stabilized at Railroad (RR) Trail as part of the recreation site development program, for a total of 5.5 miles of stabilized bank, improving water quality, scenic quality, and wildlife habitat. Implementation complete.
Boundary/Buffer Fence	Construct 6 miles of additional fence to create/protect the boundary or buffer.	Constructed 60 miles of fence (necessary to protect Project Boundary from unauthorized uses). Implementation complete.

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
Erosion Control Sedimentation Basins	Build erosion control catch basins where needed in North Marsh and Reservoir Units.	Constructed 13 erosion control catch basins, improving both water quality and wildlife habitat. Implementation complete.
Sensitive/Unique Wildlife Habitats	Protect sensitive wildlife habitats.	Fenced colonial nesting bird habitats, provided artificial nest structures for osprey and owls, implemented Recreation Use Policy and state boating regulations (including a trapping program), and planted roses and other shrubs along railroad dike to improve specific areas of wildlife habitat. Implementation complete.
Agricultural Lease		
Land Use Practices (monitored and managed as part of leases, below)		Complete for grazing, farming, and wildlife food/cover leases. Reduced current leases to approximately 2,841 acres. Actions improved water quality and wildlife habitat. Implementation complete.
Grazing	Evaluate practices and incorporate new conditions into grazing leases.	Incorporated new practices into leases affecting up to 2,396 acres (of which up to 663 acres can be grazed for wildlife food/cover plots). Leases reconfigured to improve practices. Actions improved water quality and wildlife habitat. Implementation complete.
Farming	Evaluate practices and incorporate new conditions into farming leases.	Incorporated new practices into leases affecting 445 acres. Actions improved water quality and wildlife habitat. Implementation complete.
Wildlife Food/Cover	Evaluate practices and incorporate new conditions into wildlife food/cover leases.	Currently managing up to nine fields for wildlife food/cover. Implementation complete.

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
Cattle Management Fence	Construct six miles of fence to control cattle/conflicting uses (an additional six miles was required in a separate category).	Constructed 21 miles of fencing (necessary to control grazing effects to shoreline and pastures, improving water quality and wildlife habitat). Implementation complete.
Property Coordination	Resolve property and boundary issues.	Resolved most previous issues with adjacent landowners. Chronic and new encroachments continue to be managed through property incident process and civil court, as necessary. Implementation complete.
Recreation Site Development	Establish: Eight day-use sites (four developed, four primitive) Two boat-in picnic sites One pedestrian loop trail and bridge Two canoe trails Conduct a visitor use survey.	Completed: Eight day-use sites (four developed, four primitive—last site, Logan River Access, completed in 2010) Two boat-in picnic sites One pedestrian loop trail and fishing bridge and 1 point-to-point pedestrian trail Three canoe trails Canoe trail marker system replaced with reflector poles. Interpretive signage and information provided. Recreation use policy and trapping policy instituted. Visitor use survey completed. Implementation complete.
Wetland Mitigation Area	Construct a six-acre wetland complex on state land in South Marsh to serve as mitigation for recreation sites developed.	Completed in spring 2001, approved by USACE, and turned over in 2001 to UDWR for permanent management.
Fish Habitat Structures	Install four to six fish habitat structures at two sites.	Installed 30 structures at three sites. Implementation complete.
Water Quality Monitoring	Conduct quarterly sampling 1996–1998. After that, quarterly sampling every fifth year, beginning in 2003. Analysis and results in five-year reports.	Prepared 2018 Water Quality Report

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
Water Level Monitoring	Conduct reservoir elevation study. File results of proposed operating plan with FERC.	As required. FERC order with modified operating plan implemented in 2002. New order requires annual submission of daily average Cutler Reservoir elevation data.

Source: PacifiCorp 2018

FERC = Federal Energy Regulatory Commission; UDWR = Utah Division of Wildlife Resources; USACE = U.S. Army Corps of Engineers

2.1.4.4 CULTURAL RESOURCES

Adverse effects to historic properties and tribal resources are currently managed under the Project CRMP implemented for Cutler in 1995 (PacifiCorp 1995b). The CRMP derives from several articles in the existing Project license, including Articles 403 and 404. The CRMP focuses largely on the historical buildings and structures directly associated with the Cutler hydroelectric facilities, including those resources of the Cutler Hydroelectric Power Plant Historic District (e.g., the powerhouse, dam, conduit, and surge tank). Details on existing cultural resources protection measures are presented in Section 3.3.8, Cultural and Tribal Resources.

2.2 PROPOSED ACTION

The Proposed Action consists exclusively of a revised operations scheme, with no new Project facilities proposed other than standard facility maintenance activities and like-for-like replacements of facility components.

2.2.1 PROPOSED PROJECT FACILITIES

Proposed Project facilities would remain the same as under the current license. No new Project facilities would be constructed, and no Project facilities would be decommissioned. A number of large- and smaller-scale maintenance projects are proposed (see Exhibit A) following approval of a new license, but no new substantial construction of facilities is proposed. The proposed Project Boundary is outlined in Exhibit G.

2.2.2 PROPOSED PROJECT OPERATIONS

Proposed Project operations are detailed in Exhibit B of this application and are summarized here. PacifiCorp's proposed operations in the new license would mimic the existing operational

range (Table 2-1 above) from elevation 4,407.5 to 4,406.5 feet at least 85 percent of the time. This is referred to as ‘normal’ operations and would occur a minimum of 310 days per year (e.g., March through October), including the irrigation season, with a tolerance limit of +/- 0.5 feet (primarily to accommodate high water events and occasional un-forecasted irrigation variation). There would also be a wider operating range from elevation 4,406.5 to 4,405.0 feet up to 15 percent of the time. This is referred to as ‘extended range’ operations and would occur up to 55 days per year (e.g., November to March), outside of the irrigation season and not during high flows, as determined by daily average adjusted elevations at Cutler Dam. The extended range operations would also not be used during extreme icing events. During the irrigation season, generally April 15 to October 31, no operational changes to the reservoir limits are sought, as irrigation pumping from the reservoir must occur within specific operational limits. Note that although the proposed extended operations only occur outside of the irrigation season, they otherwise are intended to be defined by river conditions (primarily flow, including irrigation delivery contract requirements, and air temperatures that create extreme icing), and not by specific calendar dates.

The two general proposed operational scenarios are presented in Table 2-3 (compare to current operations in Table 2-1) and are depicted graphically on Figure 2-2. On Figure 2-2, the blue line represents the flow rate of water used to generate power and the solid orange and dotted red lines show the reservoir elevations under the proposed normal and extended operations, respectively.

TABLE 2-3 PROPOSED NORMAL AND EXTENDED OPERATION ELEVATION RANGES

RANGE TYPE	OPERATING RANGE* (ELEVATION IN FEET)	TOLERANCE (FEET)	PERCENT TIME WITHIN TOLERANCE	PERCENTAGE OF CALENDAR DAYS FOR RANGE TYPE
Normal	4,407.5 – 4,406.5	(+0.5 @ 4,408.0)	95%	At least 85% (~310 days)
Extended	4,406.5 – 4,405.0	(-0.5 @ 4,404.5)	95%	15% (~55 days) or less

*Quantified by daily average adjusted reservoir elevations at Cutler Dam.

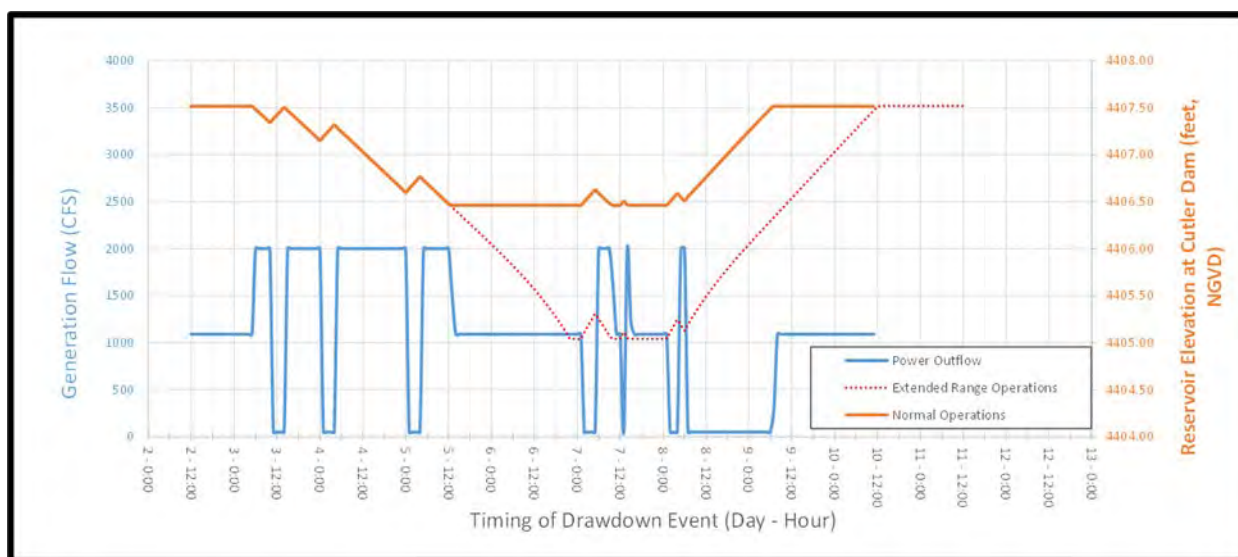


FIGURE 2-2 ILLUSTRATION OF TYPICAL 10-DAY PERIOD UNDER EXISTING (SAME AS NORMAL) AND PROPOSED EXTENDED RANGE OPERATION SCENARIOS

The increased (from +/- 0.25 to +/- 0.5) target for tolerance range would assist in irrigation operations but may also help respond to generation fluctuations during other portions of the year. It would be particularly useful during high runoff when reservoir sloping is used to alleviate unusually high reservoir levels in the southern portion of the reservoir resulting from high inflows from the southern tributaries. Under those conditions, due to the sloping effect described previously, reservoir levels at Cutler Dam are frequently lower than the lower compliance limit.

These deviations from the tolerance range target are most frequently a result of unexpected weather and/or irrigation flow changes rather than an operations error, are short-term (lasting at most a few days), and of generally small magnitude (frequently exceeding the limits by less than 3 inches) but require consultation with stakeholders and reporting to FERC for each incident. Specifically, in just a few weeks of 2021, there were three separate instances of reporting to agency stakeholders and ultimately to FERC when unavoidable circumstances (i.e., not due to PacifiCorp operations error) occurred (see Exhibit H). These instances were generally based around unexpected weather fluctuations and subsequent short-term irrigator demand fluctuations to Bear River flows that resulted in reservoir elevations that marginally exceeded the upper elevation limits at Cutler, keeping the reservoir slightly higher for a few days in a very hot and dry summer. No environmental concerns have ever been reported (such as by downstream users or reservoir recreation users or adjoining), nor have agency stakeholders expressed any concerns

when the deviations have been reported; therefore, PacifiCorp proposes to increase the tolerance target and not report short-duration, minimal exceedances that are unavoidable and not a result of error.

As noted previously, it is not possible to operate in the extended range during the irrigation season nor when inflows approach and exceed hydraulic capacity, such as during normal-to-high spring runoff years. This limitation is due to two reasons: bathymetry forces the water level higher as flows increase, and there is no room for decreases in power flows when inflows are above hydraulic capacity. Therefore, the extended range would typically only be utilized during the November-to-March time period and would further exclude periods of extreme low temperature (typically sometime between mid-December and end of January) when downstream ice-damming concerns are present. Again, noting that the extended range is intended to occur outside the irrigation season, and be defined by river conditions, rather than by calendar dates.

2.2.3 PROPOSED ENVIRONMENTAL MEASURES

This section describes the PM&E measures proposed under the new license. PM&E measures can be either a series of related measures packaged into a management plan or multiple management plans, or individual PM&E measures implemented on a standalone basis separate from a management plan.

Table 2-4 presents proposed new PM&E measures and denotes whether the measure would be part of a management plan (e.g., ongoing monitoring and maintenance) or a standalone measure. As noted in Section 2.1.4 above, several of the proposed measures are currently implemented by the Project; they are presented here under proposed measures because measures may be updated or incorporated into new management plans or plan sub-components. While existing and new measures are categorized with a single resource, many of the measures serve to protect more than one resource area. Measures are also described in the individual resource sections in Section 3, Environmental Analysis, including the cross referencing of measures that will serve to protect multiple resources. Proposed PM&E measures were developed based on existing measures currently implemented under the current license and from stakeholder input, such as that provided at the PM&E stakeholder workshop held as part of the USR presentation on August 31, 2021.

The following four management plans would be developed (described in Sections 2.2.3.1 through 2.2.3.4), and in individual resource sections within Section 3, Environmental Analysis): Cutler Project Operational Plan (to include compliance management); Updated Cutler RMP; Construction Erosion and Sediment Control Plan (CESCP); and the HPMP. With the exception of the HPMP (included with this FLA as Appendix HPMP), new and updated management plans would be developed once the Project receives a FERC license Order.

TABLE 2-4 PROPOSED PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE SUMMARY	MANAGEMENT PLAN	STANDALONE MEASURE
Geology- Soils- Sediment	GEO-1	Update erosion control and sediment management program (for existing and new erosion control check dams, bank stabilization sites, and vegetated shoreline buffers- differentiated from the CESCP, developed for new construction projects) within the RMP; maintain/monitor vegetated shoreline buffers, and erosion control check dams, to minimize sedimentation to Cutler Reservoir ⁵	RMP	
	GEO-2	Identify and implement approximately three additional miles of bank stabilization projects within Project Boundary		X
	GEO-3	Continue to monitor existing (and add any potential new) bank stabilization measures	RMP	
	GEO-4	Continue to minimize flow fluctuations downstream of the reservoir during periods of ice buildup to reduce ice shearing on banks	Operational Plan	

⁵ Mitigation measures provided for in GEO-1, GEO-2, GEO-3, GEO-4, and GEO-5 will also address water quality.

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE SUMMARY	MANAGEMENT PLAN	STANDALONE MEASURE
	GEO-5	Formalize new Construction Erosion and Sediment Control Plan to address construction and ground disturbance-related erosion and sediment activities, including standard and Project-specific BMPs and requirements	CESCP	
Water Resources- Water Quantity	WR-1	Continue reservoir elevation and river flow monitoring, per updated Operational Plan	Operational Plan	
	WR-2	Continue to communicate with USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project	Operational Plan	
Water Resources- Water Quality	WR-3	Update water quality management and monitoring program within RMP; continue existing water quality monitoring on approved five-year quarterly schedule; continue to coordinate with UDWQ and other stakeholders regarding Middle Bear River TMDL and resultant Cutler water quality issues	RMP	
Botanical Resources	BOT-1	Update vegetation management program within RMP; continue to monitor and maintain shoreline buffer vegetation (see also GEO-1)	RMP	
	BOT-2	Continue to monitor and manage weeds in the Project Boundary as part of updated vegetation management program; include new areas to target <i>Phragmites</i> and stabilize banks	RMP	
Wildlife and Habitat	WILD-1	As part of RMP, develop and implement long-term avian monitoring program within Project Boundary	RMP	

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE SUMMARY	MANAGEMENT PLAN	STANDALONE MEASURE
	WILD-2	Maintain wildlife habitat improvements, including erosion control check dams, throughout Project Boundary (see also GEO-1)	RMP	
Special Status Species (not federally listed)	SS-1	Continue to cooperate with UDWR on special status species management (e.g., implement monarch butterfly way stations, long-term avian monitoring)	RMP	
T&E Species (federally listed)	TE-1	Develop Ute ladies'-tresses management program, including monitoring, within the Project boundary in the RMP	RMP	
	TE-2	Maintain current Ute ladies'-tresses habitat	RMP	
Recreation	REC-1	Update recreation management program within RMP	RMP	
	REC-2 ⁶	Develop and implement new shoreline management program within RMP to address conflicting recreation/other uses	RMP	
	REC-3	Continue to operate and maintain current recreation site facilities, and monitor facility conditions	RMP	
	REC-4	Complete recreation site improvements, including maintenance and ADA upgrades throughout Project Boundary		X
	REC-5	Extend and/or repair Cutler Canyon Marina and Benson Marina boat ramps		X
	REC-6	Evaluate and improve accessibility where feasible (e.g., improvements identified by the National Park Service) at several recreation sites		X

⁶ Mitigation measures provided for in REC-2 will also address geology and water quality.

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE SUMMARY	MANAGEMENT PLAN	STANDALONE MEASURE
	REC-7	Make carry-in boat launch access improvements at Little Bear River and Logan River access sites (evaluate adding handrails to improve boat entry, assess other needs)		X
	REC-8	Provide digital trail and property boundary maps on PacifiCorp's website for recreation use; revise and update hard copy and digital versions of wetland maze map		X
	REC-9	Review signage at recreation access sites and update/add new as needed		X
	REC-10	Engage with Utah State Parks to identify potential measures for improving public and boater safety; add any identified to Recreation Program in RMP	RMP	X
	REC-11	As part of RMP update, recreation sites with existing temporary restroom facilities will be assessed for potential upgrades to permanent vault toilet facilities.		X
Cultural	CUL-1	Developed HPMP (updated existing cultural resources management plan and ongoing inadvertent discoveries protocol)	HPMP	
	CUL-2	Add tribal/cultural history section to PacifiCorp Cutler Project website	HPMP	X
Land Use ⁷	LU-1	Review, update, monitor, and improve existing grazing management and agricultural lease programs within the RMP	RMP	

⁷ Mitigation measures provided for in LU-1, 2, 3, 4, and 5 will also address water quality, wildlife, and botanical resources.

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE SUMMARY	MANAGEMENT PLAN	STANDALONE MEASURE
	LU-2	Continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve/improve their function as necessary	RMP	
	LU-3	Evaluate fence ends within the Project Boundary, and extend where needed based on water levels		X
	LU-4	Include additional parcels (as reflected in Exhibit G) in FERC boundary downstream of powerhouse in RMP programs (land use, fencing, vegetation management) and HPMP	RMP	
	LU-5	Coordinate with BLM to confirm agreement for constructing a single buffer/boundary fence around PacifiCorp and BLM parcels south of the reservoir near Cutler Dam	RMP	
	LU-6	As part of agricultural use program in RMP, evaluate irrigation pump intakes within the Project Boundary and extend where needed	RMP	X

BLM = Bureau of Land Management; FLA = Final License Application; HPMP= Historic Properties Management Plan; RMP= Resource Management Plan; UDWR = Utah Division of Wildlife Resources; UDWQ = Utah Division of Water Quality; USFWS = U.S. Fish and Wildlife Service; CESC = Construction Erosion and Sediment Control Plan; BMP = best management practice; ADA = Americans with Disabilities Act.

PacifiCorp is proposing the development/update of the following management plans under the new license:

2.2.3.1 UPDATED OPERATIONAL PLAN

A new Cutler Project Operational Plan will be developed that incorporates many of the measures in the current plan. This new Operational Plan is to be developed after the Project receives a FERC license Order.

2.2.3.2 UPDATED CUTLER RESOURCE MANAGEMENT PLAN

As described above, a new Cutler RMP will be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP is to be developed after the Project receives a FERC license Order. The new Cutler RMP would be expected to include the following programs:

- Water quality monitoring program
- Shoreline management program
- Erosion control and sediment management program
- Vegetation management program
- Agricultural management program
- Ute ladies'-tresses management and monitoring program
- Avian monitoring program
- Recreation management program
- Property management program

2.2.3.3 CONSTRUCTION EROSION AND SEDIMENT CONTROL PLAN

A new CESCOP will be developed that incorporates and codifies existing measures to protect water quality through avoiding and minimizing impacts of any new construction during the license term, and will include standard and Project-specific BMPs and requirements to address potential construction and ground-disturbance-related erosion and sediment. This new CESCOP will be developed after the Project receives a FERC license Order.

2.2.3.4 HISTORIC PROPERTIES MANAGEMENT PLAN

An HPMP has been developed for the Project under the new license. This HPMP is filed with this FLA (Appendix HPMP) and was reviewed by FERC, interested tribes, and the SHPO. The measures in the existing CRMP were carried forward in the HPMP, with some modification to update them to current regulatory standards and account for newly identified historic properties. The HPMP includes procedures for identifying potential adverse effects to known historic properties from specific proposed undertakings (e.g., capital improvements, new construction,

ground disturbance, replacing equipment) as well as routine maintenance (e.g., painting and replacing windows or other structural features). The HPMP also includes procedures for avoiding and minimizing those potential adverse effects to historic properties, and for consulting with the Utah SHPO to mitigate any adverse effects that could not be avoided. The HPMP also includes procedures to address inadvertent discoveries of cultural resources that have not been identified to date.

2.3 OTHER ALTERNATIVES

No additional alternatives beyond the Proposed Action Alternative are proposed for this license application.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

PacifiCorp seeks to continue operation of the Cutler Project. The Project is part of a wider, coordinated Bear River hydroelectric system, which includes other PacifiCorp projects located upstream on the Bear River in Idaho. This coordinated system provides reliable and renewable power generation. The Project infrastructure is important to providing valuable irrigation water delivery and storage, as well as ensuring compliance with multiple water delivery contract requirements. The Project is a viable generation resource that has been maintained appropriately over the life of the Project, has a strong compliance record, has positive and collaborative relationships with regulatory agency stakeholders and many local/adjacent interest groups and landowners, and does not face undue regulatory or compliance concerns. A FERC license denial alternative is therefore eliminated from further detailed analysis.

The following sections evaluate other specific alternative scenarios eliminated from further analysis.

2.4.1 FEDERAL GOVERNMENT TAKEOVER OF THE PROJECT

In accordance with 18 CFR § 16.14 of FERC regulations, during Project scoping a federal department or agency may file a recommendation that the United States exercise its right to take over a hydroelectric power project with a license that is subject to Sections 14 and 15 of the FPA. During the Project scoping period, no federal department or agency filed any such recommendation. Federal government takeover of the Project is therefore not a reasonable

alternative. Federal takeover of the Project would require congressional approval. While that fact alone would not preclude detailed consideration of this alternative, there is currently no evidence showing that federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate, and no federal department or agency during the appropriate scoping window expressed interest in operating the Project.

2.4.2 ISSUING A NON-POWER LICENSE

A non-power license is a temporary license that FERC would terminate when it determines that another governmental agency is authorized and willing to assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this time, no governmental agency has suggested an interest, willingness, or ability to take over the Project, and PacifiCorp is seeking a power license.

2.4.3 RETIRING THE PROJECT

Project retirement would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. PacifiCorp seeks to retain and operate the Project. No participant has suggested that dam removal would be appropriate in this case, and there is no basis for recommending it. Dam removal is unreasonable for the reasons specified above in Section 2.4. In addition to the requirements outlined previously regarding irrigation delivery contracts, Cutler Reservoir and associated wetlands serve to provide valuable recreation and wildlife habitat, as well as provide habitat for the endangered Ute ladies'-tresses orchid, and serves as a viable renewable power generation resource.

The power generated at the Cutler Project helps PacifiCorp to balance the production and delivery of other emission-free variable sources of power generation, such as wind and solar, to the power grid. Thus, dam removal is not a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures. However, one non-governmental entity suggested that Cutler retire its hydropower operations; this comment was put forth as part of a suggestion for Project decommissioning that would leave Cutler Dam in place to provide other beneficial Project uses, but it would no longer generate hydroelectric power.

No other party has sought a non-power license or suggested Project removal or retirement, and there is no basis for concluding that the Cutler Project should no longer be used to produce power. As a result, this alternative has been eliminated from detailed study. Further, FERC eliminated this section (Retiring the Project) from the FERC EA outline proposed in the Project SD2 (FERC 2019b).

3.0 ENVIRONMENTAL ANALYSIS

This section presents a general description of the Bear River basin where the Project is located; the scope of the cumulative effects analysis, and the affected environment, potential environmental effects, and PM&E measures proposed to avoid or minimize potential environmental effects on the various resources that could be affected by the Project.

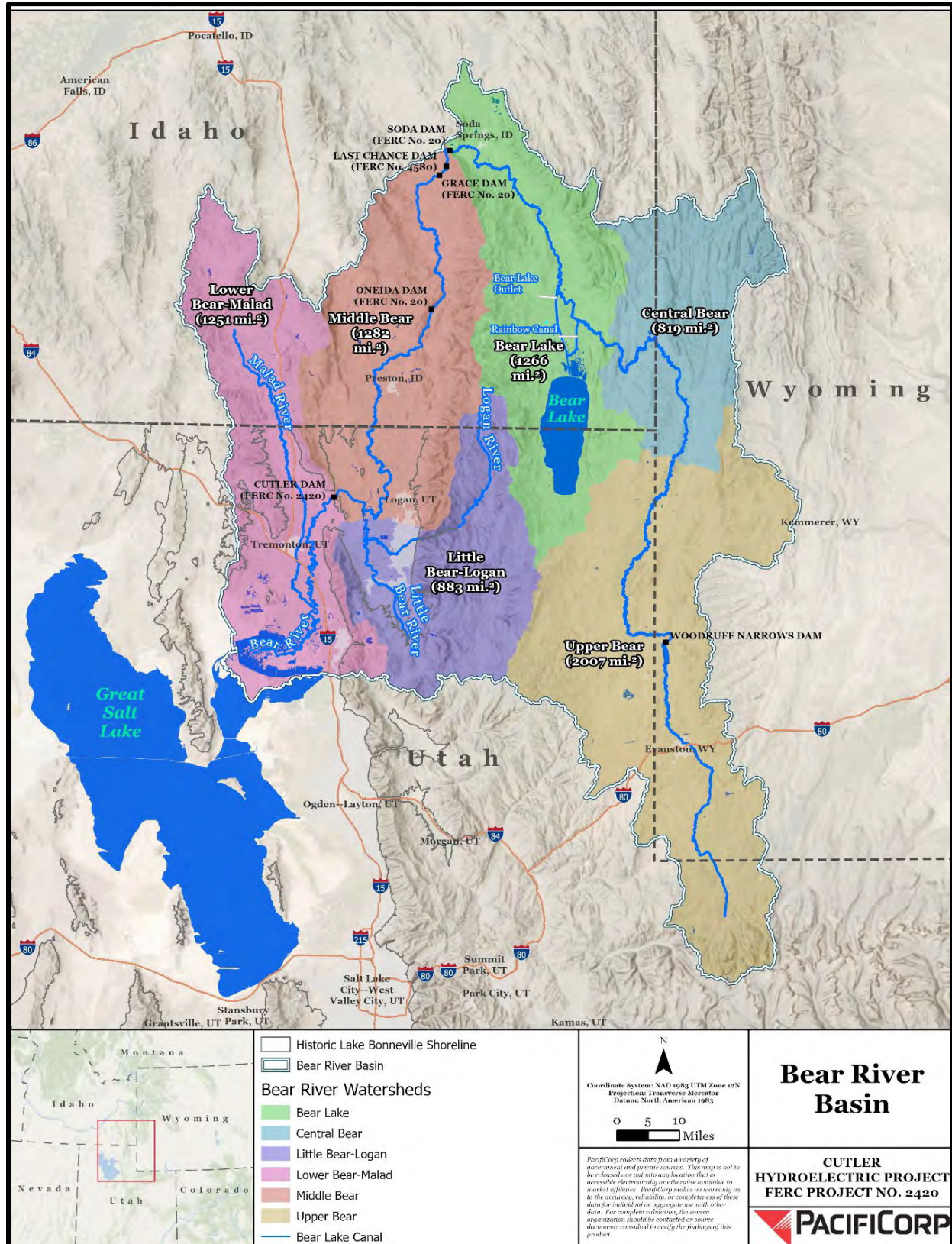
The Cutler Project Boundary includes Cutler Dam, Cutler Reservoir, the main tributary streams extending up to several miles upstream of their confluence with the reservoir, and PacifiCorp mitigation lands located adjacent to the reservoir (Figure 1-1). The term *Project Area* refers to lands located directly adjacent to the Project Boundary, specifically within 0.5 mile of the Project Boundary. *Project Vicinity* is a larger, broader area, defined for each resource (e.g., watershed or county). See the Explanation of Terms prior to Exhibit A, for a more detailed list of Project terms used herein.

3.1 GENERAL DESCRIPTION OF BEAR RIVER BASIN

The Bear River originates in northern Utah on the north side of the Uinta Mountain Range. In its 350-mile length, the river forms a large, inverted U-shape first heading in a northerly direction into southwestern Wyoming, then westward into southeastern Idaho, and finally turning back south into northeastern Utah. The Bear River drains mountainous areas and farmlands northeast of the Great Salt Lake and southeast of the Snake River Plains, forming an approximately 7,500-square-mile basin across six major sub-watersheds (Hopkins 1997; Figure 3-1).

The mainstem of the Bear River begins at the confluence of Hayden Fork and Stillwater Fork in the Uinta Mountains in Summit County, Utah (USGS 2018). From the Uinta Mountains, the Bear River flows north, through the town of Evanston, Wyoming, and then meanders along the Wyoming-Utah state border until it turns west into Idaho, past the city of Montpelier where it meets first with the Rainbow Canal. Rainbow Canal sends the vast majority of the Bear River into Bear Lake as part the irrigation storage governed by the Bear River Compact and numerous irrigation contracts, which then enters the Bear Lake Outlet Canal that flows from Bear Lake when water is being pumped back into the river from Bear Lake. Water that collects in Bear River from numerous tributaries that are not part of the stored water system in Bear Lake is

referred to as “natural flow” to distinguish it from water in the Bear River that has been diverted, stored, and then released to meet irrigation and other water right demands. At the north end of the Bear River Range near Soda Springs, Idaho, the Bear River turns south and eventually enters Utah again and flows through Cutler Reservoir. From its release at Cutler Dam, the river flows downstream and through the Bear River Migratory Bird Refuge terminating at the Great Salt Lake. The Bear River is the largest tributary—both in length and volume—to the Great Salt Lake and is the longest river in North America that does not reach the ocean (USGS 2006).



Source: PacifiCorp 2018

FIGURE 3-1 BEAR RIVER BASIN AND SUB-BASINS, UTAH, IDAHO, AND WYOMING

3.1.1 TOPOGRAPHY AND CLIMATE

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 2018). The Uinta Mountain Range has elevations nearing 13,000 feet (UDWR 1992). Downstream where the Bear River leaves the Uinta Mountains, the river flows at approximately 7,000 feet elevation in a broad valley. Several hydroelectric power plants are located on the Bear River downstream of Bear Lake Valley (three in southeast Idaho are owned by PacifiCorp and are licensed collectively as the Bear River Hydroelectric Project [FERC Project No. 20]), taking advantage of the drop in elevation (UDWR 1992). The river enters the Cache Valley at an elevation of 4,720 feet (UDWR 1992) and terminates into the northeast side of the Great Salt Lake, Utah, at an elevation of approximately 4,200 feet (USGS 2018).

Precipitation in the Bear River basin primarily falls at the higher elevations in the form of snow, and ranges from 11 to 57 inches of precipitation per year, with an average of 22 inches per year (USU 2007). During the summer months, temperatures in the vicinity of the Cutler Dam regularly exceed 90 degrees Fahrenheit (°F), with July and August being the hottest months (USU 2021). In the winter, average temperatures can range from 3.6 to 41.2 °F, and an average of 102 days at or below freezing temperatures was recorded in 2019 and 2020 (USU 2021). 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 °F in 1985 (USU 2019). Daily and cumulative snowpack information available from the Natural Resources Conservation Service (NRCS) states that median peak snowpack in the Bear River basin between 1981 and 2010 was 25 inches (NRCS 2018).

Models predict that between 2040 and 2060, the Bear River basin's climate could be 5 to 6 °F warmer and could have a 5 to 13 percent decrease in annual runoff, 10 to 15 percent decrease in annual snowpack, earlier spring melt by 2 to 4 weeks, and increased precipitation in the winter months in the form of rain (Degiorgio et al. 2010).

3.1.2 MAJOR LAND USES AND ECONOMIC ACTIVITY

Land use and economic activity in the Project Vicinity are presented in detail in Section 3.3.9 Land Use, and Section 3.3.10, Socioeconomics, and are summarized here.

The Cutler Project is located in the Middle Bear and Little Bear-Logan sub-watersheds of the Bear River watershed, which combined drain approximately 2,165 square miles in Utah and Idaho (Figure 3-1). The Project itself sits almost entirely in Cache County, excluding the western and narrowest part of Cutler Canyon and Cutler Dam, which are located in Box Elder County. The five dominant land cover types in the watershed are shrubland, pasture and hay, small grains, grasslands and herbaceous plants, and evergreen forest (see Figure 3-39 in Section 3.3.9, Land Use). Land ownership in the portion of the Middle Bear and Little Bear-Logan watersheds located in Utah is primarily in private ownership or United States Forest Service (USFS; Table 3-1).

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 n.d._a). 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 (Utah DNR 2017). Specifically, the state of Utah claims fee title ownership to the summer channel⁸ 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; Olson et al. 2004). The DFFSL is “required to ensure the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality” (Utah DNR n.d._b).

⁸ “Summer channel” refers to the bank-to-bank *below* the ordinary high-water mark.

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 one 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). Box Elder has 16 percent water coverage, much higher when compared to Cache County (USDA 2014), due in large part to the presence of the Great Salt Lake and surrounding freshwater impoundments and wetlands. Box Elder County is the top producing region for winter wheat, spring wheat, oats, and corn in Utah. Of the 103,836 acres irrigated in Box Elder County, approximately 60 percent of that irrigation water is provided by the Bear River Canal System, originating at Cutler Dam (USDA 2017).

TABLE 3-1 LAND OWNERSHIP IN THE UTAH PORTIONS OF THE MIDDLE BEAR AND LITTLE BEAR-LOGAN SUB-WATERSHEDS

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

Source: USU 2007

3.1.3 MAJOR WATER USES

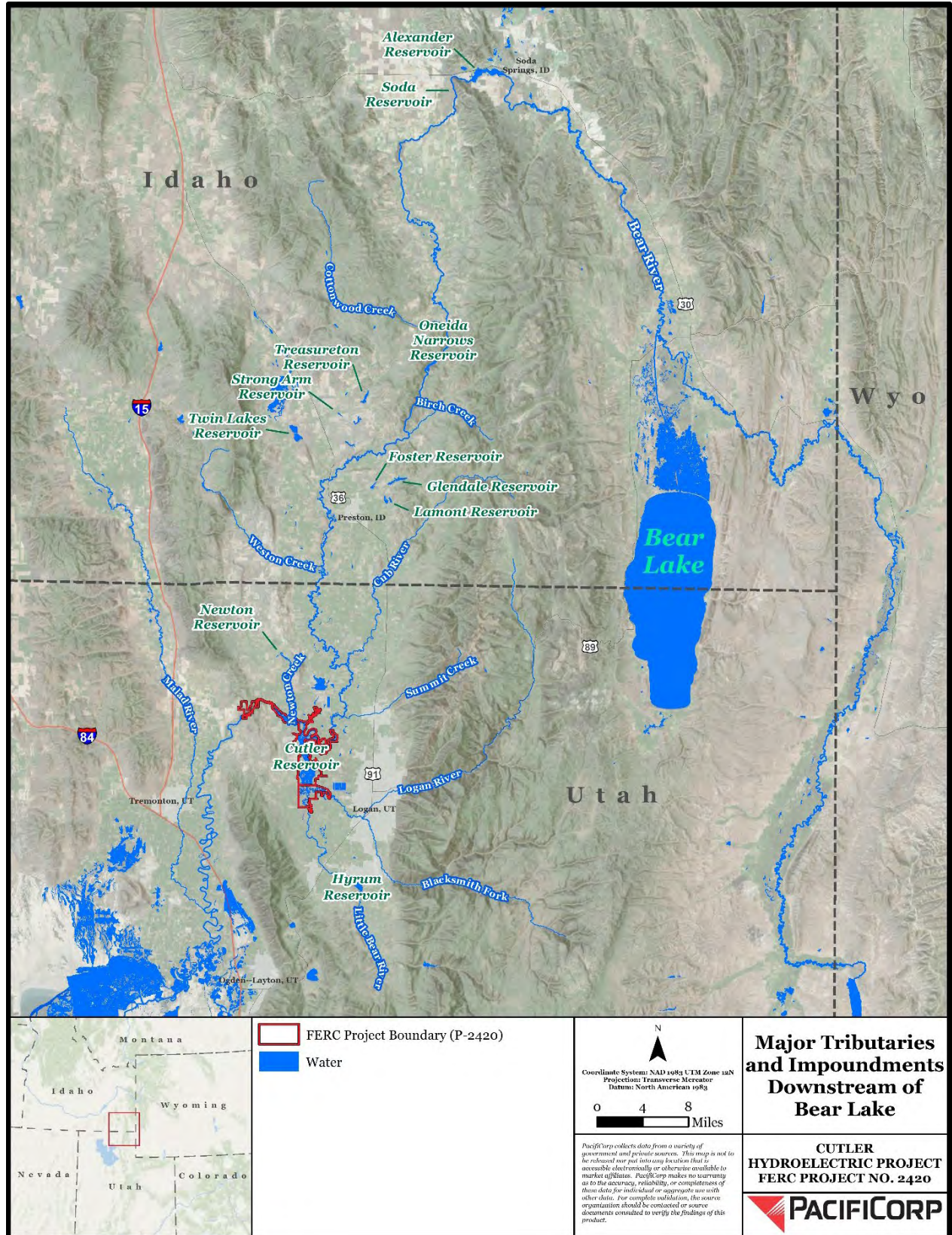
The amount of water available in the Bear River and its tributaries varies seasonally and annually. Snowmelt that originates on the north slope of the Uinta Mountains generally results in high flows in the early spring and is responsible for the base flows that maintain the river naturally throughout the rest of year (Utah DNR 2017). These flows are often altered due to irrigation diversions and can be modified based on dam releases and storage in Bear Lake (Utah DNR 2017).

When water is withdrawn from the Bear River system, most of the water is used in Utah and Idaho. Major water uses in the Bear River basin (both consumptive and non-consumptive) include agriculture, irrigation, municipal and industrial uses, power generation, and recreation. 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 af). Another 11.6 percent (430,793 af) is used for agricultural purposes, 0.7 percent (25,323 af) is used for municipal and industrial purposes, and 7.3 percent (271,878 af) is lost in the basin's open areas and evaporation in the Bear River Migratory Bird Refuge (Utah DNR 2017). Approximately 23 percent (845,863 af) of the water flows into the Great Salt Lake annually (Utah DNR 2017). The Bear River's average annual flow into the Great Salt Lake is approximately 1.2 million af (USU 2007).

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 between Bear Lake and Cutler Reservoir, PacifiCorp owns and operates five hydroelectric plants and five dams. A more detailed description of the dams and hydroelectric projects is presented in Section 3.3.2, Water Resources). Annual Project operations are heavily influenced by water delivery for adjacent agricultural lands; there are at least 118 irrigation companies or other entities that own and operate water withdrawal and delivery systems within the Bear River watershed (UDWQ 2010).

3.1.4 PROJECT DRAINAGE BASIN 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 3-2). 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 3-2). In addition, as noted above in Section 3.1, Bear Lake functions as an agricultural storage waterbody for the Bear River and is connected by a canal system, which is augmented annually by the Lifton Pump Station.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

FIGURE 3-2 MAJOR TRIBUTARIES AND IMPOUNDMENTS DOWNSTREAM OF BEAR LAKE

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

The cumulative effects of the Project are summarized in this section and discussed in greater detail in the Affected Environment subsections of individual resources. The scope of cumulative effects was reviewed and determined by the FERC SD2 (FERC 2019b).

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR 1508.7), a cumulative effect is the effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

3.2.1 RESOURCES THAT COULD BE CUMULATIVELY AFFECTED

Based on information evaluated in the SD2 and this Exhibit E, including the study reports and comments received, the following resources were identified that may be cumulatively affected: water, geology and soils, and terrestrial resources (specifically noxious weeds and invasive plant species).

- **Water Resources:** The SD2 noted that water quantity and quality could be cumulatively affected by the proposed continued operation and maintenance of the Project in combination with other hydroelectric and water storage, diversion, and wastewater treatment projects in the Bear River basin.
- **Geology and Soil Resources:** The SD2 also noted that geology and soil resources may be cumulatively affected as a result of continuing and future potential erosion effects at the Project, and also resulting from natural events and land-use practices within the Bear River.
- **Terrestrial Resources:** Finally, the SD2 noted that because noxious weeds and invasive plant species exploit exposed soils that may be caused by erosion and/or sediment deposition, affected by the Project or other activities within the Bear River, terrestrial resources may be cumulatively affected.

As described above in Section 3.1.1, Topography and Climate, the only climate change model developed for the Bear River basin predicts warmer temperatures, decreased annual runoff, earlier spring runoff, and increased winter precipitation (Degiorgio et al. 2010). However, although in theory climate change could cumulatively affect the water supply for the Project, potential effects of climate change *on* the Project are not addressed in this Exhibit E as a cumulative impact because FERC considers climate change a future condition that cannot be accurately predicted for this site given the lack of site-specific climate change models (as stated in FERC SD2 [FERC 2019b]). In addition, because the Project operates in a run-of-river mode it does not affect the volume of water moving through and downstream of the Project. Therefore, any climate change-induced changes to runoff and in turn to flow volumes in the reservoir or downstream in the Bear River would likely not be further influenced by Project operations.

Moreover, in FERC’s response to a stakeholder request that PacifiCorp conduct a climate change study during the August 2021 USR public meeting, FERC responded that, “The baseline for our analysis is current environmental conditions, not a projected or modeled future condition” (Appendix B in FERC 2021a). As such, FERC indicated that a climate change study was not currently part of their analysis or requirements. This determination is described in more detail in FERC’s *Determination on Requests for Study Modifications and New Studies for the Cutler Hydroelectric Project* (Appendix B in FERC 2021a), which addressed stakeholder comments on the ISR (PacifiCorp 2021a).

3.2.2 GEOGRAPHIC SCOPE

FERC determined that the geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of 1) the Proposed Action's effect on the resources, and 2) contributing effects from other hydropower and non-hydropower activities within the Bear River basin.

The geographic scope of the water resources (quantity and quality) cumulative effects analysis includes the Bear River basin. This geographic scope was chosen because the operation and maintenance of the Project in combination with other hydroelectric and water storage projects in the Bear River basin may affect flow and water quantity and water quality throughout the Bear River system.

The geographic scope of the geology and soils resources (i.e., sediment) cumulative effects analysis includes the Bear River basin from the upstream extent of the Bear River Hydroelectric Project (FERC Project No. 20) Oneida Development Dam downstream to the Great Salt Lake. This geographic scope was chosen because the operation and maintenance of the Project in combination with the upstream and downstream land-use practices in the Bear River basin may affect erosion, and/or sediment transport and deposition in the Bear River.

The geographic scope of the terrestrial resources (i.e., noxious weeds and invasive plants) cumulative effects analysis includes the Bear River basin from the upstream extent of the Bear River Hydroelectric Project (FERC Project No. 20) Oneida Development Dam downstream to the Great Salt Lake. This geographic scope was chosen because the operation and maintenance of the Project in combination with the upstream and downstream land-use practices in the Bear River basin may provide suitable habitat for noxious weeds and invasive plant species in the Bear River.

3.2.3 TEMPORAL SCOPE (PAST, PRESENT, AND FUTURE ACTIONS)

FERC determined that the temporal scope of the cumulative effects analysis would include a discussion of past, present, and reasonably foreseeable future actions and their effects on each resource that could be cumulatively affected. Based on the potential term of a new license, the temporal scope for all of the resources looks 30 to 50 years into the future, concentrating on the potential effects on the resources from reasonably foreseeable future actions, generally in a qualitative analysis. The historical discussion is limited to the amount of available information for each resource. The quality and quantity of information and associated analysis diminishes further back in time from the present.

3.3 RESOURCE ISSUES

This section presents the affected environment, potential environmental effects, and PM&E measures proposed to avoid or minimize potential environmental effects on the various resources that could be affected by the Project. This environmental analysis follows FERC's SD2 (FERC 2019b), which determined (based on stakeholder input) which resources should be included in the site-specific analysis and which resources should be further assessed in a cumulative effects

analysis (as described in Section 3.2 above, Scope of Cumulative Effects Analysis). This analysis also incorporates information documented in two technical study reports: the ISR (PacifiCorp 2021a) and the USR (PacifiCorp 2021b).

A substantive portion of this environmental analysis for several of the resources is based on predicted changes using the hydraulic model and direct empirical observations of water surface elevation (WSE), reservoir wetted area, and associated hydraulic conditions in the reservoir under the proposed extended operations. As discussed in both the ISR and USR that preceded this environmental analysis, as well as in the response to comments on the DLA (Attachment A), a full reservoir drawdown conducted in fall 2019 drew the reservoir down to WSE 4,387.5 feet, significantly lower than the proposed lowest extended operating limit of WSE of 4,405 feet, covering an elevation range that is *not* being proposed for any future operational scenarios (as described in the ISR [PacifiCorp 2021a]).

The analysis of the Proposed Action on operations included the following data sources collected during and after the full 2019 drawdown:

- WSE measurements using pressure transducers across multiple locations in Cutler Reservoir;
- Sonar bathymetry survey;
- Direct observations associated with respective resource studies in fall 2019;
- Aerial images throughout Cutler Reservoir during the fall 2019 drawdown across a range of WSEs (as measured at Cutler Dam); and
- Hydraulic modeling, used to predict reservoir wetted area and variable WSEs throughout locations in Cutler Reservoir under a range of WSEs (again, as measured at Cutler Dam), as part of the Hydraulic Modeling ISR (Appendix G in PacifiCorp 2021a and Appendix A in PacifiCorp 2021b).

The full 2019 drawdown, the hydraulic modeling methods and results, as well as the studies conducted using the associated data, are described in detail in the ISR (PacifiCorp 2021a). In addition, several data corrections and clarifications regarding hydraulic modeling, and a new aerial photo set, were included in the USR (Appendix A, PacifiCorp 2021b). However, given the

reliance of the environmental analysis on the combination of hydraulic modeling and data collected directly during the full 2019 experimental drawdown for several resource areas, additional discussion on the methods and limitations of the data sources is included here and referenced throughout the resource sections below, as appropriate (also see detailed additional discussions regarding the modeling results in Attachment A to this Exhibit E).

3.3.1 FALL 2019 FULL DRAWDOWN

A full drawdown of Cutler Reservoir was conducted in the fall of 2019 for the purpose of obtaining light detection and ranging (LiDAR) and bathymetry data of the reservoir to populate a two-dimensional (2D) hydraulic model and one-dimensional (1D) sediment transport model. In addition, the drawdown provided a unique opportunity to collect a range of specific resource data under drawdown conditions. The drawdown was conducted from October 25 to November 16, 2019. Over 21 days, the reservoir was lowered from full pool (4,407.3 feet⁹ on October 24) down to 4,387.5 feet on November 6, 2019, then refilled. As mentioned above, the lowest WSE during the 2019 drawdown was substantially lower than the proposed extended operations lowest elevation of 4,405.0 feet, and covers an elevation range that is not proposed for any future operational scenarios. A compilation of aerial photographs illustrating Cutler Reservoir inundation areas near or just below WSE 4,405.0 on October 28 and 31, 2019 are presented in Attachment B of this Exhibit E, and provide additional clarification and direct visual observation of reservoir conditions at elevations lower than the lowest proposed operational limit of WSE 4,405.0 feet (which is approximately one foot below the current lowest operational limit of WSE 4,406.0 feet).

As part of the aesthetic portion of the Land Use ISR (Appendix G in PacifiCorp 2021a) photographic data was collected at 26 photopoints that included PacifiCorp recreation sites and bridges within or near the Project Boundary, and State Highway 30 entering Cache Valley from the west. Prior to the initiation of the drawdown, full-pool photos were taken at all photopoints on October 24, 2019 as part of the Land Use ISR. Drawdown photos were then captured at all

⁹ Elevations reported herein refer to National Geodetic Vertical Datum of 1929, or NGVD29; all are as measured at Cutler Dam.

photopoints again on November 1, 2019¹⁰ (4,392.4 feet). These elevations are as measured at Cutler Dam by transducers deployed during the drawdown. The photos and other observations made during the drawdown allowed for an empirical data source to supplement the model results described below.

Drone photographs were also collected at various recreation sites daily from October 25, through November 3, 2019 to document reservoir wetted area and water depth at boat access sites across a range of WSE's during the full 2019 drawdown as part of the Recreation ISR (Appendix I of PacifiCorp 2021a) and the USR (PacifiCorp 2021b). Recreation sites included Cutler Marsh Marina, Benson Marina, Clay Slough, Cutler Canyon Marina, Little Bear River access, Logan River Recreation Site, and Upper Bear River Access Site. Aerial images from multiple directions obtained with drones documented reservoir wetted area daily for a range of WSEs measured at Cutler Dam including documentation of reservoir conditions during the drawdown, at or below the elevations proposed for normal and extended operations.

3.3.2 HYDRAULIC MODELING

The 1D sediment transport and 2D hydraulic models were developed as part of the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a) to predict potential changes to the hydraulics and sediment transport in order to inform potential changes to Project operations. The study area for the hydraulic models (“model boundary”) included Cutler Reservoir and its shoreline, as well as a portion of the Bear River downstream from Cutler Dam. The 1D model was used to predict sediment transport within the reservoir, and the 2D model was used to predict flow behavior, inundation boundaries, and other hydraulic characteristics within the model boundary.

The hydraulic models were developed using terrain data from two sources: 1) data from a sonar bathymetry survey collected before and after the 2019 drawdown, used to map the reservoir bed in submerged areas in the reservoir; and 2) LiDAR data collected during the 2019 drawdown,

¹⁰ Photos were captured again on November 6, 2019 (4,387.5 feet), yet only the November 1 photos were analyzed in the Land Use ISR as the November 6 photos were well below the lowest proposed extended operational WSE of 4,405.0 feet.

used to create a terrain surface of the areas of exposed but saturated reservoir bed, as well as the water surface elevation.

Hydraulic calibration included adjusting hydraulic parameters within the model to reproduce inundation boundaries within the Project Area and WSE data at specific points within the reservoir. Sediment transport calibration included adjusting the hydraulic and reservoir bed parameters to match the minimum reservoir bed elevation during the drawdown. Detailed modeling methods are presented in the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a). The models informed PacifiCorp’s evaluation of a range of alternatives for future operations and other studies, but especially for the potentially affected wildlife habitat analysis.

The 2D model is useful for analyzing and comparing the proposed normal and proposed extended reservoir operation scenarios (Table 2-3) that are a focus of this analysis. However, models inherently contain a degree of uncertainty which is critical to understanding and interpreting model results. Uncertainty in the hydraulic model is a result of: 1) the LiDAR data collected for developing the 2D model geometry, 2) the highly complex interaction between the reservoir’s groundwater bed material at the end of the reservoir boundary, and 3) the inherent accuracy limitations of model output at shallow depths.

In addition, post-processing of the LiDAR survey data revealed that some portions of the reservoir bed had low levels of elevation survey returns due to the saturation or very shallow surface water of the reservoir bed material at the time of the 2019 full drawdown event. This occurred in what will be referred to in this Exhibit E as the “transition zone” of the reservoir, which are the nearshore shallower areas between the reservoir banks and the reservoir open water. Recognizing that Cutler Reservoir is shallow throughout, the term “open water” is not defined as a specific depth, although as noted below, the shallowest areas of the reservoir (i.e., those areas with depths less than six inches) also have greater potential for model uncertainty.

The low LiDAR survey returns limited the level of elevation information in some of these transition zones, which makes reporting model depths and velocities in these areas more difficult than in areas with full LiDAR coverage. During reservoir lowering operations many of these transition zones also experience complex hydraulic phenomena including increased groundwater

inflow from the perched groundwater levels surrounding the reservoir, as well as capillary action from the bed material drawing moisture from the reservoir.

The result is that many of the transition zones remain partially or mostly saturated even after the reservoir drops below the bed elevation in certain areas. Lastly, the uncertainty of the hydraulic model results increases as the depths of the reservoir approach zero in the transition areas (i.e., at depths less than six inches) given both inherent model uncertainty, and the potentially additive uncertainty related to the LiDAR data itself. Further, there may be an additional increase in model uncertainty due to the complex physics involved with very shallow flow, some of which is not accounted for in 2D hydraulic modeling (see additional detail in Attachment A). Overall, the results of the model simply do not consistently reproduce the observed shallow depths of water that exist in the transition zones of the reservoir for the reasons discussed above. The model is, however, extremely useful in providing the capability for comparisons between the proposed normal (which mirrors the existing operations range during most of the year) and the proposed extended range effects, particularly for the analysis of potential effects of proposed Project operations on the avian community.

3.3.3 GEOLOGY, SOILS, AND SEDIMENT

This section describes the geology, soils, and sediment characteristics within the Project Boundary and Project Vicinity and assesses how proposed operations may affect these resources. The information presented in this section focuses on those aspects of the geologic environment that are pertinent to hydropower facilities or may affect stream or reservoir conditions. The Project Vicinity or geographic scope for this resource section includes Cache and Box Elder counties.

The resource issues related to geology and soils (specifically in regard to erosion and sediment) identified in FERC SD2 (FERC 2019b) are presented in Table 3-2. These issues were identified as needing to be addressed in the FERC EA and are therefore included in this Exhibit E section. For reference, Table 3-2 also identifies where each of the issues was initially studied in the *Hydraulic Modeling Initial Study Report* (referred to here as the Hydraulic Modeling ISR, which is included as Appendix G of PacifiCorp 2021a) or in the USR (PacifiCorp 2021b), and where further analysis is presented (e.g., Exhibit E section). Each of the relevant studies is described

below. Lastly, three of the issues were flagged by FERC as needing a review of cumulative effects in addition to site-specific effects. Cumulative effects for these issues are addressed in Section 3.3.3.3.

TABLE 3-2 GEOLOGIC AND SOIL RESOURCE ISSUES IDENTIFIED IN FERC SCOPING DOCUMENT 2

ISSUE IDENTIFIED IN FERC SCOPING DOCUMENT 2	WHERE ASSESSED	CUMULATIVE EFFECTS ANALYSIS
Effects of continued Project operation on turbidity and suspended sediment loads	<ul style="list-style-type: none"> Hydraulic Modeling ISR sediment transport model (Appendix G of PacifiCorp 2021a) FLA Exhibit E Section 3.3.3, Geology, Soils, and Sediment (herein) 	Yes
Effects of continued Project operation on reservoir bank erosion and the Bear River downstream of Cutler Dam that could lead to loss of shoreline lands and a reduction in buffers, agricultural lease lands, and wildlife habitat	<ul style="list-style-type: none"> Land Use ISR (Appendix D of PacifiCorp 2021a) Land Use USR (Appendix C of PacifiCorp 2021b) FLA Exhibit E Section 3.3.9, Land Use (herein) 	No
Effects of continued Project operations on sediment loading within the reservoir and potential backwater effects within tributaries	<ul style="list-style-type: none"> Hydraulic Modeling ISR sediment transport model (Appendix G of PacifiCorp 2021a) FLA Exhibit E Section 3.3.3, Geology, Soils, and Sediment (herein) 	Yes
Effects of potential Project operation on sediment recruitment and transport downstream of Cutler Dam, and the potential effect on the Bear River, including effect on the Refuge and its habitats, to the mouth of the Bear River at Great Salt Lake	<ul style="list-style-type: none"> Hydraulic Modeling ISR sediment transport model (Appendix D of PacifiCorp 2021a) ISR Comment Response Attachment 4 (PacifiCorp 2021c) FLA Exhibit E Section 3.3.3, Geology, Soils, and Sediment (herein) 	Yes

Given that all of the issues noted were related to erosion and sediment, the studies below were conducted as part of the ISR and USR to address gaps in the sediment and erosion data. These studies were used to 1) inform the baseline conditions of erosion along the reservoir shoreline and upstream and downstream on the Bear River, and sediment mobilization and transport in the reservoir and downstream on the Bear River, and 2) analyze the potential effects of proposed operations on erosion and sediment in the reservoir and in the Bear River.

- Land Use ISR (Appendix D of PacifiCorp 2021a): presents the current conditions for reservoir shoreline and streambank erosion on the Bear River upstream of the reservoir

(but within the Project Boundary) and presents the results of an erosion study conducted along the reservoir shoreline during the 2019 drawdown.

- Land Use USR (Appendix C of PacifiCorp 2021b): presents the results of a streambank erosion study conducted on the Bear River downstream of Cutler Dam.
- Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a): developed a sediment transport model for the reservoir and the Bear River downstream of the dam to analyze potential effects of proposed normal and extended operations on sediment mobilization and transport (presented in Section 3.3.3.2, Environmental Analysis, below).
- Sediment ISR (Appendix H of PacifiCorp 2021a): developed a sediment distribution model for the reservoir (spatial distribution of depths and volume), which was used to inform the baseline sediment conditions presented in this section. Phosphorus and other pollutants in sediments was also addressed in the ISR. Lastly, the study reviewed the practicability of dredging and removal of Wheelon Dam as a sediment management measure and assessed its potential environmental effects¹¹ (discussed in Section 3.3.3.2, Environmental Analysis, below).

3.3.3.1 AFFECTED ENVIRONMENT

This section presents the following affected environment information for the Project Vicinity and within the Project Boundary.

- **Geology:** bedrock lithology, stratigraphy, structural features, glacial features, unconsolidated deposits, and mineral resources at the Project, as well as existing and potential geological and soil hazards, and seismology information
- **Soils:** types, occurrence, physical and chemical characteristics, erodibility, and potential for mass soil movement; a description of the current soil and erosion conditions along Cutler Reservoir shorelines and Bear River streambanks upstream and downstream of the reservoir; steepness; composition (bedrock and unconsolidated deposits); and vegetative cover; and existing erosion, mass soil movement, slumping, or other forms of instability

¹¹ Dredging and Wheelon Dam removal are *no longer included in the proposed Project* as the studies demonstrated that it would not change the distribution pattern of sediment deposition in the reservoir in any meaningful way.

- **Sediment:** sediment distribution and volume in the reservoir and downstream in the Bear River; phosphorus in reservoir sediments

GEOLOGY

Site Characteristics

Cutler Reservoir is located in the west-central part of Cache Valley in northern Utah (Figure 3-3). Cache Valley is a north-trending graben valley occupying approximately 600 square miles (PacifiCorp 2018). The principal physiographic features of the Project Vicinity 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 south to Cutler Reservoir via Clay Slough.

Cache Valley is drained by the Bear River, which originates at the western end of the north slope of the Uinta Mountains (see detailed description in Section 3.1, General Description of Bear River Basin). The Cache Valley floor ranges from approximate elevations of 4,400 to 5,400 feet. Cutler Reservoir is located in the western portion and at the lowest parts of the valley and ranges in elevation from 4,400 to 4,450 feet.

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 where it enters Cutler Reservoir. The reservoir trends to the northwest into the Cutler Canyon, upstream of Cutler Dam. Cutler Canyon is a nearly symmetrical gorge eroded by the Bear River that contains no roads that extend through the canyon but is traversed by Union Pacific (U.P.) Railroad tracks. The highest points on the north and south sides of the gorge are 5,478 and 5,596 feet, respectively.

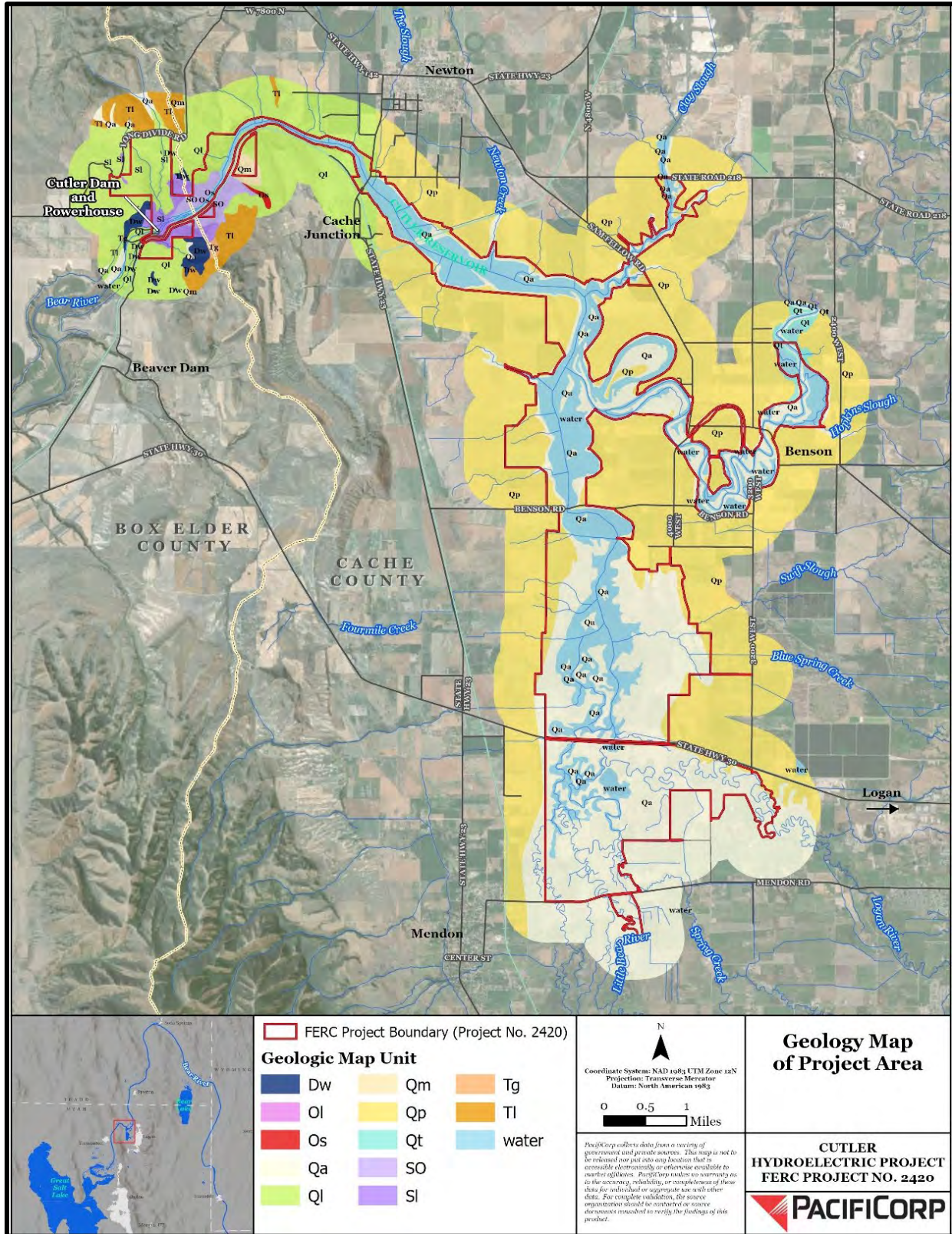


FIGURE 3-3 GEOLOGIC FEATURES AND ROCK FORMATIONS IN THE PROJECT AREA

Stratigraphy

The stratigraphy of the Project Area (i.e., encompassing all land within the Project Boundary plus a 0.5-mile buffer) consists of five bedrock units and seven surficial units. Some of the geologic characteristics of these bedrock units are listed in Table 3-3. Geologic features are shown above in Figure 3-3.

TABLE 3-3 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 mile southeast of Cutler Dam and 3 miles south of Cache Junction. Thick bedded, moderately fractured. Estimated compressive strength less than 1,500 psi.
Hyrum Dolomite	Devonian 370–380 Mya	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 Mya	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 Mya	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 Mya	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 Mya	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)

Mya = millions of years ago; psi = pounds per square inch

The oldest bedrock units are exposed on the northeast side of Little Mountain and an isolated location approximately 2.4 miles southeast of Cutler Dam. This unit consists of dark gray limestone which is locally siliceous. The second unit consists of dark gray quartzite exposed approximately 0.5 mile upstream of the 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 dam. The fourth unit is a gray-brown conglomerate, which is thick bedded and moderately fractured and is exposed approximately 0.5 mile southeast of the 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 areas near Cutler Dam are light greenish-gray, massive, and moderately to extremely fractured (PacifiCorp 1991).

Seismology

The Project is situated in the Intermountain Seismic Belt (Utah Geological Survey 1996). This belt extends from southern Nevada through Utah, north through western Wyoming, and north through western Montana. The Intermountain Seismic Belt is characterized by moderate to large magnitude earthquakes with shallow focal depths. The largest known earthquake to occur in the Project Vicinity 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 in damage to the city of Logan, Utah. 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.

SOILS

This section presents information on soils within the Project Boundary, with emphasis on the potential for soil erosion along the reservoir shoreline and Bear River streambanks upstream and downstream of the reservoir. The current status of shoreline and streambank erosion are also discussed, as well as the current condition of the extensive erosion mitigation measures that have

been established under the current license (FERC 1994), including the vegetated shoreline buffers and bank stabilization projects.

Soil Types and Erosion Hazard

NRCS soil classifications within the Project Area are shown on Figure 3-4. The dominant surficial material in the Project Area is silty clay deposited as lake bottom sediment in ancient Lake Bonneville (PacifiCorp 1991), which inundated the Cache Valley approximately 22,000 years ago. On the Bear River 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 land type consists of stratified, dominantly sandy alluvial soil in floodplains. Mixed alluvial land includes many abandoned oxbows and seasonally or permanently wet areas and is subject to overflow during high-water events in the Bear River.

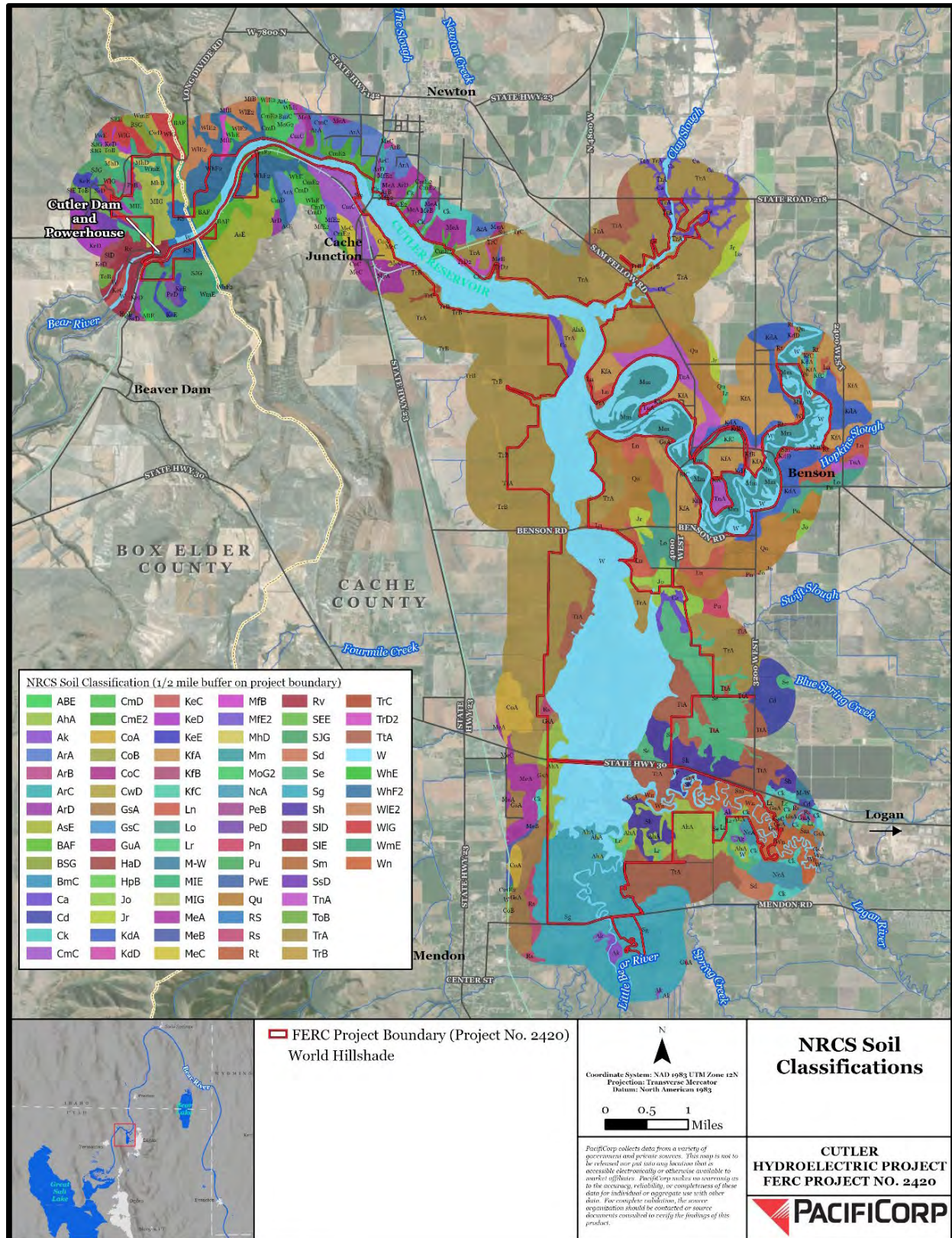


FIGURE 3-4 NRCS SOIL CLASSIFICATIONS IN THE PROJECT AREA

NRCS soil survey results identified 35 soil types in the Project Area that intersect or occur adjacent to the shoreline of Cutler Reservoir and the Bear River (NRCS 2020). This coverage was used to assign soil properties to the area adjacent to the Ordinary High-Water Line (OHWL), which was digitized from the high-resolution imagery collected during the 2019 full drawdown.

Soil types that comprise the majority of the reservoir shorelines and tributary river channel banks within the Project Boundary are presented in Table 3-4, along with characteristics that relate to soil erosion and bank stability. The most common soil type on the reservoir shoreline is mixed alluvial soils (NRCS 2020). This soil type is a composite of deposition from other soil types and generally has properties that are similar to soil types TrA, TtA, AhA, and CmE2, which are frequently found on lake terraces and lacustrine deposits.

Erosion hazard for all shoreline and streambank soil types is rated as slight or moderate by the NRCS (2020). This rating reflects characteristics including hydraulic conductivity, susceptibility to frost action, and shear strength. Saturated hydraulic conductivity indicates the ability of soil to absorb or release water. Soils with low hydraulic conductivity are slow to drain and experience increased internal pore pressure; these soils are also slow to absorb water. Potential frost action indicates the susceptibility of the soil to upward or lateral movement by the formation of ice lenses. This property is also influenced by soil pore size, saturated hydraulic conductivity, and contact with water through infiltration or a source such as groundwater or surface water.

Measurements of shear strength provide an indication of the amount of force required for moving water to erode soil; critical shear strength is the force required to mobilize sediments through detachment or resuspension in a body of water. As part of the Land Use ISR, shear strength was measured in shoreline soils between Newton Bridge and Benson Marina, with results presented in Table 5 of the Land Use ISR (Appendix D of PacifiCorp 2021a). Mean shear strength ranged from 184 to 1,024 pounds per square foot. These values are far greater than the allowable shear strength thresholds used for cohesive soils in stream channel restoration, which are typically less than 1 pound per square foot (NRCS 2007).

TABLE 3-4 RESERVOIR SHORELINE AND STREAMBANK SOIL TYPES WITHIN THE PROJECT BOUNDARY

NAME	EROSION HAZARD	SATURATED HYDRAULIC CONDUCTIVITY	POTENTIAL FROST ACTION	DESCRIPTION
Mm = mixed alluvial soil	Not rated	Not available	Not available	Depth to water table 12 inches, poorly drained
TrA = Trenton silty clay loam, 0–2 percent slopes	Slight	Moderately Low	Moderate	Depth to water table 51 inches, somewhat poorly drained; 30–60 percent clay
TtA = Trenton silty clay loam, moderately deep water table, 0–2 percent slopes	Slight	Moderately Low	Moderate	Depth to water table 30 inches, somewhat poorly drained; 30–60 percent clay
AhA = Airport Silt Loam, 0–3 percent slopes	Slight	Moderately Low	High	Depth to water table 30 inches, poorly drained; 20–35 percent clay
CmE2 = Collinston Loam, 10–30 percent slopes, eroded	Moderate	Moderately High	High	Depth to water table, none within the soil profile, well drained; 15–35 percent clay
Ln = Lewiston Fine Sandy Loam	Slight	High	High	Depth to water table 39 inches, somewhat poorly drained; 5–20 percent clay

Source: NRCS 2020

In addition to the major shoreline and streambank soil types presented in Table 3-4, more minor soil types in the vicinity of Cutler Dam are described as follows. Cutler Dam is located on soils classified as rock land type (USDA 1974; USDA 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, which consists of very steep escarpment-like breaks above river bottomland and very steep drainageways. These soil types are classified as having a moderate erosion hazard. Immediately upstream of the dam, the shoreline soil 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 other soils. The Barfuss and La Plata families are generally classified as having moderately erosive hazards.

Existing Erosion

Erosion from Cutler Reservoir shorelines and Bear River channel banks has occurred in the past due to several factors, including the geologic history of Cache Valley soils, normal river bed and floodplain processes, adjacent land use practices that remove protective vegetation and expose soil surfaces, reservoir operations (both at Cutler Reservoir and upstream within the Project Boundary) since the creation of the Bear River/Bear Lake irrigation water storage and conveyance system, wave action created by recreation uses such as motorboats and jet skis, steep banks, and freeze-thaw cycles that lead to cracking and slumping. Historically, much of the land adjacent to the Cutler Reservoir shoreline was farmed and grazed to the water's edge, which also contributed to soil erosion and associated negative effects on water quality, as well as increasing the ongoing rate of bank loss in some areas.

The current status of erosion along the Cutler Reservoir shoreline and the Bear River upstream of the reservoir was reported in the Land Use ISR (Appendix D of PacifiCorp 2021a) and Land Use USR (Appendix C of PacifiCorp 2021b), respectively. A summary of existing shoreline and streambank erosion is provided below.

Bear River Streambank

Numerous factors contribute to bank erosion on the Bear River downstream of Cutler Dam, including the composition of local soils, normal riverbed and floodplain processes, adjacent land-use practices, hydroelectric power generation operations, wave action created by motorized recreation on the river, vertical and overhanging banks, and freeze-thaw cycles (PacifiCorp 1995a; UDWQ 2002a; UDWQ 2018). Regardless of whether power generation is occurring or not, Bear River banks downstream of Cutler Dam experience erosion due to natural variations in hydrology and the fundamental nature of rivers and soils. Past agricultural practices on lands adjacent to the Bear River have also reduced vegetation through tilling, herbicide application, and livestock grazing (PacifiCorp 1995a). This has reduced soil stability in affected areas. These

activities can also increase the potential for stormwater runoff and overland flow, which is another potential cause of bank instability (Leopold 1994).

To further describe historic and current bank conditions downstream of Cutler Dam, the Land Use USR assessed background information and a historic series of aerial photographs (covering photos from 1937 to 2017) at two of the sites used for the bank erosion study. Results of this assessment indicate that lateral bank movement on the reach of the Bear River downstream of Cutler Dam responds to the cumulative effect of natural, riverine processes, and human influences associated with land and water use (Appendix C in PacifiCorp 2021b). Since 1924, these influences have included the Cutler Project under a range of operating modes.

This investigation found that meander formation resulting from bank erosion, including both soil loss and accumulation, resulted in lateral bank movement of more than 90 feet since 1966 at one site and more than 150 feet since 1937 at the other site. In addition, the photo interpretation conducted as part of the Land Use USR indicated that bank movement does not differ notably under run-of-river versus power-optimization operations.

Reservoir Shoreline

Based on the high-resolution imagery collected during the 2019 Cutler reservoir drawdown, the Land Use ISR (Appendix D of PacifiCorp 2021a) identified approximately 17,200 feet (3.3 miles) of eroding reservoir shoreline and riverbank segments within the Project Boundary from the total 531,900 feet (101.1 miles) of mapped shoreline and streambank within the Project Boundary. Most of the eroding shoreline banks are located in two places: 1) on the reservoir downstream of the Bear River confluence with Cutler Reservoir, and 2) on outside bends of the Bear River between the reservoir confluence to a point upstream at the 3200 West bridge crossing (Figure 1-1). A mapbook of areas of eroding shoreline are presented in Attachment D3 of the Land Use ISR.

Eroding banks within the Project Boundary and broader Project Area have substantially improved during the last three decades due to removal and replacement of concrete and car bodies that were previously used to prevent shoreline erosion. During the current license period, PacifiCorp replaced these materials through the implementation of bank stabilization projects

that include a combination of recontouring and planting banks with native shrubs and the addition of large rock past the toe of the resultant slope and planting the area between the slope and the rock with emergent vegetation and willows (the “breakwater” design). Some areas have also used rock gabions, rip-rap, geotextiles, and bank revetments to dissipate energy from waves and flowing water.

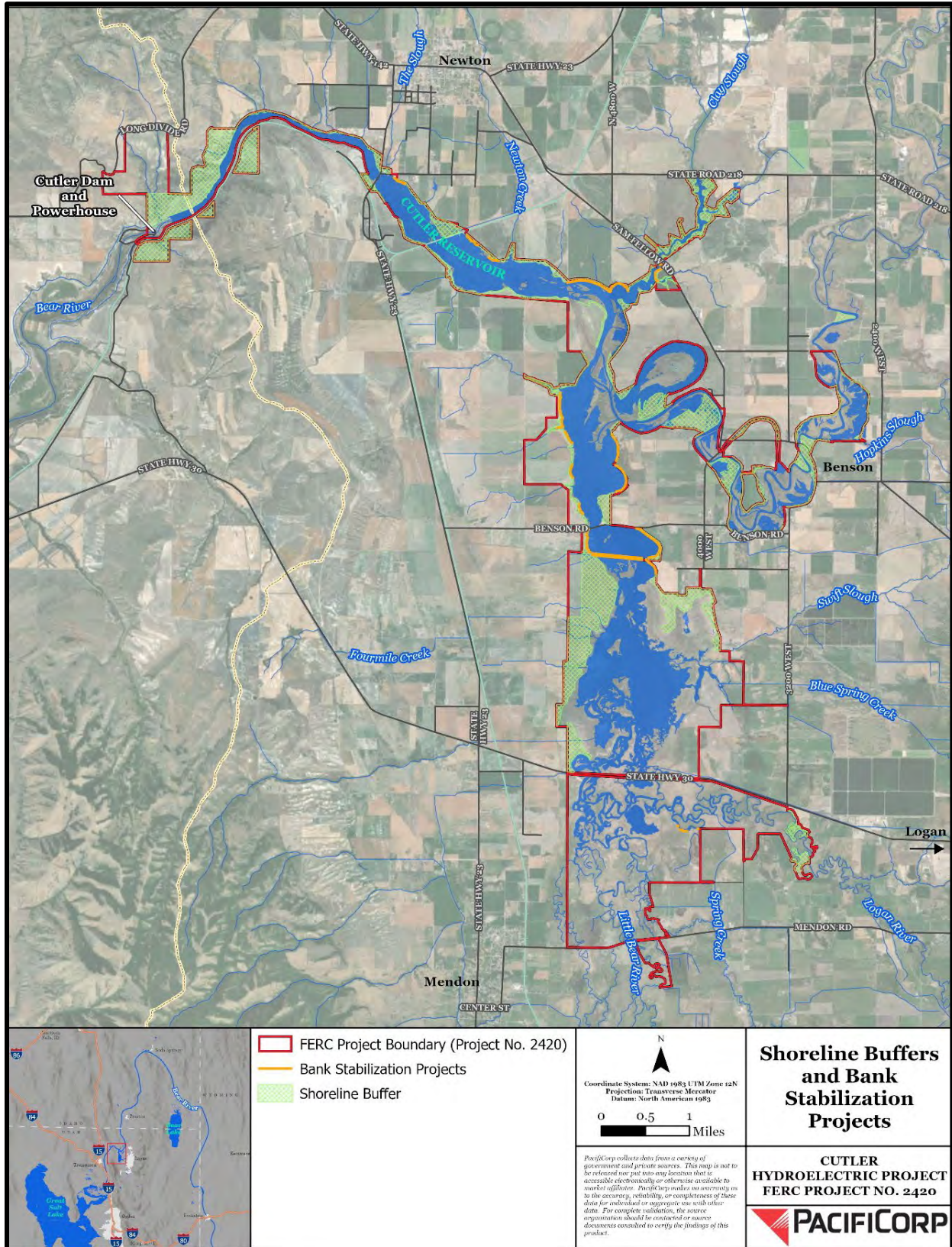
These bank stabilization projects are described below and presented in greater detail in Attachments D2 and D3 of the Land Use ISR (Appendix D of PacifiCorp 2021a). In addition to the bank stabilization projects, vegetated shoreline buffer areas were developed along the reservoir shoreline as part of the Cutler Resource Management Plan (RMP; PacifiCorp 1995a). Although the bank stabilization projects and shoreline buffers are protection measures intended to mitigate erosion, they are also an integral part of the current affected environment and are therefore presented here as part of baseline conditions within the Project Boundary. In addition, these bank stabilization projects and shoreline buffer measures are listed in Section 3.3.3.4, New Proposed Measures, as PM&E measures that would continue to be maintained and monitored under the new license.

Bank Stabilization Projects

PacifiCorp has implemented numerous bank stabilization projects (covering approximately 5.5 linear miles of shoreline) to reduce shoreline erosion during the current license period, which when coupled with establishment and monitoring of vegetated buffers (over 1,400 acres) has eliminated much of the active erosion on the reservoir shoreline. Some erosion still occurs, however, primarily in areas without bank stabilization projects as a result of past agricultural and other land uses, and in response to waves generated by wind and watercraft recreation. PacifiCorp follows self-imposed discharge guidelines to limit bank erosion in the Bear River downstream of the Project (e.g., when a significant mass of ice builds up on the river downstream, flow fluctuations associated with power generation are eliminated to reduce the possibility of ice-dam flooding) (Appendix D of PacifiCorp 2021a).

Existing bank stabilization projects were identified at 18 locations within the Project Boundary (Figure 3-5). These projects have been implemented and maintained during the current license period to improve the physical stability of shorelines and bank areas and eliminate erosion at

those sites. Descriptions of each of the bank stabilization projects are presented in Attachment D2 of the Land Use ISR (Appendix D of PacifiCorp 2021a), including bank stabilization type and current condition as evaluated for the Land Use ISR. A mapbook presenting the location and type of bank stabilization projects is presented in Attachment D3 of the Land Use ISR.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

FIGURE 3-5 SHORELINE BUFFERS AND BANK STABILIZATION PROJECTS

Past monitoring results of the bank stabilization projects show a small decline in project condition in 2016 when damage to shrub plantings at some locations was noted due to overspray from county herbicide applications (applied without consultation/coordination from a boat, creating large swaths of non-target damage). These sites were visited again in 2017 and 2018 (and annually since, per the Cutler RMP). Although impairment was still evident, especially on older and established woody shrubs, each site was found to be regenerating new growth.

The 2020 field survey results presented in the Land Use ISR (Appendix D of PacifiCorp 2021a) found that all projects remained in good condition and were maintaining bank stability. Some projects had small segments of eroding banks that did not affect the overall mitigation efforts. Projects that included the breakwater design were functioning particularly well. This design includes large rocks placed parallel to but 1 to 3 feet off the toe of recontoured banks, followed by planting emergent wetland and riparian vegetation between the rocks and the toe of the sloped shoreline. Wave energy is dissipated against rocks that protect adjacent soils. The recontoured banks are also planted with native shrubs extending up from the shoreline. Shoreline vegetation in these areas continues to provide bank stability as well as habitat for aquatic and terrestrial wildlife. In many locations, rocks were difficult to identify due to the density of aquatic vegetation growing through and around these features, increasing their resilience to erosive forces.

Other bank stabilization projects that include willow, cattail, and hardstem also demonstrated good protection from erosion. Native vegetation has been colonized in some areas by invasive species such as common reed, or *Phragmites (Phragmites australis)* which provides equal protection in regard to bank stabilization and surface cover (although it negatively affects native vegetation diversity and resultant wildlife habitat).

Projects that include rip-rap or gabion baskets (completed prior to development of the breakwater technique) are maintaining bank stability but do not seem to develop the diversity of native vegetation, which would be expected to continue to resist erosive forces over time, such as observed in the breakwater areas. Sheet erosion from upslope areas has covered portions of some projects where rip-rap consisted of smaller cobbles and gravel. Limited vegetation was observed in these areas.

A few barren surfaces were noted at some project sites near the Railroad Bridge where access trails to the water's edge have been created by recreation use and wildlife. Small pockets of erosion were also observed at the ends of other projects where banks were exposed to ongoing wave action. As noted in the Project *Resource Management Plan Five-Year Monitoring Report 2013-2017* (PacifiCorp 2018), rock gabions at the Archibald and Watterson projects have tipped but are still maintaining bank stability where they are located. Although these areas could be improved, the overall bank stability where these projects were installed remains in good condition. The analysis of current condition of existing erosion control features indicated that given current conditions, none are likely to need repair or retrofitting in the near-term.

Shoreline Buffers

Surface vegetation protects soil surfaces and provides internal structure to shorelines and channel banks to resist slumping and other types of instability. Past agricultural practices removed vegetation adjacent to Cutler Reservoir and the Bear River through tilling, herbicide application, and livestock grazing, reducing soil stability in affected areas. The creation and protection of vegetated buffers of various widths around almost all of the reservoir shoreline over the current license period has ameliorated the effects of bare, eroding lands adjacent and within the Project Boundary (PacifiCorp 2021a).

As part of the Cutler RMP Vegetation Enhancement Program (PacifiCorp 1995a), approximately 1,440 acres of shoreline buffers covering approximately 52 miles of shoreline were implemented along Cutler Reservoir to minimize shoreline erosion and improve water quality (Figure 3-5). Buffers include 610 acres of tilled land converted to permanent grass buffer; 15 woody vegetation pockets at a density of 5,000 shrubs per acre; approximately 5.54 miles of stabilized shoreline; and approximately 60 miles of buffer/boundary fencing. In addition, 13 erosion control basins have 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.

There are 55 shoreline buffers monitored annually to document vegetation 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 from excellent to at-risk, using 2002 as the baseline data point for comparison (PacifiCorp 2002). Monitoring activities are reported to FERC every 5 years, with the next monitoring report due in 2023.

The most recent monitoring results for the shoreline buffers are presented in the 2018 monitoring report (PacifiCorp 2018). 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 affected by farming, grazing, and other encroachments (PacifiCorp 2018). In the 2018 monitoring period, three existing buffer sites remained as high priority.

As noted in the 2018 monitoring report (PacifiCorp 2018), 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 stabilize the banks long-term. In 2018, no specific future work stabilizing the banks was proposed as all the sites were considered to be in good or improving condition.

The Cutler license and Cutler RMP both require erosion control check dam sediment basins where needed in the North Marsh and Reservoir Management Units. Thirteen sites were monitored from 2013 to 2017; with the exception of Basin 3, all sites were considered to be in good condition through the monitoring cycles. See Table 6-4 in Section 6.2.4 of the PAD (PacifiCorp 2019) for a summary of the individual erosion control sediment basins and how they fared between 2013 and 2017.

SEDIMENT

Cutler Reservoir can be characterized as a shallow reservoir with two distinct areas divided at approximately the confluence of the Bear River with the reservoir: 1) the southern reach, which comprises most of the inundated lands (i.e., the Reservoir Unit, and the North and South Marsh Management Units), and 2) the northern reach, which is mostly Cutler Canyon (Cutler Canyon Unit) and the northern portions of the Reservoir Unit. The southern reach of the reservoir is a

flooded shallow river valley bounded by low-angle valley slopes. The Logan River, Spring Creek, and the Little Bear River—the main tributaries to this portion of the reservoir—meander through the valley in a sinuous manner forming long bends and cutoff oxbows. These long historic (i.e., pre-construction) tributary meanders and river bends terminate just north of the confluence with the Bear River near the Newton (Highway 23) Bridge as the reservoir enters Cutler Canyon.

Cutler Canyon is a long, narrow feature that cuts through the northern end of the Wellsville Mountain foothills, extending from near the town of Newton, Utah, west to the Cutler Dam and Powerhouse at the western end of the canyon. The river is bound by steep to vertical walls, narrowing to 250 feet wide in some areas of Cutler Canyon. The canyon can be divided into two sections (upstream and downstream), with the boundary being the historic and now inundated Wheelon Dam (Figure 1-1). The upper section of Cutler Canyon from Newton Bridge to Wheelon Dam maintains a similar gradient with little change in reservoir bed elevation. From Wheelon Dam downstream to Cutler Dam, Cutler Canyon drops approximately 80 to 90 feet in less than 1 mile, which is the highest gradient across the entire Project Area.

The shallow depth and highly silted environment of the reservoir result from the upstream transport of fine sediment continuously from the Bear River and seasonally during spring runoff from other smaller tributaries. Over time, millions of tons of fine sediment have been deposited in the Bear River upstream of the reservoir, largely as a result of accelerated erosion due to irrigation and agricultural practices over a century ago (Clyde 1953). Clyde (1953) estimated that as a result of bench erosion and gully formation, the Bear River bed elevation was raised in excess of 12 feet in places upstream of the Project, and some 6 million tons of sediment were deposited into Cutler Reservoir prior to 1950, raising the river bed as much as 6 feet in areas. Today the Bear River continues to transport these fine material deposits, along with bank material, into the reservoir (PacifiCorp 2021b).

Distribution

Overall, Cutler Dam is not considered the cause of sediment deposition, but its presence influences sediment transport and redistribution observed today. The Sediment ISR (Appendix H in PacifiCorp 2021a) described the use of a low frequency echosounder combined with sediment

coring and Light Detection and Ranging (LiDAR) data to map the distribution and depth of sediments throughout the reservoir. The Sediment ISR presents a detailed assessment of sediment distribution across the reservoir within the five reaches evaluated in the study, with sediment distribution maps presented in Figures 5-2 through 5-5 of the Sediment ISR.

The distribution of sediment deposits in the reservoir is highly variable, with sediment depths across the reservoir ranging from zero where it is scoured out to more than 90 feet in the area immediately upstream of Cutler Dam (Appendix H in PacifiCorp 2021a). The inundated historic channels of both the Bear and Logan/Little Bear Rivers have been filled completely in some areas, with sediment deposits exceeding 22 feet at several locations. Sediment deposits have also created bars and islands in some locations where the channels once flowed historically.

Areas with higher velocity and hence little deposition are mostly constriction points, such as bridge crossings and parts of the reservoir where the current channel lies on top of old inundated river benches. These areas are likely to see very little downcutting due to the cohesive nature of the soil and higher content of fine materials such as clay.

Open-water portions of the reservoir, such as around Clay Slough, have become controlling features that slow water movement and limit the site-specific variability of upstream WSEs compared to farther downstream in the reservoir, particularly when elevations drop at Cutler Dam. Simultaneously, this results in greater overall spatial variability of WSEs across the reservoir at any given elevation at the dam. Other water-surface-controlling features were noted during the 2019 reservoir drawdown (October 26 to November 16, 2019) upstream of the Newton Bridge, where a riffle formed as the active channel ran perpendicular to the historic channel and eroded the sediment deposits located there. This river bench feature now constitutes the hydraulic control of WSE between Clay Slough and Newton Bridge.

Cutler Canyon has maintained its original channel form, which includes some of the deeper areas in the reservoir. As deposition has occurred on the inundated historic river benches and sides of the canyon, this has allowed more energy to stay within the original river channel, thereby maintaining water depths. Based on the hydraulic modeling completed in the Hydraulic Modeling ISR (Appendix G in PacifiCorp 2021a), it is clear that Wheelon Dam plays a minor role in sediment deposition upstream of Cutler Canyon; however, core measurements

immediately upstream of Wheelon Dam indicated as little as 46 inches of sediment deposition, which is less accumulation as compared to much of the reservoir.

Volume

In addition to mapping sediment distribution, the Sediment ISR (Appendix H of PacifiCorp 2021a) used cut-and-fill estimates to provide a general idea of depositional volume in Cutler Reservoir. The study estimated that 10,131 af of sediment have been deposited. This includes deposits occurring prior to the existence of Cutler Reservoir (completed in the 1920s) due to the previous (since the late 1880s) operation of Wheelon Dam, as well as sediment bars in the original river channel. Total sediment volume estimates include Wheelon Dam to Cutler Dam (1,468 af), Wheelon Dam to the Newton Bridge (580 af), Newton Bridge to the Bear River confluence near Benson (4,543 af), and from Benson Bridge upstream (3,539 af).

Phosphorus

Phosphorus loading has been identified as a key water-quality issue in Cutler Reservoir (SWCA 2020; UDWQ 2010) and has been a driving factor for management decisions regarding Cutler Reservoir water quality for a variety of entities, including PacifiCorp, UDWQ, and other private landowners in the watershed. This section only addresses phosphorus in the sediments, either as total phosphorus (TP) bound to bed sediments (TP_{sed}) or as dissolved TP from water in the interstitial voids of the sediment (DTP_{sed}). Water column phosphorus is addressed separately in Section 3.3.4.1, [Affected Environment] Water Quality.

The Sediment ISR measured TP_{sed} and DTP_{sed} at 11 locations in the reservoir and in the Bear River upstream of the reservoir (see Figure 3-2 in the Sediment ISR [Appendix H of PacifiCorp 2021a]), in March, June, September, and November 2020. Results are presented in Table 5-3, Figure 5-12, and Figure 5-13 of the Sediment ISR and summarized here. TP_{sed} variability across the 11 sample sites ranged from a high at Site 6 (1,150 milligram per kilogram [mg/kg]) to a low at Site 9 (574.4 mg/kg). Sites 3, 6, and 8 (sites described below) had concentrations above 1,000 mg/kg, and Site 3 (Swift Slough) recorded three of the highest concentrations during the study period (1,087 mg/kg, 1,150 mg/kg, and 977.8 mg/kg).

To determine background TP_{sed} levels, bank sediments were collected at three locations: downstream of Benson Railroad Bridge near Site 4; Benson Marina area near Site 6 (composite); and Clay Slough near Site 8. TP_{sed} in the background samples ranged from 620 to 730 mg/kg (see results in Table 5-6 of the Sediment ISR; Appendix H of PacifiCorp 2021a). TP_{sed} concentrations at most sites were similar to background levels measured in bank samples. The exception being those concentrations at Sites 3 and 6 were substantially higher than any other site, measuring in excess of 1000 mg/kg of phosphorus, suggesting that a large amount of phosphorus has been deposited and bound to bed sediments in this area. The higher levels were assumed to be attributed to upstream sources of phosphorus. TP_{sed} concentrations at Site 4, located between Sites 3 and 6, were lower and may be the result of potentially higher velocities and lower settling rates that transport and ultimately deposit sediment at Site 6.

The differences in DTP_{sed} concentrations measured in the interstitial voids of the sediment and in the water column suggest that little internal loading occurs during periods of warmer weather when biological activity is greatest. Most phosphorus released from bed sediments occurs under redox conditions; thus, this limited release of DTP_{sed} suggests there is likely a strong oxic layer at the sediment surface, which combined with the well-oxygenated water column inhibits the release of phosphorus into the water column (Ruban and Demare 1998). DO data for the reservoir is summarized in Section 3.3.4.2, Water Quality.

3.3.3.2 ENVIRONMENTAL ANALYSIS

This section discusses the potential direct and indirect effects of proposed Project operations on geologic features, soils, changes in erosion along the reservoir shoreline and Bear River streambanks downstream of the dam, and the potential effects of changes in sediment dynamics in the reservoir and downstream on the Bear River. The analysis of potential effects is limited to operations, as no new construction is proposed under the new license. Reservoir operations would remain the same as under the current license for the majority of the year (generally March through October), with changes to proposed operations occurring exclusively during periodic 10-day cycles from WSE 4,406.5 or 4,406.0 feet (the latter currently occurs only from December to March, per the 1994 license) down to WSE 4,405.0 feet during the winter months (the proposed extended operating range, which conditions would allow typically November through February).

The issues identified in FERC SD2 (FERC 2019b) related to erosion and sedimentation are addressed in the respective sections below. The three issues identified in SD2 as needing cumulative effects analysis are reviewed in Section 3.3.3.3, Cumulative Effects.

GEOLOGY

Potential changes in Project operation could change the way in which the system functions hydraulically, potentially affecting short-term inundation boundaries, flow patterns, sediment transport capacity, and other hydraulic behaviors of Cutler Reservoir and downstream on the Bear River (see Section 3.3.4, Water Resources) over the proposed 10-day cycles. These hydrologic changes are not anticipated to have an effect on the geology in the Project Area.

SOILS

Proposed operations have the potential to change the way Cutler Reservoir and the Bear River function hydraulically with regards to short-term inundation boundaries, reservoir levels, flow patterns, and water velocities over the proposed 10-day cycles. Changes in these hydraulic factors could in turn affect shoreline and stream bank erosion. Physical characteristics such as soil texture and bank profiles can influence bank stability following changes in soil moisture and temperature (Leopold 1994). Saturated soils drain from exposed surfaces in response to a decrease in water surface elevation. As soils are draining, the internal pore pressure of saturated soils may cause instability and sloughing (Duncan et al. 2014). Bank instability can also occur in the spring following cycles of freezing and thawing that create cracks, fissures, and generally disrupt soil structure (Gatto 1995; Ferrick et al. 2005; Korshunov et al. 2016). Surface vegetation protects soil surfaces and provides internal structure to shorelines and channel banks to resist slumping and other types of instability (Leopold 1994; Camporeale et al. 2013).

This section analyzes the potential effects of proposed operations on soil erosion on the Bear River streambanks immediately upstream (within the Project Boundary) and downstream of the reservoir and along the Cutler Reservoir shoreline.

Bear River Streambank Erosion

Potential effects of proposed operations on streambank erosion downstream of Cutler Dam on the Bear River in the Project Boundary were investigated in the Land Use USR (Appendix C in PacifiCorp 2021b). Results of these investigations are summarized below and include a description of discharge patterns under normal and proposed extended operations as well as potential effects of proposed operations on streambank erosion.

Although reservoir discharge associated with the additional foot of reservoir fluctuation under proposed extended operations was noted as a concern regarding the potential to exacerbate ongoing bank erosion on the Bear River downstream of Cutler Dam, studies completed for relicensing suggest that would be a potentially minor effect, if any. The Land Use USR simulated discharge hydrographs for power-optimization operating scenarios for the proposed extended operations. The simulated hydrographs enabled comparisons between run-of-river and power-optimization operations under the proposed extended operations and the potential effects on downstream bank erosion.

Reservoir discharge to the Bear River would be similar in volume and flow fluctuation under the normal and proposed extended operating scenarios based on the comparison between run-of-river and power-optimization hydrographs. Comparison of projected hydrographs for the normal and proposed extended operations indicated that the additional foot of fluctuation under the extended operation scenario would have no effect on the maximum discharge, minimum discharge, or ramp rates (see Table 6-5 in the Land Use USR; Appendix C of PacifiCorp 2021b). Extended operations would delay by up to 3.5 days the release of about 14 percent of the total volume within a roughly 10-day-long generation cycle. Project operations under the normal run-of-river or extended operating scenario would have no discernible effect on flow volumes downstream of Cutler Dam.

The Land Use USR also monitored bank erosion at six sites on the Bear River downstream from Cutler Dam (Figure 3-6) from December 2020 through January 2021. Bank profiles were measured at each site for two types of project operation scenarios from Cutler Dam: 1) 2 weeks of run-of-river Project operations, and 2) 4 weeks of power generation cycling two times daily simulating proposed power optimization under either the normal or extended operations.

Baseline bank profile measurements were taken prior to run-of-river flows and compared to measurements made prior to and after the power-optimization flows. At each site, soil loss and accumulation were compared between survey dates, then profiles were categorized based on similar patterns (categories are presented in Table 7-4 in the Land Use USR).

The bank-profile monitoring results indicate that effects on bank erosion were minor and varied little between run-of-river and power-optimization flow conditions (see the Land Use USR; Appendix C in PacifiCorp 2021b). Bank erosion downstream of Cutler Dam is a long-term, ongoing phenomenon. The proposed extended operations would not be expected to alter the hydraulics (i.e., flow attenuation, fluctuation, or volume) or patterns of bank erosion downstream of Cutler Dam on the Bear River. Reservoir discharge under either run-of-river or power-optimization operating scenarios would not substantially change or alter existing patterns of downstream bank erosion.

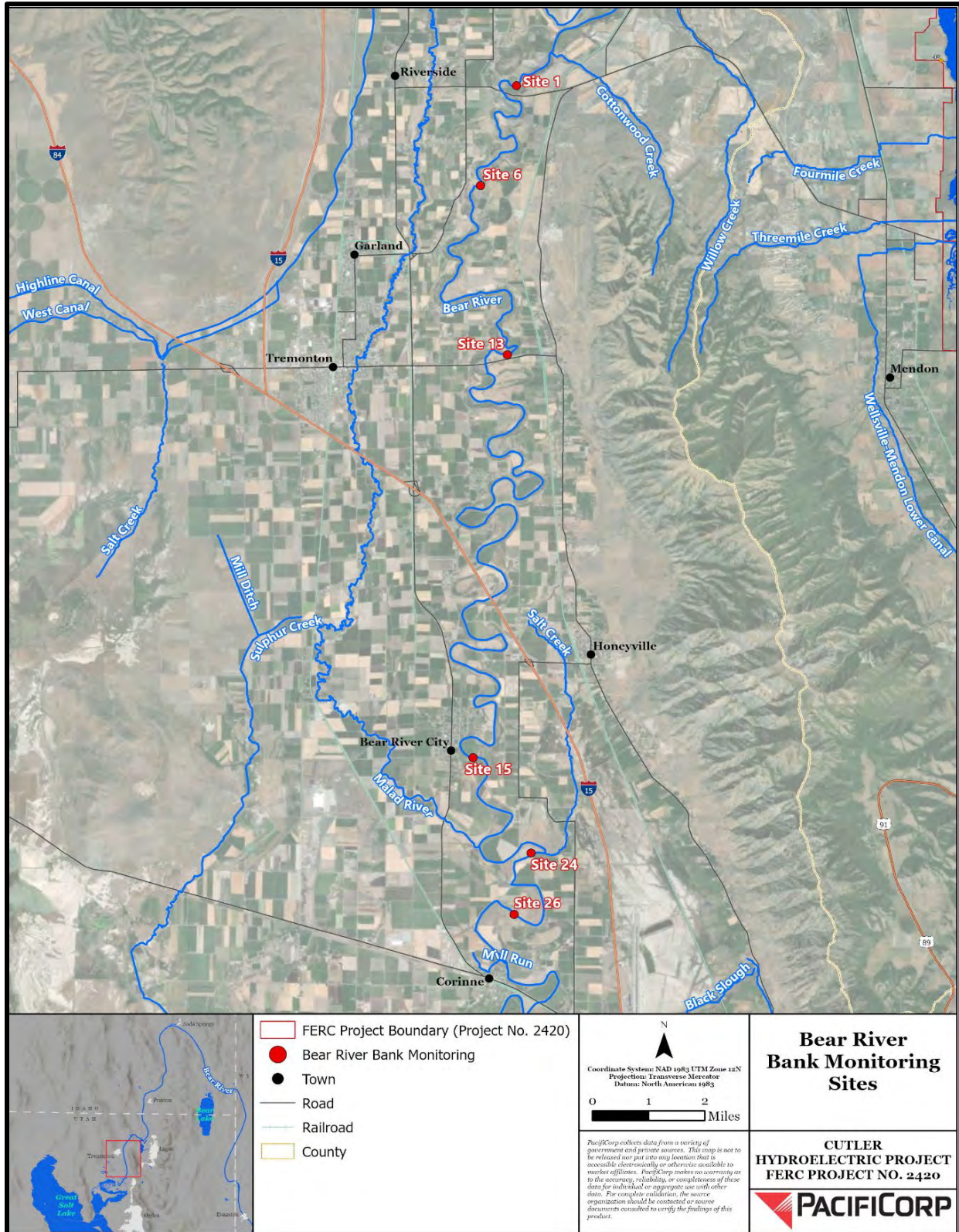


FIGURE 3-6 2021 BANK MONITORING SITES ON THE BEAR RIVER DOWNSTREAM OF CUTLER DAM

Reservoir Shoreline Erosion

Bank erosion potential within the Project Boundary involves a range of factors including soil characteristics described above; fluctuations in WSE, wave action; water velocity; and physical characteristics of the reservoir bed, shoreline, and riverbanks.

Project operations would continue to facilitate potentially erosive wave action in the reservoir associated with jet skis and motorboats, which would be considered an indirect effect of continued Project operations. This indirect effect would be limited in geographic and temporal scope to the reservoir during the summer (mostly) recreation season, and is therefore not expected to cause a significant increase in erosion or sedimentation in the Bear River basin downstream of the Project.

The Land Use ISR (Attachment D of PacifiCorp 2021a) assessed the potential for the proposed extended operations to cause increased erosion associated with soil draining and drying along the reservoir shoreline and along the Bear River upstream of the reservoir. Five sites were selected based on the presence of steep slopes, bare surfaces, large cracks, and sloughed material near the water's edge (i.e., those areas considered most likely to experience shoreline erosion due to the full drawdown implemented in late 2019 to facilitate relicensing data collection and studies). Cameras were installed to collect time-lapse photos every 5 minutes during the 2019 full drawdown (October 26 to November 15, measured at over 20 vertical feet at Cutler Dam). Photos were reviewed to document slumping or soil movement.

Study results reported that maximum bank exposure generally occurred within the first 48 hours of the fall 2019 drawdown (which equated to approximately the first 1-foot drawdown), with additional bed exposure occurring as water elevations continued to decrease. No slumping or soil movement of reservoir banks was reported at any of the monitoring sites during the fall 2019 drawdown, which was a significantly lower drawdown event than the proposed extended operations WSE. Therefore, given the short 10-day time frame of the proposed extended operations, no additional shoreline or streambank erosion is expected to occur under the proposed extended operations than would be expected under the current reservoir operations.

Due to contractual obligations, the drawdown occurred as early as possible following the end of the irrigation season to minimize the risk of potentially complicating very low temperatures and resultant ice formation and reservoir bed exposure. However, at the start of the 2019 drawdown, minimum daily temperatures dropped to 1 °F and remained well below freezing for several days. These temperatures are not typical of late October / early November in northern Utah and potentially affected several facets of the preliminary drawdown studies. However, despite the cold temperatures that could have potentially caused (and would be expected to cause) sloughing due to the resultant freeze-thaw action, no movement of reservoir banks was observed during the drawdown period at any of the monitoring sites, even after temperatures had ameliorated.

Existing measures to limit shoreline erosion include shoreline buffer areas and bank stabilization projects as part of the Cutler RMP Vegetation Enhancement Program (PacifiCorp 1995a). These measures are described above in Section 3.3.3.1, [Affected Environment] Soils, and are also included below in Section 3.3.3.4, Proposed Measures, as existing protection measures that would continue under the new license.

SEDIMENT

This section analyzes the potential effects of proposed extended operations on sediment transport and loading, including sediment distribution, transport, bed elevations, and total suspended solids (TSS). It also evaluates potential effects on sediment phosphorus that could result from changes in sediment dynamics associated with proposed changes in reservoir operations. Lastly, this section presents the assessment of the practicability of dredging and removal of Wheelon Dam as a sediment management measure.

Summary results of the various sediment studies, modeling, and analysis efforts comparing sediment parameters in the reservoir and the Bear River under conditions analogous to the proposed normal and extended operations are described below. These study results were then used to make a determination of potential effects of proposed extended operations on sediment dynamics within the Project Boundary.

Sediment Dynamics

Potential effects of proposed extended operations on sediment dynamics were evaluated using three primary sources.

- The **velocity modeling** developed under the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a; and subsequently as part of Section 3.3.3.2 Environmental Analysis), informed the assessment of potential resuspension and transport of sediments during proposed normal and extended operations.
- The **sediment transport model** developed as part of Hydraulic Modeling ISR was used to qualitatively compare bed elevations and TSS within the reservoir and downstream of the dam on the Bear River during proposed normal and extended operations.
- **Turbidity data collected downstream of the dam** during the 2019 drawdown at WSEs representative of proposed normal and extended operations was used to predict sediment loading and assess any potential changes in downstream loading under proposed operations.

These analyses are presented separately below, followed by a summary of potential effects of proposed normal and extended operations on sediment dynamics in the reservoir and downstream of the dam on the Bear River. Cumulative effects on sediment dynamics in the reservoir and on the Bear River downstream of the reservoir are also discussed in Section 3.3.3.3, Cumulative Effects, per FERC SD2 (FERC 2019b).

Velocity Modeling, Sediment Resuspension, and Sediment Transport

The Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a) investigated how proposed Project operations could potentially change water velocities in the reservoir, in turn possibly causing sediment resuspension and transport downflow within the reservoir or downstream in the Bear River. As summarized below, the velocity modeling did not predict substantial changes in reservoir velocity between the proposed normal and extended operations; therefore, sediment resuspension driven by velocity changes would not occur.

Reservoir velocities under proposed normal and extended operations were modeled as part of the Hydraulic Modeling ISR. The velocity maps presented in the Hydraulic Modeling ISR were revised following comments submitted by the USFWS as part of the ISR Comment Response process and subsequent video meeting with the USFWS (Attachment 7 of PacifiCorp 2021c). The revised velocity maps are presented in Figure 3-7 through Figure 3-10. The modeled velocities predict negligible differences between the proposed normal and extended operating ranges throughout the reservoir (Figure 3-9 through Figure 3-10). No or minimal change in velocity was predicted for the majority of the reservoir outside the thalweg (i.e., between zero and 0.5 foot per second [ft/s]). In most of the thalweg, and at constriction points such as at road crossings or railroad bridges, the maximum modeled change in velocity between the proposed normal and extended ranges ranged from 0.1 to 0.5 ft/s. In a handful of locations, the change in modeled velocity extended up to 1.5 ft/s, with a few areas of up to 2 ft/s change (primarily downstream of Cutler Dam). These areas of higher change in velocity generally contain larger particles such as fine sands or are deep pools scoured down to native clays, reducing the potential for large sediment movement.

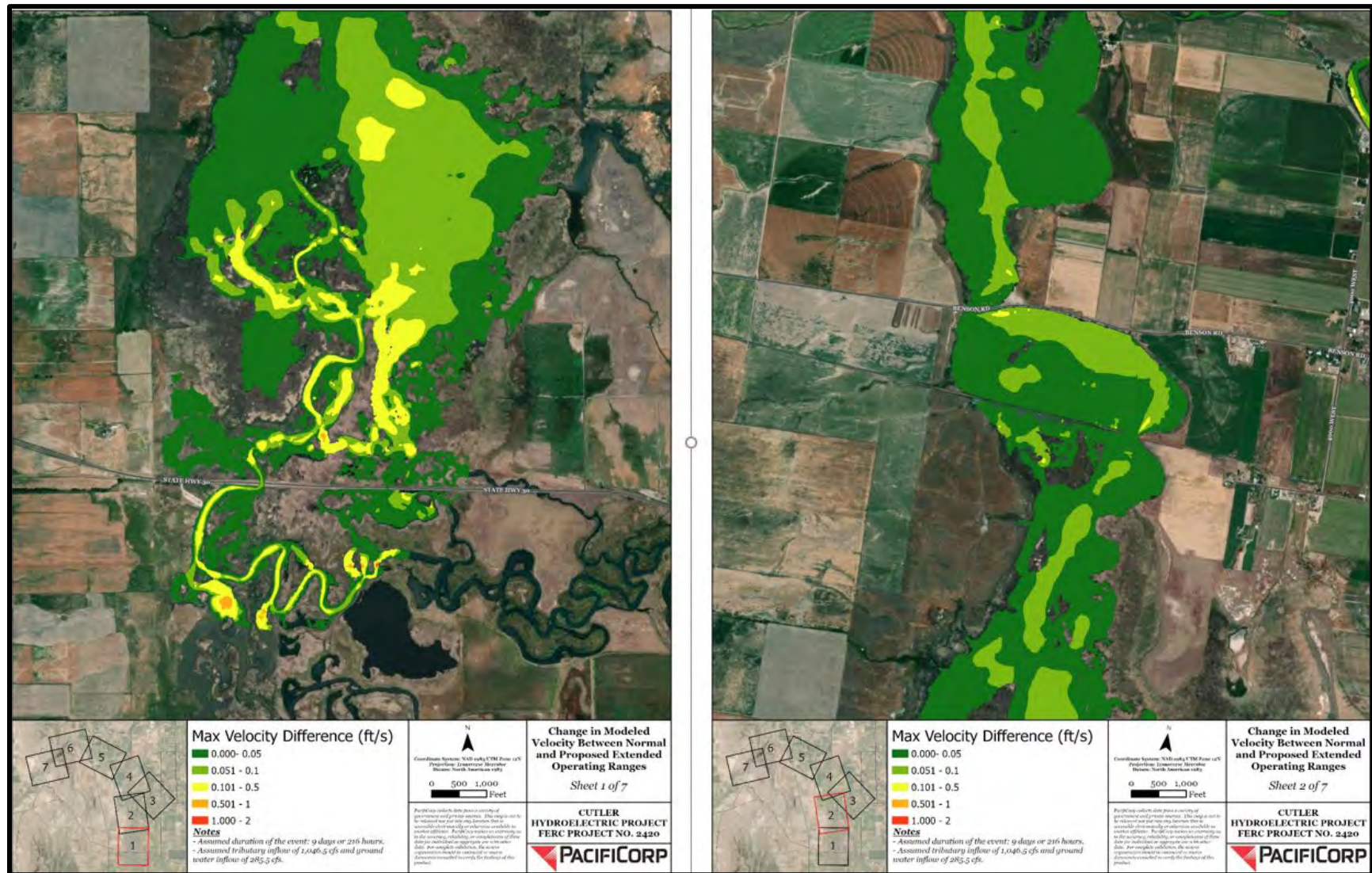


FIGURE 3-7 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

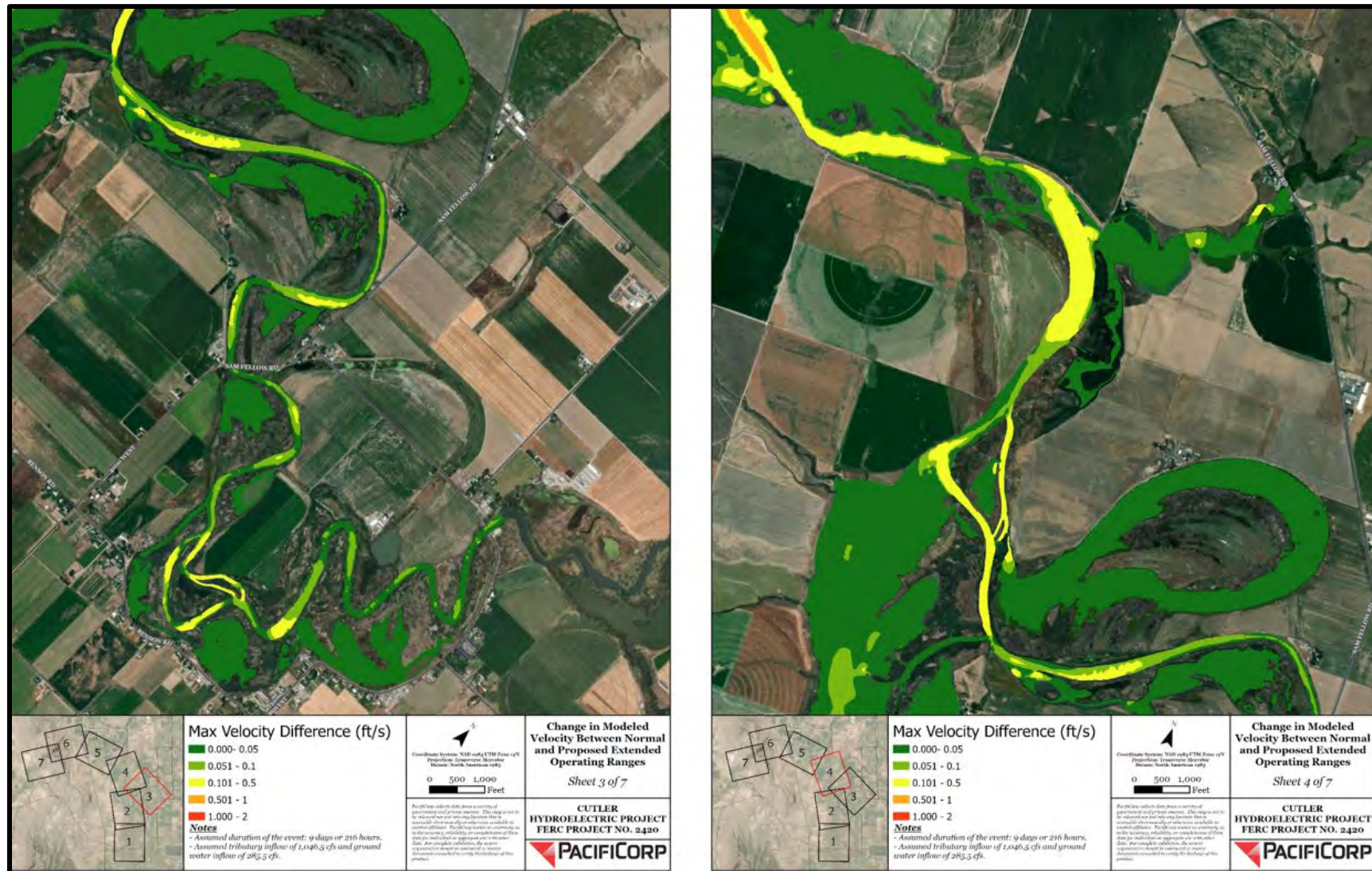


FIGURE 3-8 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

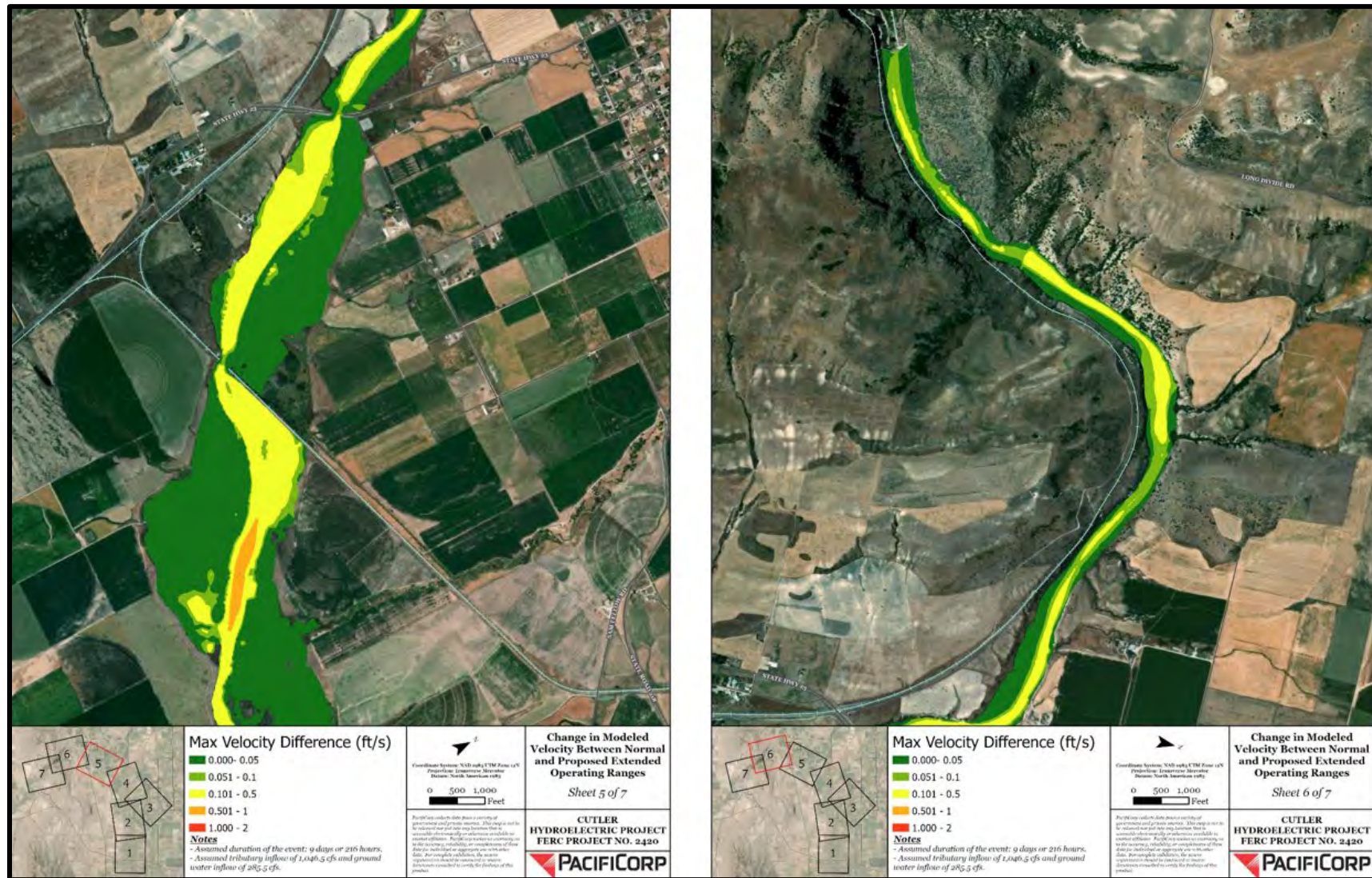


FIGURE 3-9 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

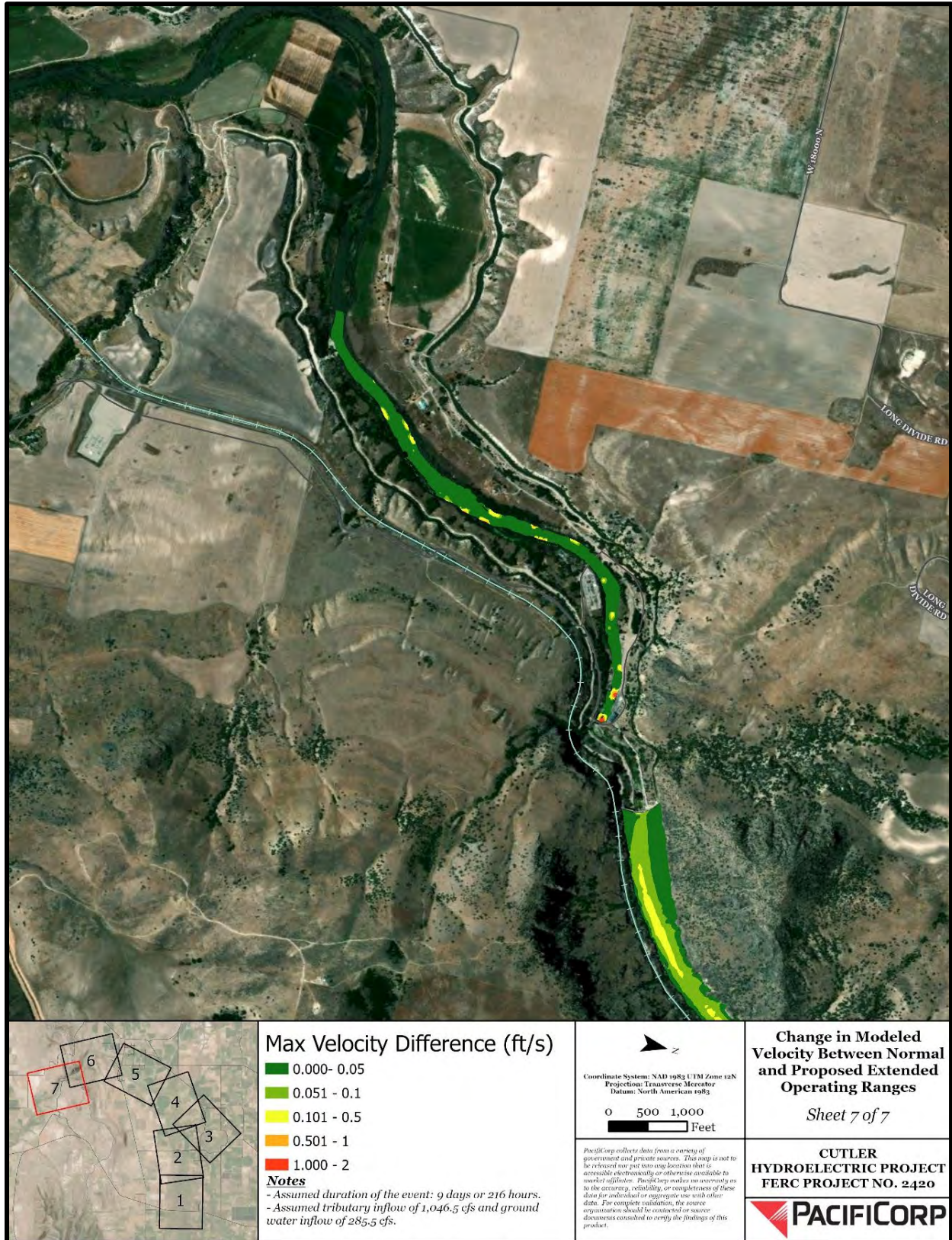


FIGURE 3-10 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

*Sediment Transport Model: Predicted Bed Elevations and Total
Suspended Solids*

The sediment transport model predicted that increasing the operational range of Cutler Reservoir from the existing/proposed operating range of 4,407.5 to 4,406.5 feet down to the proposed extended range of 4,407.5 to 4,405.0 feet would not likely result in a substantial increase in bed sediment erosion. The model did predict that average TSS concentrations within the reservoir could increase slightly under the proposed extended 2.5-foot fluctuation compared to the proposed normal 1-foot fluctuation. A summary of sediment transport model findings supporting this conclusion is presented below.

The purpose of the 1D sediment transport model was to make a qualitative comparison of sediment concentrations between normal and proposed extended operations. Sediment data for model development and calibration was collected under the Sediment ISR (Appendix H of PacifiCorp 2021a), while the model itself was developed as part of the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a). Detailed methods for sediment data collection, model development, and calibration are presented in each of these ISRs, respectively, and are summarized here.

Sixty-two sediment core samples were collected under the Sediment ISR within the reservoir and upstream of the reservoir on the Bear River (see core collection locations in Sediment ISR Figure 3-1; Appendix H of PacifiCorp 2021a). Critical areas of data collection for use in the sediment transport model were determined based on factors such as inflow, cutting potential, constrictions that increase velocities, and potential for erosion at different elevations. Therefore, of these 62 core samples, a subset of 30 sediment cores from 24 of the sites were used to provide input data for development and calibration of the sediment transport model.

The final sediment model was then used to estimate sediment parameters at 16 cross-sections (13 reservoir cross-sections, 2 cross-sections downstream of the dam, and 1 upstream of the reservoir within the Project Boundary) on the Bear River (Figure 3-11). Model outputs for the 16 cross-sections (bed elevation and TSS loading) are presented in Table 3-5, under the normal and proposed extended operating ranges. The difference in bed elevation and TSS at each cross section was then calculated to assess the relative change. As mentioned above, although the

differences were calculated, the assessment is intended to be qualitative. To better account for the magnitude of change relative to the TSS tons per day present under each operations scenario, the change in TSS is presented as the relative (rather than absolute) percent difference.

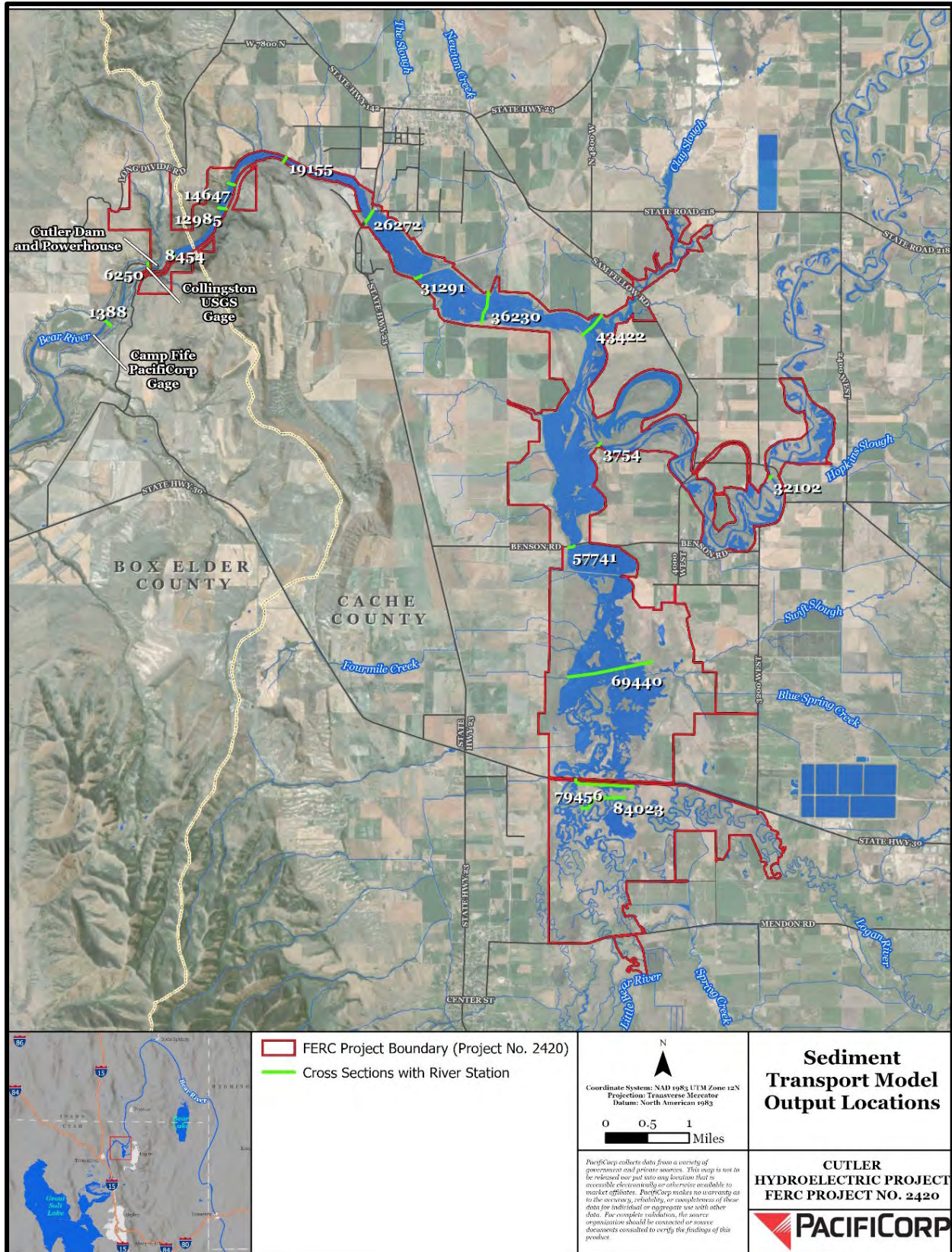


FIGURE 3-11 SEDIMENT MODEL OUTPUT LOCATIONS

TABLE 3-5 SEDIMENT MODEL RESULTS FOR NORMAL AND PROPOSED EXTENDED OPERATIONS

AREA	XS ID ^a	LOCATION	NORMAL OPERATIONAL RANGE (4,407.5 – 4,406.5 FEET)		PROPOSED EXTENDED OPERATIONS (4,406.5 – 4,405.0 FEET)		DIFFERENCE BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS		
			BED ELEVATION (FEET)	AVG TSS (TONS/HOUR)	BED ELEVATION (FEET)	AVG TSS (TONS/HOUR)	Δ BED ELEVATION (FEET)	Δ AVG TSS (TONS/HOUR)	RELATIVE % DIFFERENCE TSS
Bear River Upstream	32102	Upper Bear River Access	4,394.6	1.27	4,394.6	1.58	-0.02	0.31	22%
Reservoir	84023	South Marsh	4,403.1	3.01	4,403.1	4.96	0	1.95	49%
	79456	U.S. Highway 30	4,396.4	0.96	4,396.4	1.80	0	0.84	61%
	69440	Cutler Reservoir-North Marsh	4,404.3	0.22	4,404.3	0.49	0	0.28	78%
	57741	Benson Marina	4,388	0.13	4,388	0.29	0	0.16	75%
	3754	Bear River Confluence	4,391.5	3.59	4,391.5	5.73	0	2.14	46%
	43422	Clay Slough	4,401.6	2.60	4,401.6	4.51	0	1.91	54%
	36230	Cutler Reservoir	4,401.3	2.40	4,401.3	4.31	0	1.91	57%
	31291	U.P. Railroad Bridge	4,388.3	2.17	4,388.3	3.77	0	1.60	54%

AREA	XS ID ^a	LOCATION	NORMAL OPERATIONAL RANGE (4,407.5 – 4,406.5 FEET)		PROPOSED EXTENDED OPERATIONS (4,406.5 – 4,405.0 FEET)		DIFFERENCE BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS		
			BED ELEVATION (FEET)	AVG TSS (TONS/HOUR)	BED ELEVATION (FEET)	AVG TSS (TONS/HOUR)	Δ BED ELEVATION (FEET)	Δ AVG TSS (TONS/HOUR)	RELATIVE % DIFFERENCE TSS
	26272	U.S. Highway 24 - Cache Junction Bridge	4,388	2.06	4,388	3.52	0	1.45	52%
	19155	Cutler Canyon	4,391.5	2.01	4,391.5	3.43	0	1.42	52%
	14647	Cutler Canyon	4,390.5	1.80	4,390.5	2.96	0	1.17	49%
	12985	Cutler Canyon	4,389.2	1.78	4,389.2	2.95	0	1.16	49%
	8454	Cutler Dam (upstream)	4,369.9	1.57	4,369.9	2.57	0	1.00	48%
Bear River Downstream of Dam	6250	Collinston Gage	4,271.8	0.28	4,271.7	0.41	-0.04	0.13	38%
	1388	Camp Fife	4,266.1	0.83	4,266.1	0.79	-0.02	-0.04	-5%

^a Cross-sections are presented upstream to downstream.
Δ = delta (“change in”)

The sediment transport model predicted that bed elevations at all but three of the cross-sections would remain the same under both the normal and proposed extended operation range, with no net bed scour or deposition. For the three cross-sections where bed elevations were lowered due to predicted scour, the change was minimal at less than one tenth of a foot.

The model did predict increases in average TSS loading for all but one of the cross-sections under the proposed extended 2.5-foot fluctuation scenario. At the one cross-section upstream of the reservoir on the Bear River within the Project Boundary (Upper Bear River Access), the sediment transport model predicted the second lowest relative percent increase in TSS at 22 percent, as changes in WSE as a result of operational changes are known to be minimal at that location given the distance upstream from the dam. In the reservoir, a relative increase of approximately 50 percent in TSS loading was predicted for most sites, with two of the sites predicted to increase up to approximately 75 percent (also see discussion in the Summary of Potential Effects on Sediment Dynamics subsection below). Although some of the cross-sections were located at constriction points in the reservoir (e.g., Benson Marina and U.P. Railroad Bridge), as described in the previous section, the degree of constriction at the cross-section location did not appear to be a strong predictor of the relative percent TSS increase, as other model input parameters such as sediment size were also driving the increase.

Downstream of Cutler Dam on the Bear River, TSS loading was predicted to increase by 38 percent at the Collinston gage (located 700 feet downstream of Cutler Dam) cross-section between the two operational scenarios, and a slight decrease in TSS (5 percent) was predicted farther downstream at the Camp Fife cross-section (Figure 3-11). However, the model predicted TSS values of less than 1 ton per hour at these downstream cross-sections, while the TSS data¹² collected at the normal and proposed extended operations during the 2019 drawdown at the Collinston gage site recorded higher TSS levels ranging from approximately 2.5 to 7.5 tons per hour, depending on flows. As a result, the analysis of potential effects of proposed extended operations on sediment loading downstream of the dam on the Bear River used the higher

¹² As described in the following section, hourly TSS data was not collected; rather, hourly TSS readings were extrapolated from turbidity data collected using a digital sensor deployed at the Collinston gage site during the 2019 drawdown.

empirical data rather than the modeled TSS values. Analysis of the empirical data is presented in the following section.

Sediment Loads Downstream of Cutler Dam During 2019 Drawdown

Additional analysis of potential sediment loading downstream of Cutler Dam was completed in response to USFWS comments submitted as part of the ISR Comment Response process (Attachment 1 of PacifiCorp 2021c). USFWS was concerned that the proposed extended operations could potentially increase sediment loads downstream of dam, which could in turn be deposited in the Bear River Migratory Bird Refuge downstream. Because the TSS data collected downstream of the dam (at the Collinston gage [Figure 3-11]) during the drawdown was not collected at a high enough temporal frequency to adequately determine sediment loading, hourly turbidity data collected during the drawdown was used as a proxy to predict TSS. A total of 130 paired samples were used to plot the TSS-turbidity relationship to develop a regression formula to predict TSS from instantaneous turbidity measurements. The paired TSS and turbidity data had an $R^2 = 0.9228$, indicating a strong relationship sufficient for predicting TSS from the turbidity data.

Using this extrapolated TSS data, sediment load (in TSS tons per hour) was plotted for the drawdown period representing the WSEs for the normal and proposed extended operating ranges, which occurred October 24 to 28, 2019 (Figure 3-12 and Figure 3-13). For reference, Figure 3-12 presents the TSS during the representative period with the WSE on the secondary axis; Figure 3-13 presents TSS with flow on the secondary axis. In Figure 3-12, the range of WSEs within the normal operating range (WSE 4,407.5 to 4,406.5 feet) is depicted in the upper fine pattern box; WSEs within the proposed extended operating range (WSE 4,406.5 to 4,405.0 feet) is delineated in the lower patterned fill. TSS values ranged from approximately 2.5 to 7.5 tons per hour, and closely tracked flows indicating that TSS concentrations were stable throughout the drawdown period.

As further evidence of the limited range of TSS concentrations during the drawdown, TSS concentrations (as opposed to the TSS *loading* presented in Figure 3-12) were plotted for the same time frame across the WSEs representing normal and proposed extended operations (Figure 3-14). As expected, concentrations were relatively stable for the entire range of WSEs, ranging

from 25 to 32 milligrams per liter (mg/L), and did not appear to exhibit any trend associated with WSE.

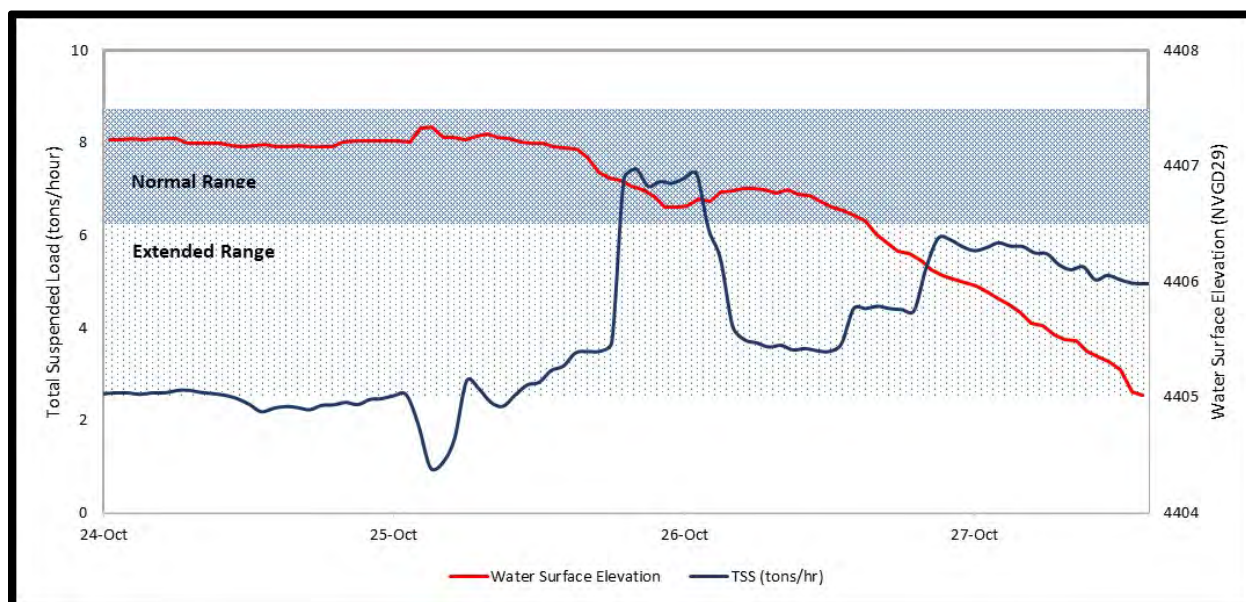


FIGURE 3-12 WSE AND TSS LOADING AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WSE

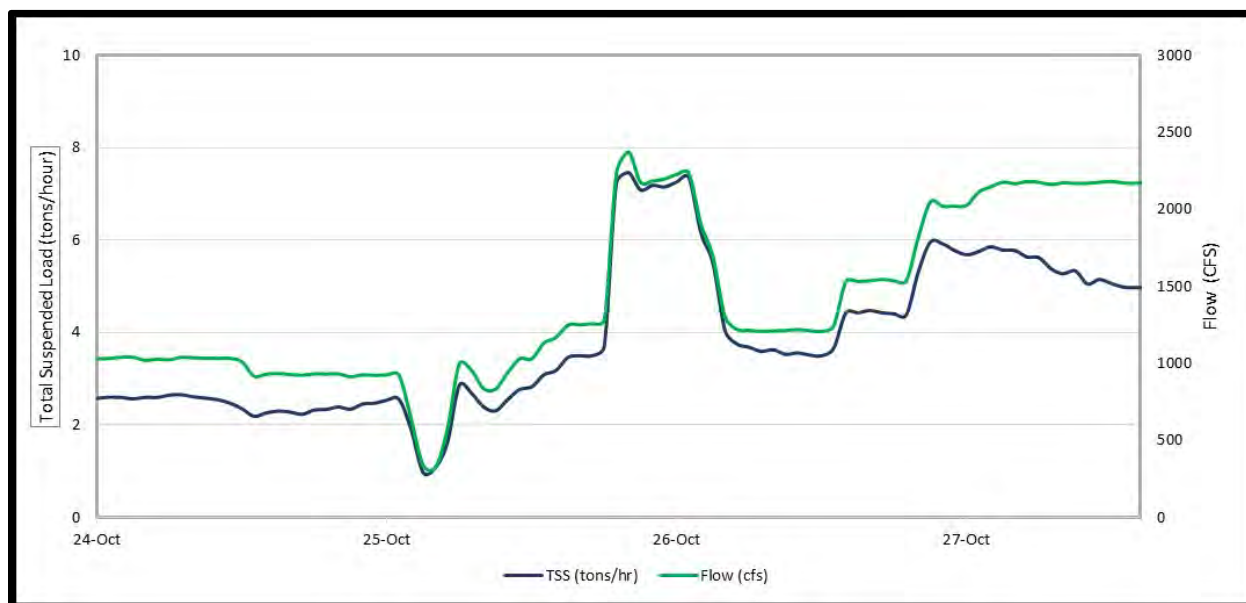


FIGURE 3-13 FLOW AND TSS LOADING AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WATER LEVELS

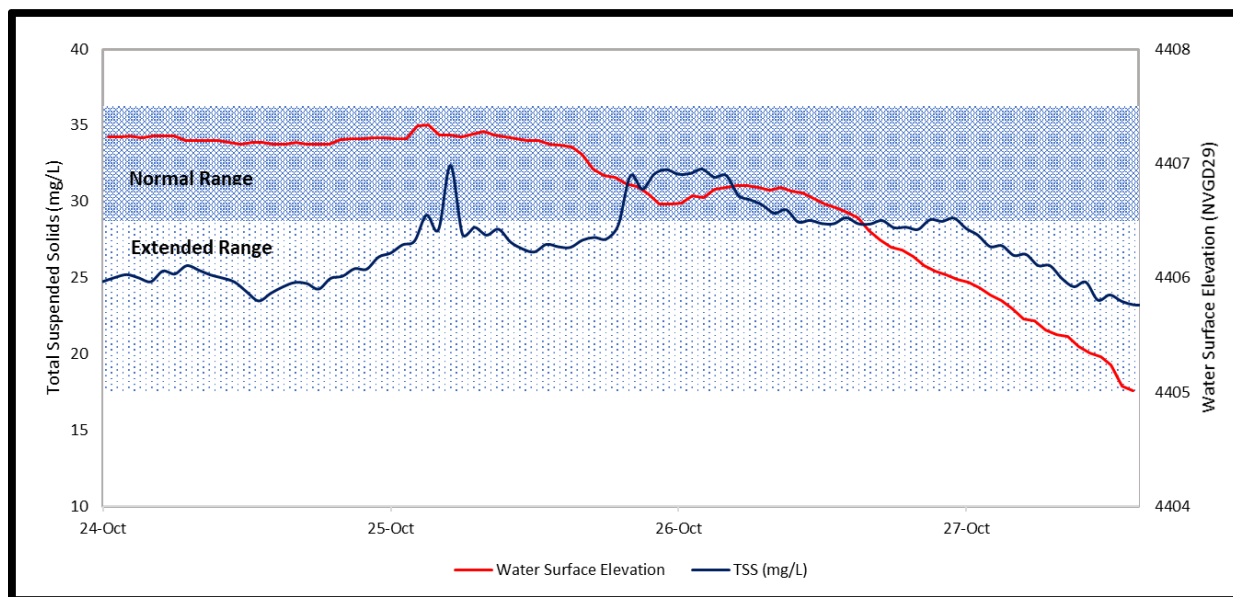


FIGURE 3-14 WSE AND TSS CONCENTRATION AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WATER LEVELS

Summary of Potential Effects on Sediment Dynamics

This section presents a summary of potential effects of proposed operations on sediment dynamics in the reservoir and downstream of the reservoir on the Bear River based on the analysis presented above.

The sediment transport model predicted an increase in TSS at all of the modeled cross-sections in the reservoir and at one of the two cross-sections located downstream of the dam. However, the results of the analysis of turbidity/TSS data collected during the 2019 drawdown indicate that a change in sediment transport and loading downstream of Cutler Dam under proposed extended operations is not expected given the lack of change in TSS concentration between the normal and proposed extended operation range simulated during the fall 2019 drawdown. As such, sediment load or delivery to the Bear River Migratory Bird Refuge downstream of Cutler Reservoir is also not expected to occur under proposed extended operations.

Similarly, no change is expected in tributary backwater effects associated with proposed operations due to potential sediment deposition at the mouths of tributary channels entering the reservoir. Tributary flows are primarily driven by the river or stream flow, and not by the reservoir WSE caused by dam operations. As evidence of this, the Hydraulic Modeling ISR

predicted minimal increases in WSE at the mouths of the tributary channels, as they are all far enough upstream from Cutler Dam that any change in WSE at the dam does not cause substantial change in WSE at the tributary mouths (Appendix G of PacifiCorp 2021a). Further, the normal and proposed extended operations would not raise the reservoir WSE above current operation levels. The Hydraulic Modeling ISR also did not predict any bed elevation increases, and the reservoir thalweg is expected to be maintained, not allowing any increase in bed elevation that could cause backwater effects.

Overall, the proposed extended operating range is not likely to substantially change sediment dynamics within the reservoir compared to sediment dynamics under current normal operations; this result is not surprising, in large measure as the two regimes are so similar overall. Under either the normal or proposed extended operations, the reservoir is likely to continue to lose storage volume from continued sediment deposition in shallow, low-velocity areas. Continued low velocities outside of the thalweg under normal and proposed extended operations are also not likely to contribute to large amounts of sediment resuspension. However, as the reservoir loses volume, water-based recreation activities and natural variables such as wind that cause wave action are likely to result in more fine sediment resuspension in shallow areas. These actions are unrelated to the proposed change in Project operations but are considered an indirect effect of continued Project operations.

Sediment Phosphorus

Cutler Reservoir has become a receiving sink for excess external loading of phosphorus that is not consumed biologically. Phosphorus is passed into the Bear River system as a result of surrounding land-use practices combined with surface runoff and NPDES discharges. As described above, phosphorus in reservoir sediments is either bound to sediment particles or found within the interstitial spaces in the sediment. Although phosphorus levels are considered high, the ratio of nitrogen to phosphorus is such that phosphorus is considered limiting (regarding bioavailability for algal/plant uptake) in the reservoir due to the inert nature of the phosphorus bound to sediments.

The potential effects on sediment phosphorus were evaluated because there was a concern noted during scoping that the potential movement of sediment under the proposed extended operations

could lead to the mobilization of phosphorus currently bound to bed sediments, in turn, affecting water quality.

As described above, the sediment transport model results indicate that the average concentrations of TSS throughout the reservoir could increase slightly during the proposed extended 2.5-foot fluctuation scenario. This potential resuspension of sediments could in turn cause an increase in TP in the water column.

Any resulting increase in sediment loading or mobilization does not necessarily translate to an increase in dissolved bioavailable phosphorus (e.g., for algae and plant uptake) because much of the phosphorus is expected to be chemically bound by elements in the sediment, such as calcium or similar redox-insensitive ions. As part of the Sediment ISR, calcium carbonate (CaCO_3) and the cation exchange capacity were measured at 4 of the 11 sediment sampling locations (see Figure 3-2 in the Sediment ISR; Appendix H of PacifiCorp 2021a) to determine the water-soluble fraction of calcium that might be available to bind phosphorus. Based on these measurements, it was determined the vast majority of phosphorus in bed sediments is most likely chemically bound by the calcium, and therefore biologically unavailable in the water column. While additional analysis and studies would be needed to determine the fraction of phosphorus that is bound to calcium in the reservoir, any resuspension of sediment resulting from proposed extended operations would not be expected to result in a substantial increase in bioavailable phosphorus in the water column.

Further, studies have shown that as little as 0.5 mg/L of DO in the water can inhibit the release of phosphorus in sediments (Ruban and Demare 1998). While phosphorus-bound sediments sensitive to redox conditions could release phosphorus under anoxic conditions, a strong oxic layer on the sediment surface, and well-oxygenated water column, would likely keep this from occurring.

In summary, both the normal and proposed extended operations could resuspend and deposit sediment-bound phosphorus and other nutrients, metals, and contaminants imported from upstream sources. However, the release of total dissolved phosphorus needed for algae and plant uptake appears limited. A large portion of the sediment-bound phosphorus appears to be permanently immobilized by calcium or similar redox insensitive ions.

Wheelon Dam Dredging and Removal

Removal of Wheelon Dam (Figure 1-1) and dredging of associated sediment deposits is no longer included as part of the proposed Project, as the studies demonstrated that it would not change reservoir capacity nor the distribution pattern of sediment deposition in any meaningful way.

Initial analysis indicated that a net gain of 540 af of reservoir storage capacity could be achieved if all of the sediment upstream of Wheelon Dam to Newton Bridge could be removed. However, the likely result would be removal of only a fraction of that estimated sediment volume.

Sediment distribution data predicted as part of the Hydraulic Modeling ISR indicate that Wheelon Dam does influence much of the deposition upstream of this site; however, core measurements immediately upstream of Wheelon Dam indicated as little as 46 inches of deposition (Appendix G of PacifiCorp 2021a). Therefore, removal of Wheelon Dam and associated sediment deposits upstream of the dam would be expected to provide only minimal increases in reservoir volume as the total deposition attributed to this controlling feature would amount to a small fraction of the 540 af of accumulated sediments mapped from Wheelon Dam upstream to Newton Bridge. In addition, removal of Wheelon Dam could have a significant short-term impact on water quality in the reservoir and downstream in the Bear River due to sediment resuspension as a new thalweg formed immediately upstream of the dam. Further, the sediment modeling informed the conclusion that any immediate reduction of sediment through dredging would only be redeposited in the near term through constant tributary sediment inputs to the reservoir.

Therefore, it was determined that removal of Wheelon Dam and associated sediment dredging would provide insufficient storage for any operational benefit when compared to water quality concerns or economic cost associated with dam removal and has therefore been eliminated as a viable option to increase water storage volume, even over time.

3.3.3.3 CUMULATIVE EFFECTS

Section 4.1.1 of the FERC SD2 stated that, “Geology and soil resources may be cumulatively affected as a result of continuing and future potential erosional effects at the project and also

resulting from natural events and land-use practices within the Bear River” (FERC 2019b).

Therefore, as indicated by FERC, cumulative effects of proposed Project operations were evaluated for the following sediment issues identified in FERC SD2 (FERC 2019b), as presented above in Table 3-2.

- Effects of continued Project operation on turbidity and suspended sediment loads;
- Effects of continued Project operations on sediment loading within the reservoir and potential backwater effects within tributaries; and
- Effects of potential project operation on sediment recruitment and transport downstream of Cutler Dam, and the potential effect on the Bear River, including effect on the Refuge and its habitats, to the mouth of the Bear River at Great Salt Lake.

FERC SD2 identified the cumulative effects geographic scope for geology and soil resources to include the Bear River basin from the Bear River Project (FERC Project No. 20)¹³ located upstream of the Cutler Project, downstream through the Cutler Project to the Great Salt Lake, “...because the operation and maintenance of the Cutler Project, in combination with the upstream and downstream land-use practices in the Bear River basin, may affect erosion, and sediment transport and deposition...” (FERC 2019b). The temporal scope of the cumulative effects analysis follows the potential term of a new license of 30 to 50 years into the future.

Erosion (and the resulting sedimentation and turbidity increases) within the Bear River basin occurs in response to several factors that are not directly related to Cutler Project operations. Natural factors include erosive soils; riverbed and floodplain processes; and freeze-thaw cycles that lead to cracking and slumping. Anthropogenic factors include agricultural practices, such as farming and grazing directly adjacent to shorelines and streambanks, and upstream reservoir operations. Further, as Cutler Reservoir loses storage volume with continued sediment delivery from the Bear River, recreation activities and natural variables such as wind could result in more fine sediment resuspension in shallow areas. Continuation of these natural and anthropogenic factors that cause shoreline and streambank erosion within the Bear River basin could be

¹³ The Bear River Project (FERC Project No. 20) consists of three dams, with the Oneida Dam being the most downstream dam on the Bear River (see Figure 3-16 in Section 3.3.2, Water Resources) and therefore serving as the most upstream extent of the cumulative effects analysis for geology and soil resources.

reasonably expected to continue to cause sediment loading, deposition, mobilization, in Cutler Reservoir and downstream on the Bear River for the period of the new Project license.

As described throughout this section, upstream sources will continue to deliver sediment to Cutler Reservoir. However, the analysis in Section 3.3.3.2, Environmental Analysis, concluded that there is not likely to be any change in tributary backwater effects associated with proposed operations due to potential sediment deposition at the mouths of tributary channels entering the reservoir; as such, no cumulative effects are identified associated with potential backwater effects in tributary channels.

Given that an increase in sediment loading downstream of Cutler Dam is not expected based on the analysis presented in Section 3.3.3.2, Environmental Analysis, proposed extended operations would not be expected to cause an increase in sediment recruitment or transport downstream of Cutler Reservoir. As such, proposed extended operations are not expected to cause any cumulative effects related to increased sedimentation downstream to the Bear River Migratory Bird Refuge or the Great Salt Lake. Mitigation projects within the Bear River basin, including measures associated with the *Middle Bear River and Cutler Reservoir Total Maximum Daily Load* (TMDL) plan (UDWQ 2010) would also be expected to limit any cumulative effects.

In summary, Project operations under the new license would be expected to continue to cause limited cumulative effects on sedimentation associated with natural and anthropogenic factors indirectly or directly resulting from the presence and continued operation of the reservoir.

3.3.3.4 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

This section provides a description of existing, proposed, and recommended PM&E measures (e.g., best management practices [BMPs], soil erosion and sedimentation control measures, and spoil and disposal measures).

EXISTING MEASURES

Measures required in the current license (FERC 1994) relevant to soils, sedimentation, and erosion that are proposed to be carried forward or required under a new license (with potential updates) are presented below, including license articles and management plans.

A summary of existing PM&Es is presented in Section 2.1.4, Existing Environmental Measures.

Current License Articles

- Standard License Article No. 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
- Article No. 402: Resource Management Plan

Project Operations

Modifications to existing Project operations were formally approved in 2002 based on the results of a 3-year study of the Bear River basin (PacifiCorp 1999). Project operations during the current license period have resulted in relatively consistent surface elevations (within the 1- to 1.5-foot reservoir elevation operating range, depending on time of year), as noted in annual monitoring reports submitted to FERC. This management effort was identified in previous reports as an opportunity for reducing erosion effects from reservoir shorelines and channel banks (PacifiCorp 1995a, 1999).

Limits on the Cutler Reservoir water elevation are currently in place to regulate the increase or decrease in WSE (known as the operating range or the reservoir deadband), regardless of PacifiCorp generating power. The operating range was adopted to help decrease instability and erosion from saturated channel banks resulting from repeated large shifts in shoreline/bank water elevation acting on erodible (often high clay content) soils.

Resource Management Plan

Per Article 402 of the current license, the following measures related to geology, soils, and sediment were required to be included in the Cutler RMP.

- 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 miles of cattle exclusion fencing.

- 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.

The above measures were incorporated into the Cutler RMP Vegetation Enhancement Program (PacifiCorp 1995a), and PacifiCorp has implemented numerous measures to reduce bank erosion and improve water quality, including shoreline buffers, bank stabilization efforts, and erosion control sediment basins within the shoreline buffers. The shoreline buffer program and bank stabilization projects along the reservoir shoreline and Bear River streambanks in the FERC Project Boundary are described above in Section 3.3.3.1, Affected Environment, because in addition to being PM&Es, they are also a part of the existing baseline condition of the reservoir shoreline and Bear River streambanks. The Cutler RMP also included a Water Quality Monitoring program that includes monitoring of sediment and phosphorus.

The Cutler RMP would not continue in its current form under the new license. Rather, PacifiCorp plans to draft a new Cutler RMP that would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP. Aspects to be included in the new Cutler RMP relevant to this resource are summarized in the New Proposed Measures subsection below.

TMDL Plans

One purpose of the *Middle Bear River and Cutler Reservoir TMDL* (UDWQ 2010) is to reduce pollutant loading to Cutler Reservoir, including point and non-point pollutant sources that were identified as causing erosion and sedimentation within the Bear River basin. In addition to this TMDL, UDWQ has written TMDL plans for several sub-basins within the Bear River watershed upstream of Cutler Reservoir that also serve to mitigate sediment and phosphorus inputs (among other pollutants) to Cutler Reservoir and the Bear River.

NEW PROPOSED MEASURES

A summary of new proposed PM&Es is presented in Section 2.2.3, Proposed Environmental Measures. New proposed standalone measures and management plans relevant to geology, soils, erosion, and sediment are presented here. The measure number from Table 2-4 is provided for reference.

Standalone Measures

PacifiCorp proposes to identify and implement approximately three additional miles of bank stabilization projects within the Project Boundary (GEO-2).

Management Plans

Resource Management Plan

An updated Cutler RMP would be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. The new Cutler RMP would be expected to include the following sub-components relevant to geology, soils, erosion, and sediment:

- Shoreline management: Update erosion control and sediment management program within the Cutler RMP; continue to maintain vegetated shoreline buffers, including erosion control check dams, to minimize sedimentation to Cutler Reservoir (GEO-1); continue to monitor existing (and add any potential new) bank stabilizations measures (GEO-3).
- Agricultural management: Review, update, monitor, and improve grazing management and agricultural lease programs (LU-1); continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve/improve their function as necessary (LU-2).

Project Operational Plan

- Continue to minimize flow fluctuations downstream of the reservoir during periods of ice buildup to reduce ice shearing on banks (GEO-4).

Currently, during periods of exceptionally cold temperatures when substantial amounts of ice can build up on the river, PacifiCorp matches incoming reservoir flows to outgoing flows as closely as possible to reduce the possibility of ice-dam flooding and ice shearing on banks. This practice would also be part of the future Project Operational Plan to avoid flow fluctuations during winter periods of extreme ice build-up.

Construction Erosion and Sediment Control Plan

A new CESCOP will be developed that incorporates and codifies existing measures intended to protect water quality through avoiding and minimizing impacts of any new construction during the license term, and will include standard and Project-specific BMPs and requirements to address potential construction and ground-disturbance-related erosion and sediment (GEO-5). This new CESCOP will be developed after the Project receives a FERC license Order.

3.3.3.5 UNAVOIDABLE ADVERSE IMPACTS

After accounting for the potential impacts presented above, as well as PM&Es, the following potential unavoidable adverse effects were identified throughout this section, all of which are related to sediment. The adverse effects are exclusively associated with continued normal operations resulting from the presence of the reservoir and are not associated with the proposed extended operations in the winter.

- Continued delivery of sediments from upstream and deposition of sediments in shallow, low-velocity areas, which would continue to reduce reservoir storage volume and act as a sink for nutrients, metals, and other contaminants imported from upstream sources. Water quality improvement projects recommended by the TMDL (DWQ 2010), including construction of the new Logan City Wastewater Treatment Plant (WWTP), will continue to reduce incoming sediment loads over time.
- As the reservoir loses storage volume from upstream sediment deposition, recreational activities (jet skis and motorboats) and natural variables such as wind could result in continued shoreline erosion of unstabilized banks, and fine sediment resuspension and increased turbidity in shallow areas.

Because PacifiCorp is not proposing to eliminate the reservoir, this analysis recognizes that these adverse effects would continue under the new license, but the adverse effects are not considered to be a result of proposed extended operations. In fact, these adverse effects are expected to be reduced under the new license compared to the current license with the implementation of the new management plans and PM&E measures such as new reservoir shoreline bank stabilization projects and additional offsite non-Project upstream bank stabilization measures.

3.3.4 WATER RESOURCES

This section addresses water quantity, water use including water rights, and water quality conditions on the Bear River and Cutler Reservoir, and how those water resource elements are affected by the proposed Project operations. The geographic scope for this resource is the area within the Project Boundary and along the Bear River for 2 miles downstream of Cutler Dam.

3.3.4.1 AFFECTED ENVIRONMENT

WATER QUANTITY

This section focuses on streamflow levels and timing in the Bear River upstream and downstream of Cutler Reservoir, and WSEs in the reservoir. It also provides a summary of the surrounding drainage basin. A more detailed description of the watershed is provided in Section 3.1, General Description of Bear River Basin.

The approximately 7,500-square-mile Bear River basin consists of six major sub-watersheds (see Figure 3-2 in Section 3.1, General Description of Bear River Basin). The Cutler Reservoir watershed stream network extends 2,022 linear miles, 16 percent of which consists of ditches or canals. Steep terrain characterizes 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 Project Vicinity 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; most of which are used locally to feed beef cattle and dairy cows. As noted in Section 3.3.9, Land Use and Management, developed land uses occupy a large portion of Cache Valley (PacifiCorp 2008).

Several major tributaries such as the Little Bear River, Spring Creek, Cub River, Logan River, and Blacksmith Fork River contribute substantial amounts of water during runoff (see Figure 3-2).

Bear River Flow

The Bear River and its tributaries are of key importance to Cutler Reservoir in terms of water quantity and quality. The U.S. Geological Survey (USGS) Collinston gage (Station No. 10118000) is located on the Bear River approximately 800 feet downstream from the Cutler Powerhouse and is used to determine streamflow data for the Project. This gage and its data are reviewed and published by USGS but funded and managed by PacifiCorp.

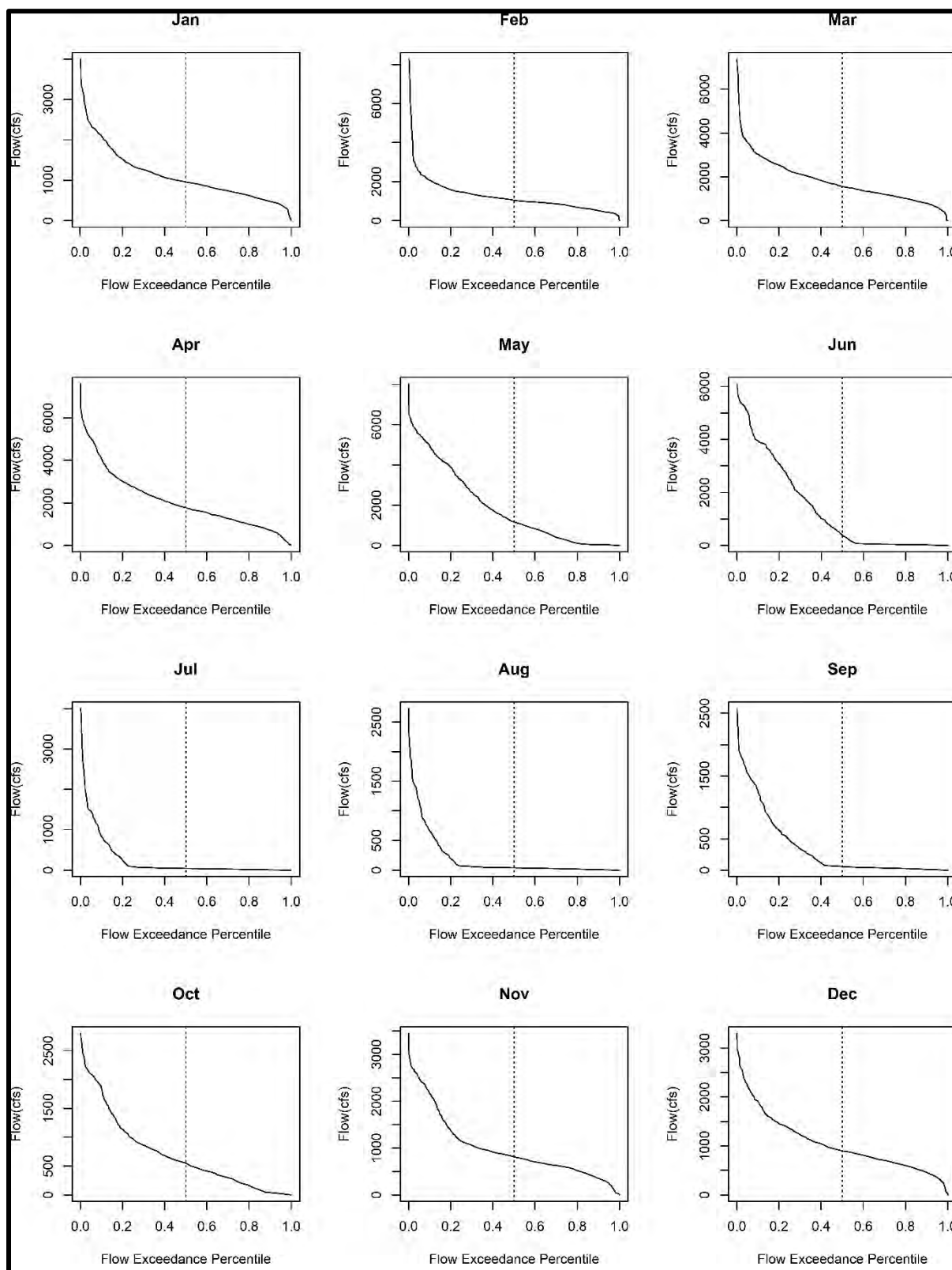
There are no minimum flow requirements downstream of Cutler Dam because of the irrigation flow requirements in the Hammond/East and West canals, which originate at the dam, and the fact that the water is the irrigator's by contract and could not be released by PacifiCorp, even if that were shown to be beneficial. FERC requests a critical flow for each relicensing project but the term is not defined. For this Exhibit E, PacifiCorp defines critical flow as, "*the lowest continuously available inflow for power over any one-month period*" (Connely Baldwin, Personal Communication, April 2, 2021). The critical streamflow for the Project is 0 cubic feet per second (cfs). Although the Project is frequently offline in July and August (that is, in all but the wettest and highest run-off years) due to irrigation withdrawals, rendering the Project inoperable, the dependable capacity of Cutler is 30 MW when water is available to operate the turbines and generator. Monthly minimum, mean, and maximum flows for the 30-year record (1991-2020 period) at the Collinston gage are presented in

Table 3-6. Flow duration curves for the Project are illustrated in Figure 3-15. The 32-year period of record for these graphs is October 1, 1988, to September 30, 2020, extracted from the USGS Collinston gage data (USGS 2019). As noted, due to lack of water during the hotter, drier portions of the irrigation season, the Cutler Powerhouse is generally not operated in July and August but is operated for infrequent spinning reserves in case of grid disturbances. The 50th percentile exceedance flow in these months combined is 33 cfs.

TABLE 3-6 BEAR RIVER DISCHARGE, USGS COLLINSTON GAGE No. 10118000, WATER YEARS 1991 TO 2020

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MINIMUM	45	47	18	27	23	22	14	9	3	11	9	33
MEAN	1,143	1,299	1,831	2,167	2,025	1,455	272	208	372	766	1,033	1,088
MAXIMUM	4,022	8,280	7,389	7,615	8,046	5,950	3,950	2,740	2,590	2,817	3,461	3,301

Note: 2020 data are preliminary. Measurements are listed as cubic feet per second (cfs).



Note: 2020 flow data are preliminary

FIGURE 3-15 MONTHLY FLOW DURATION CURVES FOR THE CUTLER HYDROELECTRIC PROJECT FROM THE PERIOD 1991 TO 2020

Cutler Reservoir

Cutler Reservoir has a surface area of approximately 2,476 acres with storage of approximately 8,563 af at a normal operating elevation of 4,407.5 feet msl.¹⁴ The reservoir has 137.75 miles of shoreline calculated using the full wetted perimeter of the inundation boundary at normal pool. The reservoir retention time was calculated by dividing the storage taken at normal operating pool from the updated stage storage curve by the average assumed inflow/outflow of 1,090 cfs, which equals 3.47 days. The reservoir substrate is primarily silt and sand (PacifiCorp 2021a).

Water levels in Cutler Reservoir fluctuate relatively little throughout the year given the existence of the reservoir operating range limits (or deadband; the range is from 4,407.5 to 4,406.5 feet as measured at Cutler Dam from March to December and expands to a lower limit of 4,406.0 feet during the winter months). During spring runoff, inflow from the Bear River and the southern tributaries (Logan, Blacksmith Fork, Spring Creek, 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, during these high inflow conditions, the reservoir elevation as measured at the dam may be lower than the lower elevation compliance target due to the operational slope on the reservoir during high water conditions (lowering the dam elevation to help move water through the southernmost and upstream portions of the reservoir). During the summer irrigation season, withdrawals from the reservoir can exceed inflow causing the reservoir surface elevation to drop. Also, large and/or unexpected precipitation events may drive agricultural users to decrease irrigation withdrawals without notification, causing the reservoir elevation to rise. PacifiCorp responds to changes in summer reservoir elevations by scheduling additional releases or reducing 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 results in a potentially dynamic WSE in Cutler Reservoir. As noted above, PacifiCorp is currently required to maintain the reservoir WSE within a 1-foot operating band during all but

¹⁴ Areas of Cutler Reservoir that do not contribute to the usable storage capacity (e.g., areas of emergent marsh vegetation) have been excluded from the reservoir surface area calculation.

the winter season per Article 401, as modified by FERC Order on April 30, 2002. From December to March, the operating band is increased by 6 inches.

WATER USE

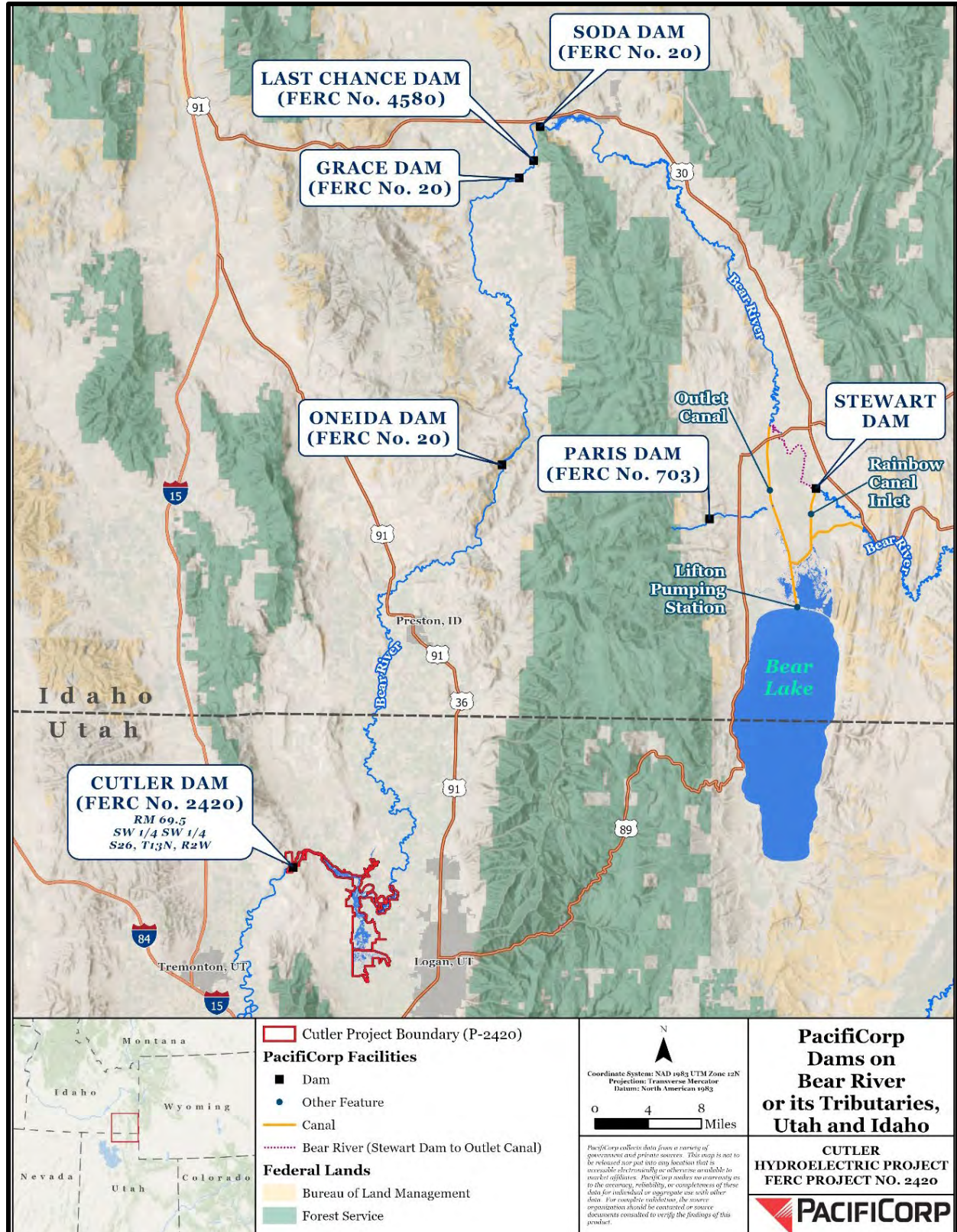
This section discusses existing water use and includes details of PacifiCorp's water rights as they relate to the Project.

The Bear River is regulated according to the multiple use needs within the basin, including irrigation, power generation, recreation, fish and wildlife enhancement, and flood control. 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.

The hydrology of the Bear River is heavily influenced by dams and diversions that are used for irrigation water and hydroelectric purposes. PacifiCorp owns and operates four hydroelectric plants and five dams on the mainstem (one additional small hydroelectric facility [Paris plant] is located on Paris Creek, a tributary) Bear River downstream of Bear Lake and upstream of Cutler Reservoir (see Figure 3-2 in Section 3.1, General Description of Bear River Basin). At the upstream end, water is diverted from the Bear River through the Rainbow Canal into Bear Lake and stored for future use. Water is then released back into the Bear River via the Outlet Canal (utilizing the Lifton Pump Station) to supply supplemental irrigation water for over 150,000 acres of farmland in Idaho and Utah (PacifiCorp 1991).

The water released from Bear Lake to meet the irrigation storage water rights guaranteed by the decrees, Compact, and irrigation contracts is used for power generation as it passes through PacifiCorp's hydroelectric plants downstream to the various points of diversion. Because the largest and oldest water right on the Bear River is diverted out of Cutler Reservoir immediately upstream of the hydroelectric project intake, during low water months (typically July and August), there is generally no power generated at Cutler as no water passes downstream of the dam until natural flows begin to increase again following the irrigation season (Figure 3-16). The Soda, Grace, and Oneida developments were all licensed together in 2003 as the Bear River Project (FERC Project No. 20). Additionally, Cutler (FERC Project No. 2420), Last Chance

(FERC Project No. 4580), Paris (FERC Project No. 703), and the Lifton Pump Station at Bear Lake (not a designated FERC project) are all owned by PacifiCorp and operated in a coordinated fashion. The Project is heavily influenced by the nearby agricultural land, where there are at least 118 irrigation companies or other entities that own and operate other water withdrawal and delivery systems within the Bear River watershed (UDWQ 2010).



Source: PacifiCorp 2018a as cited in 2019

FIGURE 3-16 PACIFICORP DAMS ON THE BEAR RIVER AND ITS TRIBUTARIES

Figure 3-17 shows percentiles of daily average flows for water years 1988 through 2018. The flow data is measured at Collinston gage immediately downstream of Cutler Powerhouse (USGS No. 10118000) and includes all generation and spill gate flows. The percentiles plotted are 7-day averages. Below is a summary of the annual discharge patterns on the Bear River at the USGS Collinston gage:

- Spring runoff starts consistently at the beginning of March at most percentile levels.
- Spring runoff ends May 1 for the 10th and 25th percentiles, June 15 for the median, and July 1 for the 75th and 90th percentiles.
- Low flows (typically with very little or no flow immediately downstream of Cutler Dam) occur during the bulk of the summer months in all but the wettest years (90th percentile).
- Flows gradually increase at the end of the summer from September 1 to October 31, depending on the type of water year, generally corresponding with the end of the irrigation season.
- Consistent and slightly increasing winter flows occur beginning from approximately November 1 until spring runoff, from 500 cfs in the driest years and up to 2,000 cfs in the wettest years. The wettest years reflect winter flood control releases from the Bear Lake (to make more room to store spring runoff and provide flood control) in addition to natural flows.

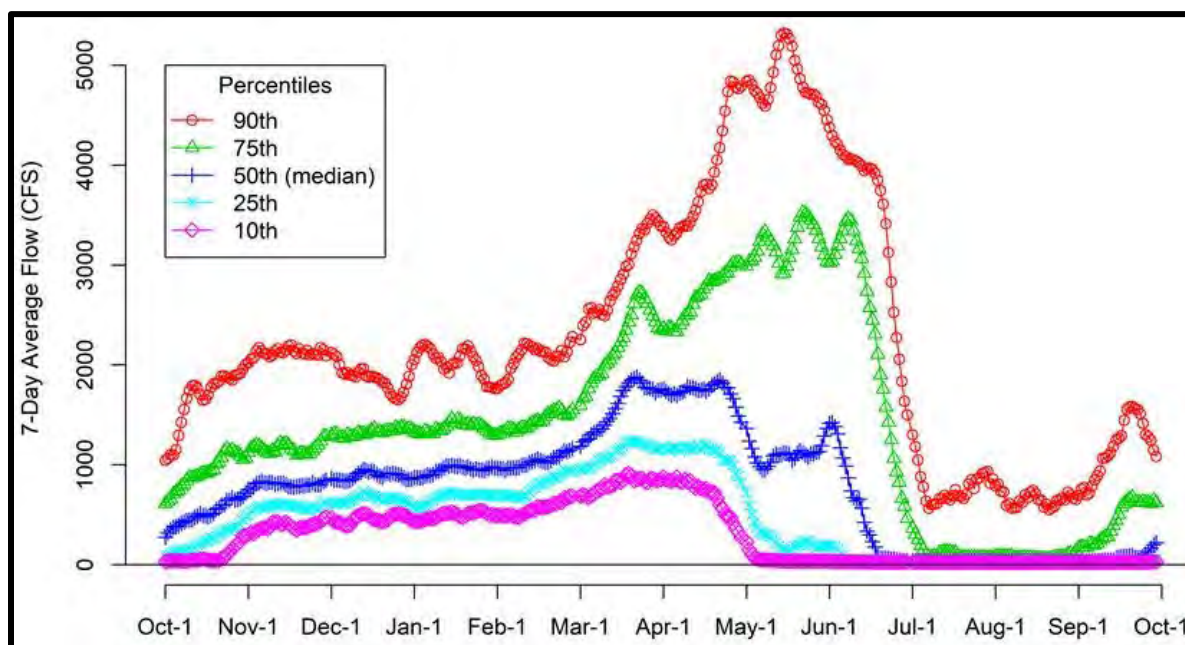


FIGURE 3-17 ANNUAL DISCHARGE PATTERNS DOWNSTREAM OF CUTLER DAM, COLLINSTON GAGE (USGS No. 10118000, 1988 TO 2018)

Water Rights

As noted previously, at least 118 different entities have consumptive water rights on the Bear River mainstem between Bear Lake and the Great Salt Lake. The following is a description of the Bear River water rights from PacifiCorp’s Final License Application (PacifiCorp 1991) for the current license:

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, are 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.

Water rights held by PacifiCorp for the Project are provided in Table 3-7.

TABLE 3-7 WATER RIGHTS HELD BY PACIFICORP

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

Source: PacifiCorp 2019

WATER QUALITY

This section presents the historic and current status of water quality in Cutler Reservoir and in the Bear River extending 2 miles downstream of the dam. The water quality information is based on data compiled in the Water Quality ISR (Appendix F of PacifiCorp 2021a). A summary of the water quality data is presented here; a more detailed evaluation of water quality data can be reviewed in the Water Quality ISR.

Utah water quality standards (Utah Administrative Code Rule R317-2, Standards of Quality for Waters [2018]), are also presented as a reference for water quality parameters that are or are not currently meeting Utah state numerical water quality standards and narrative water quality standards for a given beneficial use.

Water Quality Standards

Table 3-8 lists Utah's designated beneficial uses and relevant water quality standards. 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).

The numeric standard for total phosphorus (TP) was modified for Cutler Reservoir when the UDWQ conducted the *Middle Bear River and Cutler Reservoir TMDL* study (UDWQ 2010). At that time, it was determined that the state water quality standard (defined targets/endpoints)

should be relaxed for TP in Cutler Reservoir and the reservoir outfall at the dam, to the concentrations presented in Table 3-8.

TABLE 3-8 CUTLER RESERVOIR NUMERIC AND NARRATIVE CRITERIA FOR DESIGNATED BENEFICIAL USES

WQ PARAMETER	STANDARD FOR DESIGNATED BENEFICIAL USE ^a			
	2B	3B	3D	4
Temperature (maximum)		27°C		
Dissolved Oxygen (minimum)		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)		
TSS	No beneficial use narrative standard; Numeric standard is 70 mg/L			
Turbidity (NTE)	10 NTU	10 NTU	15 NTU	10 NTU
Total Coliform	No beneficial use standard			
Total Kjeldahl Nitrogen (TKN)	No beneficial use standard			
Nitrate, total (maximum)		4 mg/L		
Total Phosphorous		UDWQ TMDL Standard ^b for Cutler Reservoir and downstream of Reservoir: 0.09 mg/L Southern Reservoir 0.07 mg/L Northern Reservoir 0.075 mg/L Cutler Dam outfall (Bear R) Utah State Standard for all other waters: 0.05 mg/L River/Stream		
Orthophosphate (dissolved)	No beneficial use standard			

WQ PARAMETER	STANDARD FOR DESIGNATED BENEFICIAL USE ^a			
	2B	3B	3D	4
Narrative Standard	<p>“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)</p>			

Source: Utah Administrative Code Rule R317-2, Standards of Quality for Waters (2018)

mg/L = milligrams per liter; mL = milliliter; MPN = most probable number; NTE = not to exceed background level

TMDL = Total Maximum Daily Load; TSS = total suspended solids; UDWQ = Utah Division of Water Quality

^a 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.

4 = Protected for agricultural uses including irrigation of crops and stock watering.

^b Standard for TP for the reservoir and reservoir outflow at the dam is from the TMDL study (UDWQ 2010).

Water Quality Initial Study Report

As mentioned above, this section is not intended to provide a detailed presentation of the baseline water quality conditions for waters within the Project Boundary. Rather, it presents a summary of water quality conditions for specific parameters of concern. A detailed compilation of water quality data for the Project is presented in the Water Quality ISR (Appendix F of PacifiCorp 2021a). The Water Quality ISR included the following three tasks: 1) sample water quality parameters of concern during the fall 2019 drawdown (temperature, TSS, TP, and DO; 2) analyze phosphorus in reservoir sediment and associated water (in interstitial spaces); and 3) synthesize existing water quality data for the reservoir and Bear River. Each of these tasks are described below for context, with the synthesis of water quality data providing the baseline water quality information for the water quality affected environment within the Project Boundary.

Water Quality Sampling During 2019 Drawdown

The 2019 full drawdown of Cutler Reservoir was conducted by PacifiCorp to collect LiDAR data within the Project Boundary and incidentally allowed for the investigation of several environmental resources reported in various ISR sections under conditions that were partially representative¹⁵ of the proposed extended Project operations. During the drawdown, water samples were collected and analyzed for temperature, TSS, DO and TP, as these parameters were identified as the pollutants of concern in the 2010 TMDL study, as a consequence of nutrient loading (UDWQ 2010). This data provided information on potential effects of proposed operations on TSS, DO, and TP during drawdown conditions, and is therefore discussed in the Environmental Analysis Section below, and not in this Affected Environment section.

Analysis of Phosphorus in Reservoir Sediment and Associated Water

The sediment core study was part of the Sediment ISR (Appendix H of PacifiCorp 2021a), which sampled a total of 11 sites within the Project Boundary. The Water Quality ISR analyzed the results of phosphorus sampling in sediment cores and associated water from 5 of the 11 sites sampled in the Sediment ISR (see Figure 5-15 in the Water Quality ISR [Appendix F of PacifiCorp 2021a]). Sediment core water quality sampling results, including sediment phosphorus, is addressed in Section 3.3.3, Geology, Soils, and Sediment.

Synthesis of Existing Water Quality Data

The Water Quality ISR synthesized existing water quality for the Cutler Reservoir and Bear River upstream and downstream of the reservoir, from 1987 to 2018, using the following sources:

- PacifiCorp’s five-year water quality monitoring reports—water quality monitoring initially was required quarterly and annually (1996 to 1998 and 2000 to 2003), followed by quarterly monitoring requirements at five-year intervals (PacifiCorp 2002, 2008, 2013, and 2018);

¹⁵ 2019 drawdown conditions were only considered “partially representative” because reservoir levels during the 2019 drawdown were substantially lower than proposed extended operations (e.g., approximately 20 feet lower than normal operations WSE versus the proposed cyclic and approximately 2 feet lower than normal operations WSE).

- A water quality study (PacifiCorp 2020) published in May 2020 that will be included as an appendix in PacifiCorp’s next five-year monitoring report;
- UDWQ’s periodic water quality monitoring;
- Utah State University (USU) publications;
- Ecosystem Research Institute (ERI) dataset;
- Information from the City of Logan; and
- The 2010 *Middle Bear River and Cutler Reservoir TMDL* study (UDWQ 2010).

The water quality data synthesis was used as the baseline condition for the water quality Affected Environment section. Note that this summary does not include the 2019 drawdown TSS, TP or DO data, or the sediment core water data sampling results which are also presented in the Water Quality ISR (Appendix F of PacifiCorp 2021a). These aspects are presented in the Environmental Analysis section below, and in Section 3.3.3, Geology, Soils, and Sediment, respectively.

Given the extensive amount of water quality data presented in the Water Quality ISR, the data is summarized as ranges for each parameter in Table 3-9. The full suite of results can be reviewed in the Water Quality ISR. Parameters that exceeded the standard for a given beneficial use are bolded in Table 3-9. The locations sampled by the different entities were distilled into the eight general locations listed in Table 3-9 by UDWQ general area, and PacifiCorp sampling location; Figure 3-18 presents the Project management units, USGS gage locations, and water quality monitoring areas used for the baseline summary presented here.

The existing PacifiCorp water quality monitoring program is stipulated by the Cutler Resource Management Plan (RMP; PacifiCorp 1995a), as required by the current Project FERC license (FERC 1994). A final water quality monitoring data collection and report under the current license is planned for 2023/2024. For comparison with other entity sampling efforts, the Water Quality ISR used PacifiCorp’s annual averages (as summarized in Table 3-9).

TABLE 3-9 RANGE OF AVERAGE VALUES FOR WATER QUALITY PARAMETERS COLLECTED WITHIN THE PROJECT AREA BY PACIFICORP, USU, UDWQ, CITY OF LOGAN, AND ERI FROM 1983 THROUGH 2018 ^a

AREA	UTAH STATE WATER QUALITY DATABASE AREA NAME	PACIFICORP WATER QUALITY SITE NAME	WATER TEMP (°C)	TOTAL COLIFORM (ORGANISMS/ 100 mL)	NITRATE-NITROGEN (MG/L)	TOTAL KJELDAHL NITROGEN (MG/L)	TOTAL PHOSPHORUS (MG/L)	DISSOLVED OXYGEN (MG/L) ^B	TURBIDITY (NTU/FTU)	TSS (MG/L)
Utah Water Quality Standard:			<27°C	NA See footnote e	4 mg/L	0.8 mg/L	See footnotes c, d	>5.5 mg/L	≤10 NTU Change	70 mg/L
Tributary	Southern Inflow	Logan River	7.3-16.0	281->2,419.6 ^e	0.248-0.584	0.250- 3.30	0.001- 0.58 ^c	8.10-20.49	8.45-10.28	5.10-8.44
	Southern Inflow	Little Bear River	8.0-16.0	325->2,419.6	0.493-1.278	0.455-0.618	0.025-0.744 ^c	1.00 -21.99	25.64-28.82	19.96-28.82
	Southern Inflow	Spring Creek	8.4-11.0	205-2,537	1.840- 5.089	0.428- 1.270	0.025-0.842 ^c	2.00 -17.31	36.44-40.82	26.64-40.82
Reservoir	Southern Reservoir	Swift Slough	10.5-14.8	410->2,419.6	0.050-0.696	0.575- 1.757	0.025-0.371 ^d	0.00 -26.82	32.60-33.00	32.60- 99.25
	Northern Reservoir	Benson Bridge	11.4-17.1	84->2,419.6	0.072-0.740	0.732- 0.966	0.048-0.780 ^d	7.60-10.40	37.30-38.80	22.88-37.28
	Northern Reservoir	Cache Junction-Hwy 23 Bridge	8.6-16.1	103->2,419.6	0.088-0.769	0.619-0.698	0.025-0.182 ^d	7.40-9.90	33.20-43.72	30.32-33.20
Bear River	Northern Inflow	Bear River Upstream of Reservoir	8.0-16.4	208->2,419.6	0.436-0.814	0.431-0.452	0.025-0.116 ^c	8.40-9.80	31.28- 135.18	4.00-31.28
	Reservoir Outflow	Bear River Downstream of Reservoir at Collinston Gage	8.0-8.6	167->2,419.6	0.360-0.829	0.699-0.775	0.025-0.181 ^d	8.90-10.5	32.92-45.68	30.80-32.92

°C = degree Celsius; FTU = Formazin Turbidity Unit; mg/L = milligrams per liter; mL = milliliter; NA = not applicable; NTU = Nephelometric Turbidity Unit; TMDL = Total Maximum Daily Load; TSS = total suspended solids

^a This table provides a summary of water quality monitoring. See the Water Quality ISR (Appendix F of PacificCorp 2021a) for the full suite of water quality results for these parameters sampled by each entity. Concentrations that did not meet the standard are presented in **bold**. Note that total coliform and TSS do not have a standard for the listed beneficial uses; background turbidity levels were not analyzed, therefore the turbidity levels were not compared to the state standard.

^b For DO, the 30-day average for all life stages of >5.5 mg/L was used as the standard

^c Utah State Water Quality standard for phosphorus was applied at this site (0.05 mg/L) because site is located upstream of Cutler Reservoir, therefore the relaxed TMDL phosphorus standard does not apply

^d The Utah Division of Water Resources relaxed TMDL standard for phosphorus was applied at this site (0.09 mg/L Southern Reservoir; 0.07 mg/L Northern Reservoir; and 0.075 mg/L in the Bear River downstream of reservoir)

^e The maximum reporting limit for total coliform is 2,419.6 organisms per 100 mL

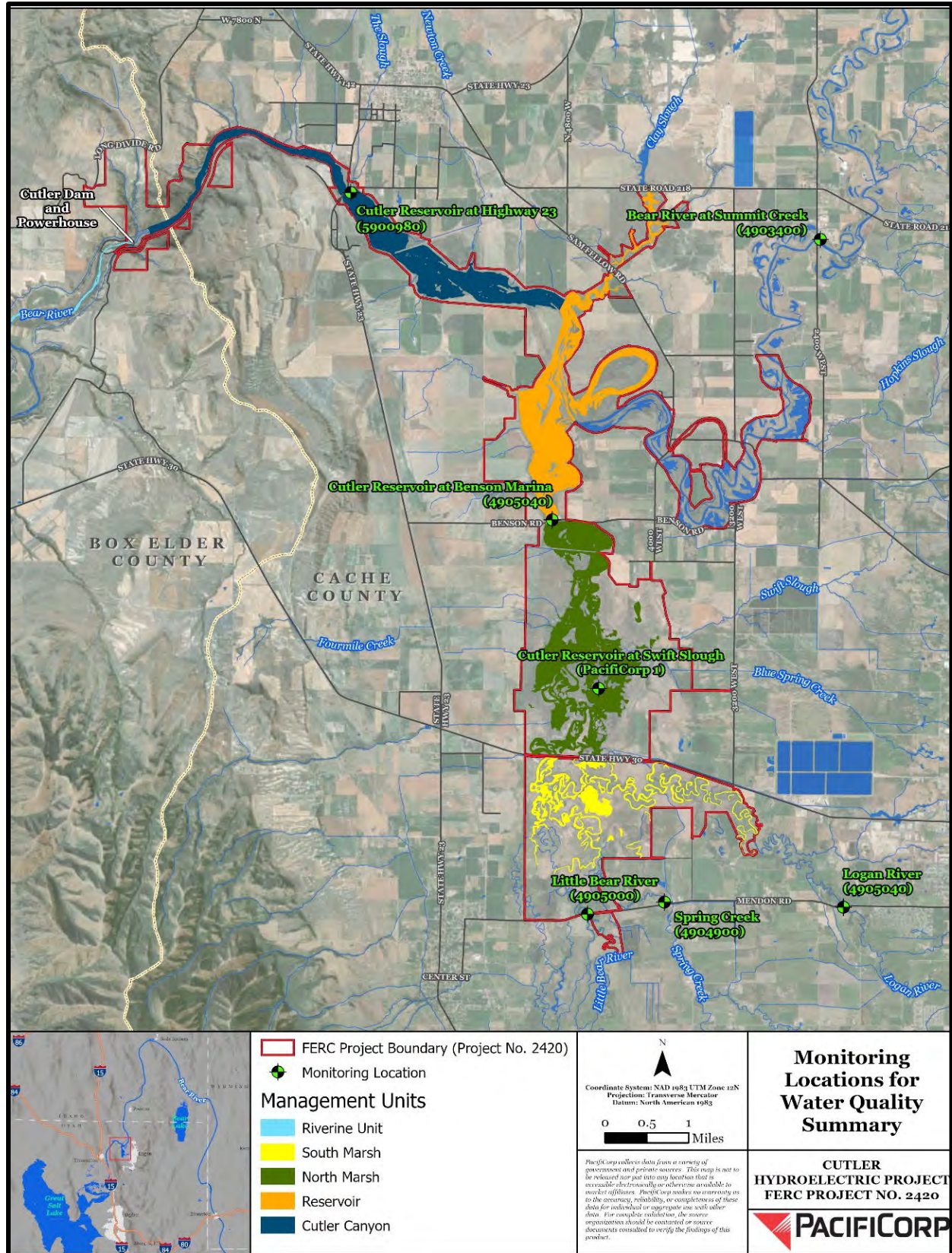


FIGURE 3-18 WATER QUALITY MONITORING SUMMARY LOCATIONS

A discussion of the results of the water quality data summarized in the Water Quality ISR and in Table 3-9 are presented below for the following parameters: temperature, total coliform, nitrogen, phosphorus, DO, turbidity, and TSS.

Temperature

Temperatures for the data compiled ranged from 7.3 to 17.1 degrees Celsius (°C), and none of the temperature readings exceeded the state standard of 27 °C. Average annual temperatures in the Cutler Reservoir system were highest in the northern reservoir at the Highway 23 Bridge and the Bear River (Northern Inflows) and lowest at the Logan River and Little Bear River inflows (Southern Inflows).

Total Coliform

Average total coliform concentrations during baseflow conditions varied through time but were generally highest at the Spring Creek site (where effluent from Logan City's wastewater facilities enters Cutler Reservoir) followed by the reservoir outfall (Collinston gage), which represents the accumulation from all the reservoir sample sites. Some of the total coliform concentrations across sites were greater than the maximum reporting limit of 2,419.6 organisms per 100 milliliters (mL) as recorded by the Utah Department of Health Lab.

Nitrogen

The Utah standard for nitrate-nitrogen is 4 mg/L. PacifiCorp and UDWQ are the only entities that monitor nitrate-nitrogen in Cutler Reservoir and tributaries on a regular basis (PacifiCorp 2021a). Nitrate-nitrogen concentrations vary from one site to another in different study results but are generally less than 1 mg/L. However, there are two sites on the reservoir (Southern Inflow-Little Bear River and Southern Inflow-Spring Creek) where the high nitrate-nitrogen values ranged from 1.278 to 5.089 mg/L, respectively. These higher values are likely related to the land use practices within those tributary drainages. Over 50 percent of the land use in the Little Bear River drainage downstream of Hyrum Reservoir is agricultural (UDWQ 2000). Spring Creek enters the Little Bear River just before the confluence with Cutler Reservoir. Approximately 75 percent of the land use in the Spring Creek drainage is agricultural, and nearly all the land (95 percent) is irrigated. The drainage area also includes feedlots, rendering plants,

and meat packing plants (UDWQ 2000). In addition, the south fork of Spring Creek receives discharge from the Hyrum WWTP and effluent from a small trout farm.

Total Kjeldahl Nitrogen (TKN) is the sum of nitrogen contained in organic substances, ammonia, and ammonium found in soil, water, or sewage effluent (USEPA 2009). The Utah standard for TKN is 0.8 mg/L, which was exceeded at the Southern Inflow-Logan River in the data reviewed in the Water Quality ISR.

Phosphorus

TP was identified as a pollutant of concern for Cutler Reservoir and Middle Bear River (which extends from the Idaho-Utah border, to downstream of Cutler Reservoir and Dam), as part of the TMDL study (UDWQ 2010). The Utah state standard for TP is 0.025 mg/L for lakes and reservoirs and 0.05 mg/L for rivers and streams. However, for the TMDL, UDWQ relaxed the standard to 0.07 mg/L and 0.09 mg/L to be the concentration limits for the northern and southern reservoir, respectively, and to 0.075 mg/L for the Bear River downstream of the dam.

TP concentrations ranged from 0.001 to 0.842 mg/L, exceeding even the more relaxed standard established by the TMDL study.

The PacifiCorp 2013 data (published in the PacifiCorp 2018 water quality report) indicate 92 percent of the 2013 TP results were below the detection limit of 0.05 mg/L (PacifiCorp 2018 and 2020c). This is a substantial deviation from the overall trend in TP concentrations from previous monitoring efforts by PacifiCorp and others (PacifiCorp 2018 and 2020c). However, comparing 2018 water quality data (reported in PacifiCorp 2020c) with data from the previous five-year monitoring reports, the TP levels are not substantially different, although for some years the TP levels are greater than those observed in 2018. This result, based on 2018 data and presented in the 2020 report, corroborates the earlier premise that the low 2013 TP values as presented in the 2018 report were likely erroneous, or potentially should be considered outlier data and discarded as they are so different from all other water quality reports during the current license period.

Regarding sediment TP, results of the ISR sediment core TP sampling are presented in Section 3.3.3, Geology, Sediment, and Soils. Results of the sediment study indicate that TP is bound in the sediments and not in a soluble form and is therefore not bioavailable for plants.

Dissolved Oxygen

DO was also identified as a metric of concern for Cutler Reservoir and Middle Bear River, as part of the TMDL study (UDWQ 2010). The Utah DO standard is 5.5 mg/L or greater averaged over a 30-day period for waterbodies classified as warm water, which although undefined in the Utah Administrative Code, relates to maximum water temperatures greater than 20 °C but generally not warmer than 27 °C (Mike Allred, personal communication, May 12, 2021). DO values generally exceeded the state minimum standard (8.9 to 10.5 mg/L) downstream of Cutler Dam and throughout the Cutler Reservoir system at all sampling dates, but were highest during fall baseflow. The lowest values recorded (which were below the state standard) were at Spring Creek and Little Bear River in 2018, Cutler Reservoir at Benson Marina in 2008, and Cutler Reservoir south of Swift Slough in 2013; not surprisingly, these areas are also correlated with the shallower portions of the reservoir.

Turbidity

Turbidity is typically reported in Nephelometric Turbidity Units (NTUs), FoRmazin Nephelometric Units (FNUs), or FoRmazin Turbidity Units (FTUs), which represent the degree to which light is scattered in water. Earlier studies used the measurement FTU, although there is virtually no difference between the three units of measurement (HACH 2020).

The turbidity standard for Utah is no more than a 10 NTU change over ambient conditions. Although the data collected by PacifiCorp and others do not officially list the ambient turbidity, turbidity generally ranged from 8.45 to 45.68 NTU for the available data within the period of record. Therefore, the reading of 135 NTU during one sampling event at the Northern Inflow-Bear River is considered higher than the standard of 10 NTU of change over ambient. It is not possible to confirm whether any of the other turbidity readings were out of compliance with this standard.

Total Suspended Solids

TSS was listed as a pollutant of concern for the Middle Bear River in the 2010 TMDL study (UDWQ 2010). The UDWQ standard for TSS is a daily maximum of 70 mg/L. Most data

recorded did not exceed the limit on average, with the exception of the Southern Reservoir-Swift Slough site (again, the nearest site to the Logan City wastewater effluent input).

3.3.4.2 ENVIRONMENTAL ANALYSIS

The following section describes the potential effects of the normal and proposed extended Project operations on water quantity, water use, and water quality prior to proposed mitigation measures.

WATER QUANTITY

For the new license term, PacifiCorp proposes to maintain the upper operating limit elevation on the reservoir, with a modest expansion to tolerance (to minimize reports of short-term, weather- or runoff-related deviations from the required operating range—the exceptions would not apply to any instances of PacifiCorp operations or compliance errors; any such deviation of the proposed operating range would continue to be reported). PacifiCorp also proposes expanding the range of the lower operating limit outside the irrigation season because recent data has shown that reservoir constraints can be difficult to maintain during high runoff events such as summer rain and spring runoff (ironically, high water frequently results in elevation readings below the operating limits as the reservoir elevation must be lowered at Cutler Dam, the compliance point, in order to help move high flows through the system), and to increase operational flexibility.

As outlined in the PAD, PacifiCorp is seeking operational flexibility within the proposed additional range to support variable energy generation needs. PacifiCorp’s proposed operation in the new license would mimic the existing operational range (see Table 3-10) from elevation 4,407.5 to 4,406.5 feet at least 85 percent of the time (“normal” operations occurring a minimum of 310 days per year, including the entire irrigation season) with a tolerance limit of +/-0.5 foot (primarily to accommodate high water events and occasional un-forecasted irrigation variation), and allow a wider operating range from elevation 4,406.5 or 4,406.0 feet (as noted previously, the current license lowest operating range is from December to March only) down to 4,405.0 feet, and occurring up to 15 percent of the time (“extended” range operations, up to 55 days per year, outside the irrigation season and not during high flows or extreme icing events) as determined by daily average adjusted elevations at Cutler Dam. These values (4,407.5 to 4,406.5

feet at least 85 percent of the time and 4,406.5 to 4,405.0 feet up to 15 percent of the time) represent the range PacifiCorp is proposing for the purposes of managing potentially increased daily, weekly, and seasonal reservoir elevation fluctuations to better support variable energy generation needs.

TABLE 3-10 CUTLER RESERVOIR PROPOSED NORMAL AND EXTENDED OPERATING RANGE ^a

RANGE TYPE	OPERATING RANGE (ELEVATION IN FEET)	TOLERANCE (FEET)	PERCENT TIME WITHIN TOLERANCE	PERCENTAGE OF CALENDAR DAYS FOR RANGE TYPE
Normal	4,407.5 – 4,406.5	(+0.5 @ 4,408.0)	95%	At least 85% (~310 days)
Extended	4,406.5 – 4,405.0	(-0.5 @ 4,404.5)	95%	15% (~55 days) or less

^a Quantified by daily average adjusted reservoir elevations at Cutler Dam

The increased target for tolerance range (from +0.25 feet to +/-0.5 feet) would assist in irrigation operations but may also help respond with generation fluctuations during other portions of the year as well as during high runoff. During high runoff, a hydraulic phenomenon occurs in reservoirs with certain hydraulic features termed “sloping” (of the reservoir water surface elevation), with higher elevations at inflow locations and lower water elevations at the outfall/dam. For Cutler Reservoir, this phenomenon is present because its bathymetry specifically can constrict the channel and shallow depths of the reservoir at the Bear River confluence (and also, to a lesser extent, at the southern tributaries), which gradually deepens towards the dam. The shallow water depths result in increasing hydraulic friction as inflow increases, which naturally results in higher surface water elevations at and downstream of the inflow location to provide enough cross-sectional flow area to pass the higher-than-normal inflow. Conversely, at the dam, *lower* surface water elevations are necessary (by increasing outflow to match or temporarily exceed inflow) to avoid exacerbating the reservoir sloping problem, which can cause problematic high-water levels in the southern portion of the reservoir (where the water level rises to match the higher water level at the Bear River confluence). Hence, the increased tolerance range would be useful in this situation—as also previously described in the ISR (PacifiCorp 2021a)—since the reservoir levels at Cutler Dam are frequently *lower* than the lower compliance limit due to the sloping of the reservoir water surface just described. Further complicating operating range compliance, unexpected precipitation and weather changes

during the irrigation season in a low-water season or year may temporarily increase the WSE at Cutler Dam as irrigators reduce their diversions in the system. In these situations, the system water is the irrigators by right and contract, and so PacifiCorp would typically allow Cutler Reservoir WSE to rise, even above the compliance target operating range, rather than spilling that water, until the irrigation diversions again pick up and the WSE in Cutler Dam returns to the normal operating range.

As noted above, it is not possible to operate in the extended range during the irrigation season nor when flows approach and exceed hydraulic capacity, even during normal-to-high spring runoff years. When inflow exceeds the hydraulic capacity of the plant, power flows cannot be reduced as there is no reservoir storage available to store the difference between inflow and outflow. This is due to the relatively small reservoir storage (which would rapidly fill if power flows were below inflow), which is further constrained at Cutler Reservoir as normal-to-high inflows quickly fill any available storage. Therefore, the extended range would typically only be utilized during the November-to-March time frame and would further exclude periods of extreme low temperature (typically sometime between mid-December and end of January) when downstream ice-damming concerns are present.

Under the Proposed Action, PacifiCorp would operate the Project for 40 to 50 years. Available flows would not change because no actions are proposed that would influence available flows in the Bear River and its tributaries. PacifiCorp is proposing to make slight changes in how the reservoir is managed seasonally, but the differences in flows between existing and proposed operations is projected to be minor, short-term, and completely overwhelmed by inherent variability in flows already present (Connely Baldwin, personal communication, April 2, 2021).

WATER USE

Proposed operations would not change flow timing or water use by the Project, as described above in Section 3.3.4.1, Affected Environment [Water Use]. As described in the PAD (PacifiCorp 2019), changes to existing water rights or water-related agreements are not part of the Proposed Action. As a result, there would also be no change in water rights with implementation of the Proposed Action.

Potential effects on the 44 existing irrigation withdrawal structures within the Project Boundary are discussed in Section 3.3.9, Land Use and Management. Since proposed extended range of operations would occur only outside the irrigation season during the winter when irrigation is not occurring, there would be no potential effect to water withdrawal infrastructure.

WATER QUALITY

This section addresses potential water quality effects anticipated under the proposed extended range of operations. Beneficial uses for Cutler Reservoir are presented in Section 3.3.4.1, Affected Environment [Water Quality], above. Pollutants of concern listed in the TMDL study for Cutler Reservoir were listed as DO and TP (as a consequence of nutrient loading); pollutants of concern for the Middle Bear River were listed as TP and TSS (UDWQ 2010).

The water quality parameters measured in Cutler Reservoir over the life of the existing license (from 1996 to present) are driven by the various water quality conditions of tributary inputs to the reservoir. Such conditions are then slightly modified by reservoir operations as flow moves downstream. For instance, TP is accrued in the southern reservoir because of the inputs to that segment of the reservoir and because the water is shallow and slow-moving and there is a flow constriction at the Benson Bridge on the northern and most-downstream end of this segment. However, the northern reservoir acts to mitigate TP levels because that area contains the confluence with the Bear River, which contributes much more volume to the reservoir than all other tributary inputs, and as a result, the water is deeper and moves through at higher velocities (UDWQ 2010).

As described in the Affected Environment section above, in addition to monitoring by PacifiCorp and other entities, the Water Quality ISR sampled temperature, TSS, DO and TP in October 2019 (pre-drawdown) and November 2019 (post-drawdown) to allow predictions of water quality conditions that were considered partially representative of proposed operations. The study evaluated pre-drawdown and post-drawdown water quality conditions at four reservoir locations and two sites downstream of Cutler Dam (Figure 3-19; Water Quality ISR [Appendix F of PacifiCorp 2021a]). The study evaluated drawdown conditions between full pool at 4,407.5 feet and the full drawdown at 4,390.89 feet as measured at Cutler Dam. The fall 2019 drawdown was an extreme elevation change greatly exceeding the proposed extended range of 4,406.5 to 4,405

feet. The effects on water quality in Cutler Reservoir and the Bear River downstream of Cutler Dam from the full 2019 drawdown to WSE 4,386.23 feet are described below. The water quality data collected at pre-drawdown and post-drawdown combined with other water quality data is used to assess potential effects on water quality for the much smaller changes in reservoir WSE associated with the proposed extended range of operations (a total of 1 to 2.5 feet WSE fluctuation versus current 1 to 1.5 feet fluctuation and the greater-than 20 feet during the full 2019 drawdown).

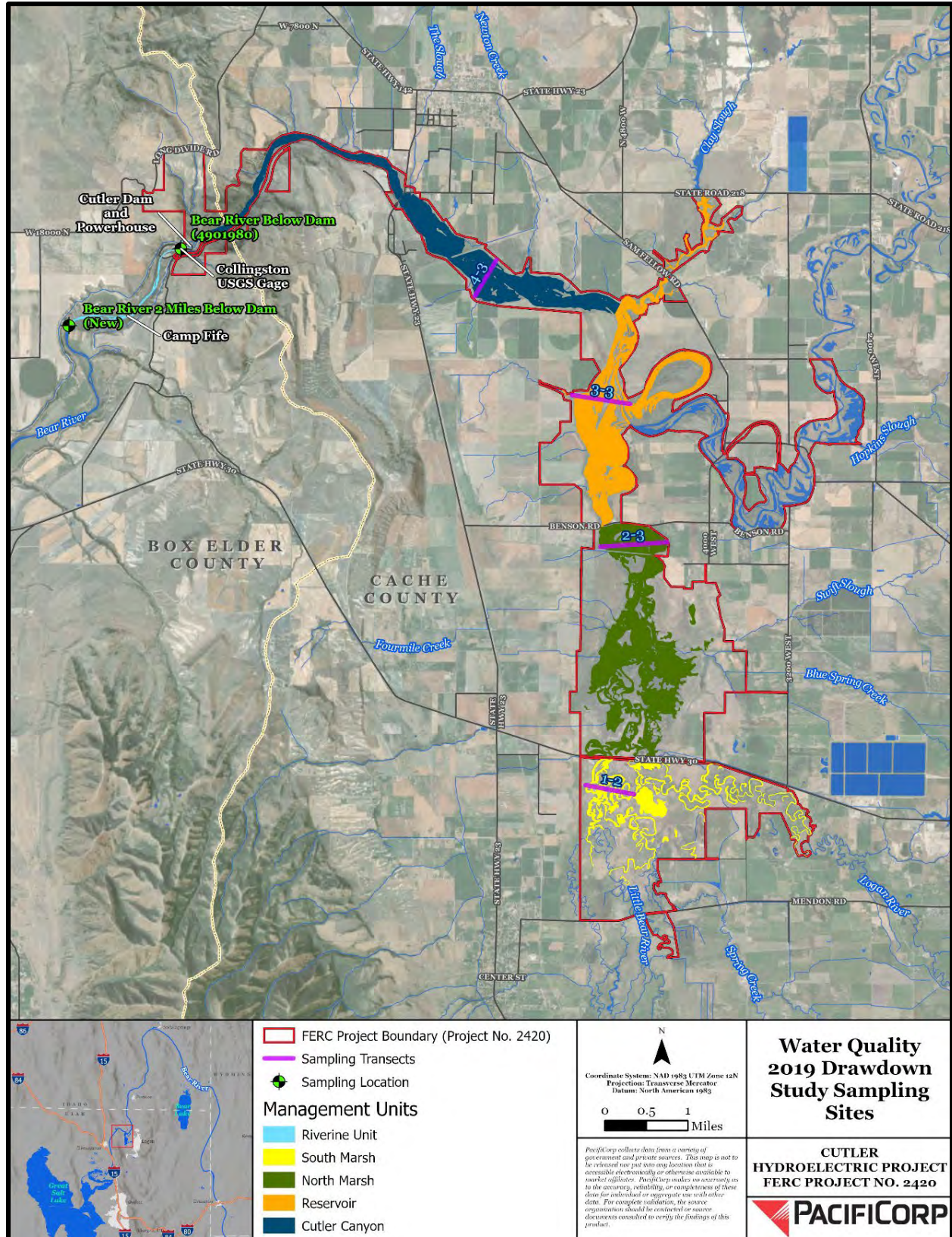


FIGURE 3-19 WATER QUALITY DRAWDOWN STUDY SAMPLING LOCATIONS

A summary of potential effects of proposed operations on water quality parameters of concern are provided below. Potential effects for temperature, TSS, DO, and TP are based on the results of the Water Quality ISR pre- and post-drawdown study. For all other water quality parameters, the information is based on a general evaluation of the known data sources for each parameter and how proposed operations may affect each parameter respectively.

Temperature

No change in water temperature is anticipated in the reservoir or the Bear River as a result of the Proposed Action because the Project would operate much the same as it has with the existing license at least 85 percent of the time. The remaining up to 15 percent of the time that the proposed extended operating range would occur during the winter when conditions allow, typically from November to March when temperatures are low and relatively stable. Average water temperatures were lower when compared to the pre-drawdown temperature data for each reservoir management unit during the fall 2019 drawdown, but the differences were most likely attributable to the seasonal (late fall) time period and an unavoidable cold-snap of below-normal air temperatures at the precise time that the reservoir was lowered for sampling for the various studies and LiDAR sampling.

Total Suspended Solids

The UDWQ standard for TSS is a daily maximum of 70 mg/L. TSS concentration would not be expected to exceed the UDWQ standard during normal or proposed extended operations.

Additional analysis of potential sediment loading downstream of Cutler Dam was completed in response to USFWS comments submitted as part of the ISR Comment Response process (Attachment 1 of PacifiCorp 2021c). USFWS was concerned that the proposed extended operations could potentially increase sediment loads downstream of the dam, which could in turn be deposited in the Bear River Migratory Bird Refuge downstream. The analysis of conditions during the fall 2019 drawdown demonstrated that TSS values ranged from approximately 2.5 to 7.5 tons per hour, closely tracking discharge from Cutler Dam (see Figure 3-11 and Figure 3-12). TSS concentrations ranged from 25 to 32 mg/L (see Figure 3-13), well below the standard. A

detailed description of the TSS analysis is provided in Section 3.3.3.2 [Environmental Analysis] Sediment Loads Downstream of Cutler Dam During 2019 Drawdown.

Phosphorus

TP is perhaps the most monitored water quality constituent in the Bear River and Cutler Reservoir system. There are several reasons, not the least of which is that the system is phosphorus and nitrogen limiting when it comes to phytoplankton and aquatic macrophyte growth (UDWQ 2010). However, and not intuitively, during the most recent TMDL conducted for Cutler Reservoir and the surrounding Bear River, and in additional discussions since, UDWQ identified phosphorus as the primary contributor to water quality exceedances in Cutler Reservoir (UDWQ 2010).

To illustrate, virtually all previous studies of Cutler Reservoir documented TP concentrations exceeding UDWQ standards, with the highest levels reaching 2.0 to 6.5 mg/L in the Southern Inflow segment (see Table 3-8). The most prominent source of phosphorus loading in the Southern Inflow areas is the Logan City WWTP (16 to 34 percent of the total Cutler Reservoir phosphorus load), but that input is also magnified by inputs documented in the Spring Creek TMDL, where 67.5 percent of the Spring Creek load comes as point source origins from commercial operations such as EA Miller, Hyrum WWTP, and the Miller Brothers feedlot (UDWQ 2002b). Of note, the average TP concentration in the reservoir outflow (Collinston gage) exceeded the UDWQ standard in PacifiCorp's most recent five-year water quality monitoring period (conducted in 2018 and reported in 2020) (PacifiCorp 2020c).

TP loading would likely continue in Cutler Reservoir and the Middle Bear drainage under the new license, but this is not expected to be a result of Project proposed operations. Rather, the primary TP contributors are the Logan City WWTP, ConAgra, and the main Bear River (UDWQ 2010). The Logan City WWTP currently contributes 16 to 34 percent of the TP loading to the reservoir. Logan City is working on completion of a new treatment facility that is intended to reduce TP loading to the reservoir in the future.

The potential effects of the proposed extended range of operations on sediment phosphorus is addressed in Section 3.3.3, Geology, Soils, and Sediment. Based on analysis of TP in sediment

cores in that section, if sediments were to be disturbed by reservoir drawdowns (which is considered unlikely; see also USR new information regarding this issue), the TP released into the water column would remain bound to sediment particles and would not likely contribute to algal or vascular plant production. More detail and analysis was provided in the *Water Quality Initial Study Technical Report* (Water Quality ISR [Appendix F of PacifiCorp 2021a]).

In summary, PacifiCorp's proposed extended range of operation would not likely affect phosphorus. For example, during the much greater magnitude fall 2019 full drawdown, there was no significant difference in TP concentrations in the water column between samples taken pre-drawdown and post-drawdown (Water Quality ISR [Appendix F of PacifiCorp 2021a]).

Dissolved Oxygen

DO (and specifically lack thereof) is listed as a primary pollutant of concern by UDWQ. The minimum 30-day value of 5.5 mg/L throughout the water column is the Utah state standard. On average, DO levels meet the standard (see Table 3-8), although exceedances have been detected in other monitoring efforts (PacifiCorp 2020c). UDWQ noted that DO sags did occasionally occur in Cutler Reservoir, especially during the summer months, but readings less than the 1-day target endpoint of 3 mg/L were a rare occurrence (UDWQ 2010). Average DO concentrations were lower post the full drawdown than pre-drawdown but were still compliant with state standards and are deemed well within support levels for aquatic life (UDWQ 2010). Because the proposed extended range of operations could only occur outside the irrigation season, any resulting WSE changes would occur only during the colder months when there is an inherent increased capacity for DO.

For the two sites downstream of Cutler Dam, DO concentrations were higher during the post-drawdown than pre-drawdown sampling period. Two factors could have contributed to the differences: 1) air and water temperatures decreased considerably between the pre-drawdown and post-drawdown samples, which would allow for an increased capacity for DO, and 2) spilling over the normally submerged Wheelon Dam site and at the reservoir outfall gate caused additional aeration and increased the DO downriver. With the proposed extended operations, the Wheelon Dam would not be exposed so aeration due to spill over Wheelon would not occur.

Total Coliform

Total coliform is driven more by tributary inputs rather than a result of reservoir operations, based on previous monitoring efforts. Therefore, the proposed extended range of operations would not affect total coliform counts in the reservoir or the Bear River downstream of the dam.

The direct cause of total coliform concentrations observed may be related to the ongoing discharge of Logan City and Cache Valley wastewater to Cutler Reservoir. A new wastewater tertiary treatment system is scheduled for construction and is intended to ameliorate some of the nutrient and coliform input issues in the reservoir.

Nitrogen

PacifiCorp's proposed extended range of operations are not likely to change nitrate-nitrogen or TKN concentrations because the sources of nitrogen are primarily the tributaries, irrigation run-off, and wastewater treatment facilities flowing into Cutler Reservoir.

Turbidity

Turbidity is currently an environmental concern in the Bear River basin, which will likely continue to persist in the future. For the most part, high turbidity concentrations enter Cutler Reservoir through the Bear River inflow (UDWQ 2010) and other reservoir tributaries (see Table 5-4 in the Water Quality ISR [Appendix F of PacifiCorp 2021a). On average, most observations of turbidity by PacifiCorp and others cited in the Water Quality ISR do not exceed Utah standards. Turbidity conditions would not likely change under the proposed extended operations. Existing point and non-point sources are the primary contributors to high turbidity and those land use practices occur outside of operations under PacifiCorp's control. Existing and ongoing mitigation measures such as the implementation of vegetated shoreline buffers (covering over 1,440 acres), construction of erosion control sediment basins, buffer and boundary fencing to eliminate trespass grazing and other ground-disturbing encroachments, and over 5.5 miles of bank stabilization projects have greatly reduced turbidity inputs to the reservoir within the FERC Project Boundary.

3.3.4.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

The following sections discuss existing PM&E measures under the current license (FERC 1994) that would continue under a new license, and new measures proposed by PacifiCorp to include in the new license. Measures specific to erosion and sediment control are summarized here but discussed in more detail in Section 3.3.3 Geology, Soils and Sediment.

EXISTING MEASURES

Measures required in the current license relevant to water resources that are expected to be carried forward or required under a new license (with potential changes/updates where necessary) are presented below, including license articles, management plans, regulatory requirements, reservoir operations, and flow and water quality monitoring. A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures.

Current License Articles

- Standard License Article No. 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.
- Article No. 401: Sets operating range and compliance limits in order to balance the needs of wildlife, recreation, irrigation, and power generation.
- Article No. 402: Develop Cutler Resource Management Plan. Monitor and report WSE and water quality.
 - Article 402 of the 1994 license required the development of the Cutler RMP, which specified a number of measures relevant to water (quality) resources, including creation of a vegetated buffer adjacent to reservoir between Highway 30 and Highway 23 bridges, stabilizing 2 miles of shoreline by planting deep-rooted shrubs and willows, reseeding 50 acres of tilled ground for grassland buffer, and installing 6 miles of cattle exclusion fencing.
 - 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.

Resource Management Plan

The PacifiCorp Water Quality Monitoring program is stipulated by the Cutler RMP (PacifiCorp 1995a), as required by the current license. The Cutler RMP would not continue in its current form under the new license. Rather, PacifiCorp plans to draft a number of integrated management plans that will incorporate and improve upon the management, monitoring, and best practices contained in the Cutler RMP. Management plans relevant to this resource are summarized in the New Proposed Measures section below.

Flow Monitoring

Three 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). PacifiCorp funds USGS to operate and publish data from the Collinston, Westside Canal, and Hammond gages and proposes to continue that arrangement with USGS for the purpose of documenting flows into the canals and monitoring streamflow in the Bear River downstream of Cutler Dam.

Water Quality Certification

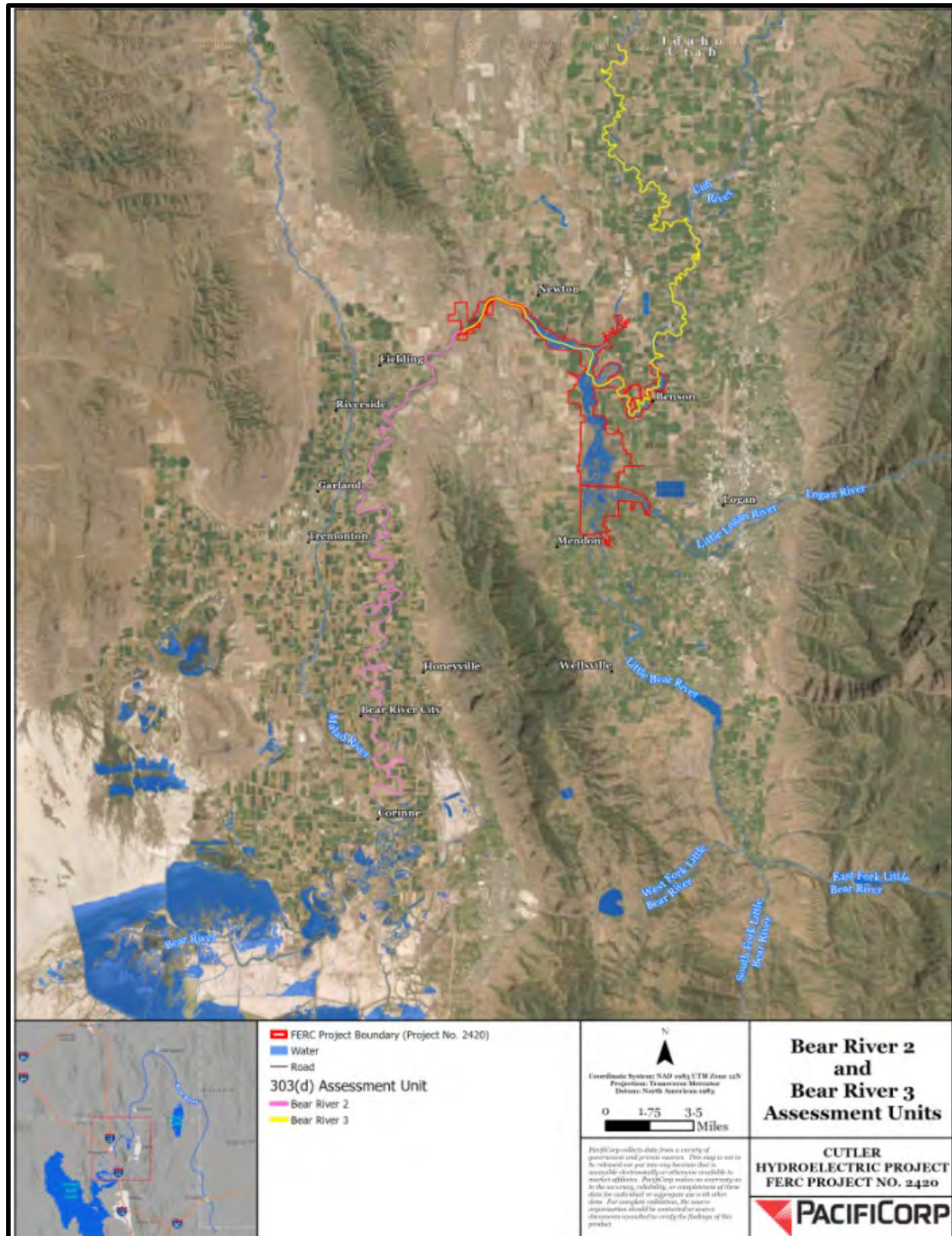
Under the existing Section 401 WQC, there are no specific requirements. The one-page WQC letter states (PacifiCorp 1991):

Based on our review it is our opinion that, with the implementation of applicable Best Management Practices in order to minimize erosion-sediment load to the affected waters during project activities, the adverse environmental impact on the existing water quality of the Bear River will be minimal.

PacifiCorp will submit a new application for a Section 401 WQC as part of the relicensing process and expects the WQC process to be completed prior to issuance of a new FERC license. Submittal of the new WQC application is scheduled to occur in 2022 following submittal of the FLA, per coordination with UDWQ staff.

Water Quality Monitoring

The existing license requires PacifiCorp to monitor water quality quarterly every 5 years and file the results in the associated five-year Cutler RMP reports with FERC (per Article 402). As part of the previous relicensing process and associated Cutler RMP, 2010 TMDL, and UDWQ-mandated watershed basin monitoring, PacifiCorp and other entities have completed water quality monitoring efforts for the past 35 years, and these efforts are summarized above in Table 3-9. PacifiCorp's 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), although locally effective, was overwhelmed by the substantial influence of tributary water quality and quantity to water quality degradation in Cutler Reservoir as a whole. In addition to water quality monitoring completed by PacifiCorp, the UDWQ delineates stream and river water quality assessment units (AUs) under the state 303(d) program based on detailed guidelines summarized in their Final Integrated Report (UDWQ 2016). The Project is included in the Bear River watershed delineated as the Bear River 2 AU (Bear River from Malad River confluence to Cutler Reservoir) and Bear River 3 AU (Bear River from Cutler Reservoir to Idaho state line). These two AUs equal approximately 47 miles and encompass the entirety of the Project (Figure 3-20). Designated beneficial uses and key water quality criteria are identified previously in Table 3-8. The water quality parameters evaluated include water temperature, total coliform, nitrate-nitrogen, TKN, TP, DO, turbidity, and TSS. Most of the water quality parameters have numeric water quality for beneficial uses as designated by UDWQ (as presented above in Table 3-8). TSS does not have a water quality criterion, but TSS values contribute to the understanding of turbidity.



**FIGURE 3-20 TMDL 303(d) BEAR RIVER 2 AND BEAR RIVER 3 ASSESSMENT UNITS
ENCOMPASSING THE CUTLER PROJECT**

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. New standalone proposed measures and management plans relevant to water resources are presented here. The measure number from Table 2-4 is provided for reference.

Standalone Measures

In addition to PM&E measures that would be part of the Project management plans described below, PacifiCorp is proposing additional standalone watershed improvement projects within the Project Boundary that would have beneficial effects on water quality. Specifically, PacifiCorp will identify approximately three additional miles of bank stabilization projects within the Project Boundary (GEO-2).

Management Plans

Resource Management Plan

An updated Cutler RMP is proposed to be developed that will incorporate many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. The new Cutler RMP would be expected to include the following sub-components relevant to water resources:

- Shoreline management: update erosion control and sediment management program within the Cutler RMP; maintain/monitor vegetated shoreline buffers, and erosion control check dams, to minimize sedimentation to Cutler Reservoir (GEO-1); continue to monitor existing (and add any potential new) bank stabilization measures (GEO-3);
- Agricultural management: review, update, monitor, and improve existing grazing management and agricultural lease programs within the Cutler RMP (LU-1)
- Water quantity: Continue to communicate with USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project (WR-2)
- Water quality monitoring: Update water quality management and monitoring program within the Cutler RMP; continue existing water quality monitoring on approved five-year

quarterly schedule; continue to coordinate with UDWQ and other stakeholders regarding Middle Bear River TMDL and resultant Cutler water quality issues (WR-3).

Project Operational Plan

In addition to the updated Cutler RMP, reservoir elevation and river flow monitoring, and operations management, would continue as part of a new Project Operational Plan (WR-1). As part of the new plan, PacifiCorp would also continue to communicate with the USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project (WR-2).

Under the new license, Project operations would overall be largely similar to current operations, except for relatively minor reservoir elevation changes during the time period outside the irrigation season. PacifiCorp's proposed operations in the new license would mimic the existing operational range (see Table 3-10, above) from elevation 4,407.5 to 4,406.5 feet at least 85 percent of the time (normal operations, occurring a minimum of 310 days per year, including the irrigation season) with a tolerance limit of +/-0.5 foot (primarily to accommodate high water events and occasional un-forecasted irrigation variation), and allow a wider operating range from elevation 4,406.5 (or from 4,406.0 feet, as currently allowed in the winter period) to 4,405.0 feet up to 15 percent of the time (extended range operations, up to 55 days per year, outside the irrigation season and not during extreme cold snaps or during high flows) as determined by daily average adjusted elevations at Cutler Dam. These values (4,407.5 to 4,406.5 feet, at least 85 percent of the time, and 4,406.5 to 4,405.0 feet, up to 15 percent of the time) represent the range PacifiCorp is proposing for purposes of managing potentially increased daily, weekly, and seasonal reservoir elevation fluctuations to better support variable energy generation needs.

For the narrower 4,406.5 to 4,407.5 feet normal range (proposed for at least 85 percent of the time), a tolerance limit of +/-0.5 foot is proposed to avoid nuisance exceedances during irrigation season rainfall events that typically result in spilling upstream reservoir storage water that was released from Bear Lake to meet irrigation demand that subsequently changed in response to weather changes. Nuisance exceedances can also occur with high flows throughout the system, such as those occurring during runoff and other high flows that may ensue when the reservoir level is lowered at Cutler Dam to manage the high flows. Historically, FERC has allowed a

temporary exceedance for these events, occurring as a result of weather or other conditions outside PacifiCorp control. This proposal adopts the FERC position already established but would not be utilized for PacifiCorp operations or compliance error. During the vast majority of the year that encompasses irrigation season, generally April 15 to October 31, no operational changes to the reservoir limits are proposed.

Construction Erosion and Sediment Control Plan

A new CESCOP will be developed that incorporates and codifies existing measures intended to protect water quality through avoiding and minimizing impacts of any new construction during the license term, and will include standard and Project-specific BMPs and requirements to address potential construction and ground-disturbance-related erosion and sediment (GEO-5). This new CESCOP is to be developed after the Project receives a FERC license Order.

3.3.4.4 UNAVOIDABLE ADVERSE IMPACTS

As stated earlier, PacifiCorp does not anticipate any adverse effects from the proposed extended range of operations on water quantity or water use, as neither of these water resource components are expected to change as a result of future proposed operations.

Although largely unrelated to proposed operations, water quality will continue to be affected by the continued influx of phosphorus and other pollutants to the Project through various sources such as municipal sewage effluent, industrial effluent, and agricultural and animal feeding operation runoff (PacifiCorp 2021a). Even though phosphorus is limiting in the Bear River system, continuous inputs from the sources mentioned will likely continue to promote aquatic macrophyte and algal growth that, in turn, can potentially cause swings in DO with expiration and respiration in the late-summer and fall each year. In addition, turbidity will likely remain an issue due to the shallow, vegetated character of the Cutler Reservoir system, agriculture runoff, carp, and other fish foraging activities in the reservoir. Likewise, coliform, phosphorus, and nitrogen concentrations are expected to remain high pending improvements made to City of Logan's WWTP.

3.3.4.5 CUMULATIVE EFFECTS ON WATER RESOURCES

This section addresses potential cumulative effects on water rights and water delivery, proposed operations and water quantity, and water quality in Cutler Reservoir and the Bear River downstream of the Project. The SD2 issued by FERC (2019b) identified the following items to address in the Cumulative Effects section of Exhibit E.

- Water quantity and quality that could be cumulatively affected by the proposed continued operation and maintenance of the Cutler Project in combination with other hydroelectric and water storage, diversion, and wastewater treatment projects in the Bear River basin, including:
 - Effects of continued non-Project water withdrawals for irrigation by the BRCC and others on water quantity for the river environment downstream of Cutler Dam; and,
 - Effects of continued Project operation on water quality in Cutler Reservoir, the Bear River downstream of Cutler Dam, and downstream on the Bear River Migratory Bird Refuge.

This analysis considers the potential effect of the Project and agricultural and industrial inflow, which includes wastewater treatment effluent including Logan City WWTP, agriculture runoff, effluent from food processing plants, the USU experimental trout farm effluent, municipal street runoff, and Concentrated Animal Feeding Operation (CAFO) / Animal Feeding Operation (AFO) runoff.

Per FERC SD2 (FERC 2019b), the geographic scope includes the Bear River beginning at the Bear Lake outflow in southwest Idaho, Cutler Reservoir and its tributaries, and the mainstem Bear River downstream of the Project to the Bear River Migratory Bird Refuge. The temporal scope of this analysis is the new license period for the next 30 to 50 years.

WATER RIGHTS AND WATER DELIVERY

PacifiCorp holds six water rights certified by the UDWRi for the purpose of power generation at the Project site (Table 3-7). Continued and proposed operations of the Project do not involve

modifications to the current water rights held by PacifiCorp and the other water users in the Bear River basin; nor does PacifiCorp propose or envision any changes to existing water rights as a result of the relicensing process. The proposed operations involve operating Cutler Reservoir in the normal operating range from full pool to 1 foot lower for at least 85 percent of the year (4,407.5 to 4,406.5 feet) during the irrigation season, which matches the current operating range elevations, with extended operations occurring up to 15 percent of the year from 4,406.5 to 4,405.0 feet (noting that the current operations range extends down to 4,406.0 in winter months) outside the irrigation season. The extended range of operations would occur outside the irrigation season only and would not affect water delivery to irrigators, including the BRCC, and therefore would not affect water rights or water delivery.

WATER QUANTITY

The range of minimum, mean, and maximum monthly flows for the 1988 to 2020 period are representative of the current affected environment and the anticipated future condition (Table 3-6). Figure 3-15 summarizes monthly flow duration curves for the same period. Effects of continued or proposed Project operations (including the proposed extended mode of operation) on water quantity are expected to remain unchanged. Water quantity is primarily driven by irrigation demands stretching from the upstream storage basin of Bear Lake, downstream through the Bear River system of hydroelectric and storage reservoirs in Idaho and Utah, to its terminus in the Great Salt Lake. PacifiCorp's proposed operations in the non-irrigation period would potentially alter the shape of flow through the river temporally (slowing it slightly for several days per a 10-day cycle) but does not change the overall amount or timing of water available in the Bear River basin from Bear Lake and downstream of the Project, through the Bear River Migratory Bird Refuge, to the Great Salt Lake, now or in the future.

WATER QUALITY

PacifiCorp completed a water quality study in 2018 and posted the resulting report on their website (PacifiCorp 2020c); this report will also be included as Appendix E in the final Cutler five-year monitoring report due in 2023. This report summarizes a 22-year period of water quality data. The normal and extended range proposed for the future Project operations are similar to the operations under the current license when the water quality data was collected. As

a result, data from the 22-year period should be indicative of future cumulative effects on water quality, although the ongoing potential changes resulting from a warming and changing climate may independently also affect both water quality and water quantity in a cumulative nature.

During operations within the irrigation season, direct and indirect effects on water quality would continue over the next license period, potentially resulting in high nutrient concentrations and swings in dissolved concentration related to aquatic macrophyte and phytoplankton respiration and the annual death and decay of vegetative material.

The proposed future Project operations would not appreciably affect changes in water quality conditions in Cutler Reservoir compared to current operations. If improvements were made in industrial and agricultural impacts to tributary inflows to Cutler Reservoir, there would be substantial improvement in water quality conditions within the reservoir and downstream of the Project.

The proposed extended range operational changes could take place only during the winter months and outside the irrigation season when water quality conditions are relatively stable and at low levels for nutrients and coliform (see Appendix Table A-1 in PacifiCorp 2020c), with some of the highest DO concentrations. This may translate to potentially favorable winter water quality downstream of Cutler Dam, including the Bear River Migratory Bird Refuge.

3.3.5 FISH AND AQUATIC RESOURCES

This section addresses the fish and aquatic resources within the Project Area, and potential effects of operations on these resources. For this assessment, fish and aquatic resources comprise aquatic habitat, and three aquatic communities (fish, benthic macroinvertebrates [BMIs], and aquatic mollusks).

No known federally listed rare, threatened, endangered, or candidate fish species or other sensitive aquatic species¹⁶ occur in the Project Area (Utah BLM 2018). Pursuant to the amended Magnuson-Stevens Fishery Conservation and Management Act, Congress mandated that habitat essential to federally managed commercial fish species be identified and that measures be taken

¹⁶ Species that are not fully aquatic (e.g., amphibians) are reviewed in Section 3.3.5, Wildlife and Habitat.

to conserve and enhance these habitats. In the amended Magnuson-Stevens Fishery Conservation and Management Act, Congress defines 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 2021). According to the National Oceanic and Atmospheric Administration Fisheries EFH Mapper, there are no EFH areas in Utah or the Project Area (NOAA 2021). Therefore, rare, sensitive, threatened, endangered, and candidate species and EFH are not further addressed in this section.

3.3.5.1 AFFECTED ENVIRONMENT

The affected environment for fish and aquatic resources includes available aquatic habitat and the three aquatic communities (fish, BMIs, and mollusks) present in Cutler Reservoir and in the Bear River downstream of Cutler Dam. The Fish and Aquatic ISR (Appendix E of PacifiCorp 2021a) summarizes results of the assessment of the existing fish and aquatic community and studies during the fall 2019 full drawdown of the reservoir including fish isolation surveys, a rapid bioassessment of the BMI community, and information provided by the UDWR from a fall 2019 survey for aquatic mollusks residing in the Cutler Reservoir; that information is incorporated into this analysis.

AQUATIC HABITAT

Cutler Reservoir is a large, shallow impoundment covering approximately 2,476 acres.¹⁷ Because of the shallow conditions, the reservoir storage capacity is only about 8,563 af. Historical aquatic habitat conditions have been altered within the Cutler Reservoir. Water depth, poor water quality, and lack of high-quality cover have limited the potential for this warm water fishery (see PacifiCorp technical report from 1991 [PacifiCorp 1991]). As such, habitat throughout the mainstem and lower tributary portions of the Bear River watershed, including Cutler Reservoir, is generally of poor quality due to silt and nutrient loading with rare periods of low DO, and algal blooms are common. Although these descriptions are from 30 years ago (PacifiCorp 1991), much of the same conditions related to temperature, DO, and other water quality constituents exist today, as documented in the Water Quality ISR (Appendix F to PacifiCorp 2021a). One key

¹⁷ Areas of Cutler Reservoir that do not contribute to the usable storage capacity (e.g., areas of emergent marsh vegetation) have been excluded from the reservoir surface area calculation.

water quality issue noted in the TMDL is periods of low DO with wide ranging swings. These DO swings can occur daily over prolonged periods and seasonally reduce availability of fish habitat (UDWQ 2010).

The reservoir substrate consists of sand and silt that have accumulated since the construction of Wheelon Dam in the 1880s and Cutler Dam in 1927 (PacifiCorp 2019). Fortunately, the substrate is suitable for spawning for most of the fish species (all introduced except for one non-game native fish residing in Cutler Reservoir because these fishes are either broadcast spawners (releasing their eggs in the water column or over the substrate and submerged vegetation) or nest spawners that excavate shallow depressions in the substrate to lay their eggs (Shipman 1977; Sigler and Sigler 1996).

Numerous irrigation diversions and withdrawals have been developed within the Project Area beginning in the late 1800s, potentially limiting the amount of water available to support initially the native fishery and subsequently (following conversion to a shallow, warm-water fishery) an abundant non-native sport fishery (PacifiCorp 1991). The two priority irrigation withdrawals have intakes at either end of Cutler Dam (Westside Canal and Hammond or Eastside Canal), both of which are owned and operated by the Bear River Canal Company. As detailed in above Section 3.3.2, Water Resources, those two canals hold the senior water rights for the Bear River and take most of the available water during the irrigation season such that typically by July and extending through September the Cutler Powerhouse does not have enough water available to generate power. This also results in very little water available to the Bear River downstream of Cutler Dam during the same time period, resulting in episodic poor habitat conditions for native fish and other aquatic life downstream of Cutler Reservoir.

Water quality conditions within the Project Area have been impacted by municipal, industrial, and agriculture run-off, wastewater effluent, and CAFOs (UDWQ 2010).

When the reservoir was initially flooded in the late 1800s (Wheelon), and subsequently for the larger Cutler Reservoir, aquatic habitat was converted from a riverine environment to a lake environment, resulting in a dramatic change in the fish community from native to a predominantly non-native mix of species. Cutler Reservoir is considered eutrophic (UDWQ 2010), although a bioenergetics study by Budy et al. (2006) produced a model indicating that,

considering fish species richness, fish condition, growth, and diet, the reservoir provides reasonably high growth and consumption potential for the predominant warm water sport fishes. UDWR does not currently stock fish in the Project Area and relies primarily on natural production (Chris Penne, personal communication, March 25, 2021).

FISH COMMUNITY

The following is a description of the fish species present downstream of the dam in the Bear River and in Cutler Reservoir. The Utah sucker (*Catostomus ardens*) is the only native fish species found in Cutler Reservoir (Fish and Aquatic ISR, Appendix E of PacifiCorp 2021a).

Bear River Downstream of Cutler Dam

UDWR surveyed the fishery in Bear River downstream of Cutler Dam on June 26 and 27, 2019, using electrofishing equipment. The main purpose of the survey was to determine the presence/absence of bluehead sucker (*Catostomus discobolus*) and northern leatherside chub (*Lepidomeda copei*) in the lower Bear River. Both species are native to the Bear River and are protected by conservation agreements. No native fish species were captured during the survey; further, UDWR has stated that there is no native fishery remaining in either Cutler Reservoir or the Bear River downstream of Cutler (UDWR 2019a). Species that were captured during the survey included northern leopard frog (*Lithobates pipiens*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), smallmouth bass (*Micropterus dolomieu*), green sunfish (*Lepomis cyanellus*), bluegill sunfish (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), common logperch (*Percina caprodes*), walleye (*Sander vitreus*), brown trout (*Salmo trutta*), and fathead minnow (*Pimephales promelas*).

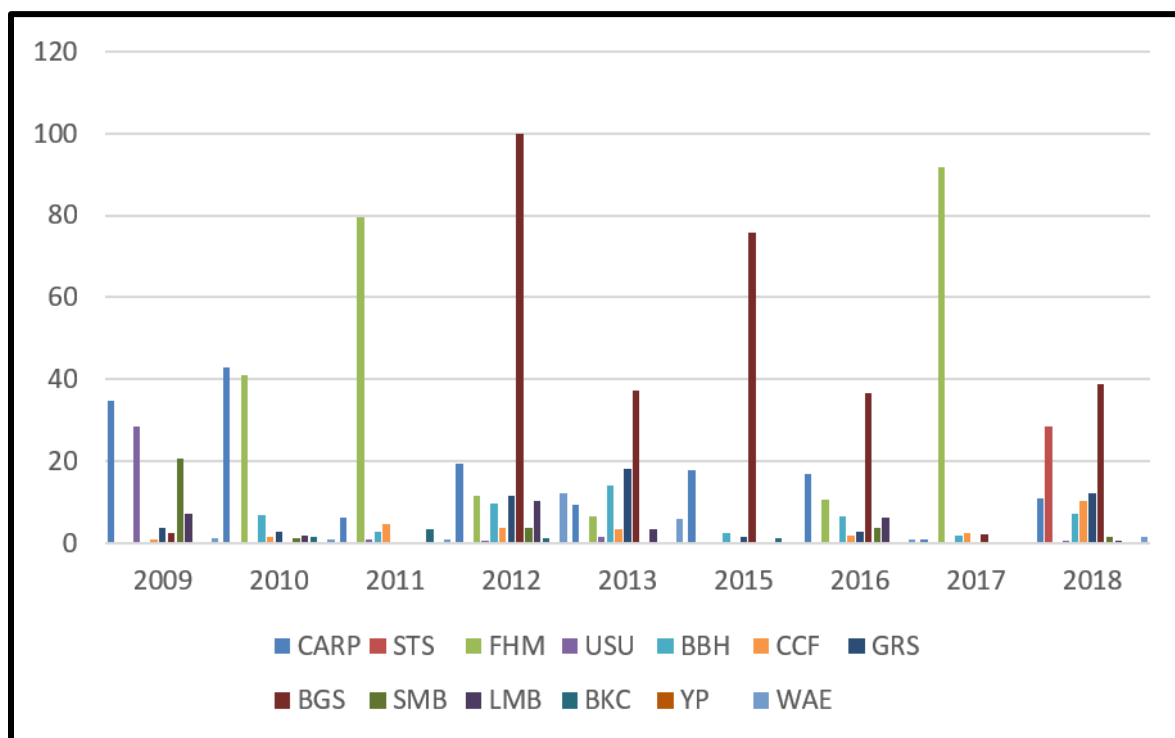
Cutler Reservoir

Fish species in the reservoir are both game fish and non-game fish and include common carp, fathead minnow, spottail shiner (*Notropis hudsonius*), Utah sucker (the only remaining native fish in the reservoir), black bullhead (*Ameiurus melas*), channel catfish, green sunfish, bluegill sunfish, smallmouth bass, largemouth bass (*Micropterus salmoides*), black crappie, yellow perch (*Perca flavescens*), and walleye (Sigler and Sigler 1996; UDWR 2021). Limited to moderate numbers of bass, crappie, catfish, and walleye provide modest sport fishing opportunities.

Nearly every year since 2009, the USU class, Watershed Sciences 3110: Fish Diversity Laboratory, participates in a fisheries assessment activity in Cutler Reservoir, leading to the development of relative abundance estimates for each species (PacifiCorp 2021a). Relative abundance analysis provides a snapshot in time for 9 years (2009–2013 and 2015–2018), illustrating which species are present and which of those are dominant in Cutler Reservoir (Figure 3-21).

The data indicate that the three most dominant fish species in Cutler Reservoir are bluegill sunfish, fathead minnow, and common carp (Appendix E of PacifiCorp 2021a). Budy et al. (2011) related water conditions in Cutler Reservoir to the viability of three popular sport fishes: walleye, channel catfish, and black crappie. 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 the fish diversity of Cutler Reservoir is relatively high for a reservoir in the western United States.

Based on their modeling results, the authors rated the reservoir at a mid-level degree of biological condition and degree of stress compared to a previously purported state of high stress and severe degradation (Budy et al. 2011). Although walleye experience eutrophic conditions with high temperatures and low DO and demonstrate negative growth during the warm summer months, more tolerant species like black crappie and channel catfish appear to be largely unaffected by the current habitat conditions in Cutler Reservoir.



Source: USU 2018

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 3-21 RELATIVE ABUNDANCE OF THE FISH SPECIES SAMPLED IN CUTLER RESERVOIR 2009–2018

Below is a description of the biology and ecology of the fish found in Cutler Reservoir.

Common Carp

The common carp is the most prevalent non-game fish in Cutler Reservoir and the Bear River, and therefore plays an important role in the ecology of the aquatic community (Budy et al. 2006). Carp are non-native, having been widely introduced across the United States by several different entities and for a number of different reasons (USFWS 2019). Railroad companies in the region were known to introduce carp to every waterbody along their route in order to create a food supply for the primarily foreign workers responsible for building the transcontinental 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 also consume plant matter. Young carp eat zooplankton and phytoplankton and compete with other game and non-game juvenile fish feeding on the same resources. 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.

Fathead Minnow

The fathead minnow is native to much of North America but 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 (UDWR 2021). The fathead minnow is an opportunistic feeder that eats plant matter, insects, 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 River and Bear River systems. Fathead minnows were introduced primarily as bait and prey fish.

Spottail Shiner

The spottail shiner is part of the minnow family and is native to parts of Canada and much of the United States east of the Rocky Mountains. 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.

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. Historically, 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 to spawn. Eggs are broadcast into the water, where fertilization occurs. No parental care is given to eggs or young.

Black Bullhead

Black bullhead, an introduced species of bullhead catfish found in Utah, are native to areas east of the Rocky Mountains in the United States, southern Canada, and northern Mexico but are 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. Black bullhead spawn 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 waterbodies and backwaters.

Channel Catfish

Channel catfish are native to many areas of North America east of the Rocky Mountains. 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 it is not native to the state. Several large individual channel catfish have been caught in Cutler Reservoir. Channel catfish eat many types of food, 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 1 week. Eggs and fingerlings are guarded by the males for a short time after hatching.

Green Sunfish

Green sunfish are 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.

Bluegill Sunfish

Bluegill are a popular sport fish that are not native to Utah but are 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.

Smallmouth Bass

Smallmouth bass are not native to Utah but rather to much of central and eastern North America. 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. Smallmouth bass primarily eat fish, but amphibians and a variety of invertebrates are also consumed, including crayfish and insects. The species spawns in late spring and early summer over nests excavated 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.

Largemouth Bass

The largemouth bass are 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 excavated by males in the substrate. Males usually guard the eggs, which hatch in 2 to 5 days. The largemouth bass requires warmer water for reproduction than does the smallmouth bass. Consequently, the distribution of the largemouth bass in Utah is not as great as that of the smallmouth bass.

Black Crappie

Black crappie are not native to Utah but rather to much of central and eastern North America. The black crappie is a popular sport fish that is currently found in many of Utah's warmer waters. The black crappie is much more abundant in Utah than the closely related white crappie (*Pomoxis annularis*). 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 excavated 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.

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.

Walleye

Walleye are native to much of central and eastern North America, but the species is not native to Utah. The walleye is a large member of the perch family and a popular sport fish in 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 1 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 both upstream and downstream of Cutler Dam. Walleye are sensitive to light, so they prefer deeper 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 have migrated from areas upstream (e.g., Oneida Reservoir) into Cutler Reservoir.

Other Fish

Several other fish species that do not currently occur in the reservoir and tributaries (and therefore not within the Project Boundary) but that have been present in the Bear River upstream of Cutler Reservoir or downstream of Cutler Dam in the past are as follows: Bonneville cutthroat trout (*Oncorhynchus clarki utah*), bluehead sucker, and northern leatherside chub. All three species are protected by Statewide and Multi-state Conservation Agreements.

Bonneville cutthroat trout are known to occur in nearby tributaries to Cutler Reservoir in the lower segments of the Logan River and Blacksmith Fork River. They also occur in the Cub River, a tributary of the Bear and upstream (USFWS 2001) but have not been documented in Cutler Reservoir or in the mainstem Bear River downstream of Cutler Dam since 2008.

Bluehead sucker were historically found in the Bear River drainage; currently, they are not present in Cutler Reservoir or downstream of the dam (UDWR 2016, 2019a).

Northern leatherside chub are also 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). UDWR also surveyed for this species in 2019, but no leatherside chub were identified in the surveys. The northern leatherside chub prefers cool riverine habitat, so they have not been documented for many decades and are not likely to be found in Cutler Reservoir as those habitat conditions no longer exist.

BENTHIC MACROINVERTEBRATE COMMUNITY

This section describes the BMI species present in Cutler Reservoir and in the Bear River downstream of the reservoir.

Bear River Downstream of Cutler Dam

The UDWQ performs statewide Integrated Assessments of waterbodies on a periodic basis about every 6 years. The latest report from 2016 obtained final approval in 2018 (UDWQ 2016). In that report, the Bear River from Cutler Dam to the confluence with the Malad River (Bear River-2) and from the confluence with the Malad River to the Great Salt Lake (Bear River-1) were listed as Category 5 reaches and not supporting for temperature, DO, and total dissolved solids. Those reaches were also listed as “Impaired” for Beneficial Use 3B (warm water fish and their associated food chain). Category 5 reaches are designated by the U.S. Environmental Protection Agency and states that, “Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed” (UDWQ 2016).

The revised study plan for the aquatic community included the following task:

- Summarize existing information on the aquatic organisms and their habitat residing in the Cutler Reservoir and its tributaries, and the Bear River up to 2 miles downstream of Cutler Dam

With the help of UDWR staff, PacifiCorp was able to update information on the fisheries downstream of Cutler Dam, but existing information on benthic macroinvertebrates downstream of the Project was difficult to obtain.

In searching for possible existing data sources regarding BMI on the mainstem Bear River downstream of Cutler Dam, four possible sources of existing information emerged: Dr. Wurtsbaugh (Emeritus Professor, USU), Trip Armstrong (Director, BLM/USU National Aquatic Monitoring Center [also known as “the Bug Lab”]), Ben Holcomb (UDWQ), and Dr. Chuck Hawkins (USU Watershed Sciences).

Dr. Wurtsbaugh was not aware of stream research and referred to Dr. Chuck Hawkins (Wayne Wurtsbaugh, personal communication, June 22, 2021). Trip Armstrong stated the USU Bug Lab database for the lower Bear River exists and shared their database spreadsheet (Trip Armstrong, personal communication, July 16, 2021). However, most of the data is from stream reaches upstream of Cutler Dam with just one set for the Bear River Bay of Great Salt Lake. That information is for a more saline environment that is not applicable for this analysis.

Ben Holcomb provided information on the statewide Integrated Assessment database but was not able to obtain details on BMI status. He was able to determine the number of BMI taxa collected in the Bear River² segment near Bear River City, which is presented in Table 3-11. The BMI community sampled at this site is very diverse, containing several representatives of mayflies and caddisflies with one unidentified stonefly and other groups such as midge flies, black flies, riffle beetles, amphipods, and crayfish. Bear River City is just upstream of the Bear River Migratory Bird Refuge. Dr. Chuck Hawkins replied via email that he did not know of any studies on the Bear River downstream of Cutler Dam and referred to UDEQ (Chuck Hawkins, personal communication, July 20, 2021).

In summary, there is some useful information available to characterize the Bear River downstream of Cutler Dam although the data is just grab samples giving a snapshot in time and does not represent systemic data. With that said, it is difficult to determine any environmental effects of PacifiCorp’s Proposed Action without further in-depth study. However, given that the proposed normal operation and extended operation is generally very similar to existing conditions, it is not likely that the BMI community downstream of the Project would be adversely affected.

TABLE 3-11 BENTHIC MACROINVERTEBRATE TAXA COLLECTED ON THE BEAR RIVER NEAR BEAR RIVER CITY BY UDWQ IN 1998 AND 2000-2002

TAXA	1998	2000	2001	2002
Mayflies				
Baetidae	1		6	
Stenonema	199	22	3	9
Ephoron			4	
Heptageniidae	265		1	
Tricorythodes	1	1		1
Ephemerellidae		2		
Caddisflies				
Hydropsychidae	5	103	75	
Hydropsyche	13	112	7	13
Cheumatopsyche	1			
Nectopsyche	2			
Stoneflies				
Plecoptera	1			
Midge Flies				
Orthoclaadiinae	1	55	129	199
Ceratopogonidae			1	
Chironomidae		3	9	
Chironominae		183	85	167
Tanypodinae	8	3		5
Black Flies				
Simuliidae		3		63
Simulium		12	261	25
Riffle Beetles				
Microcylloepus similis	8	7		1
Stenelmis			1	
Dubiraphia	3			
Elmidae	3	1		
Ordobrevia nubifera	9	1		
Water Mites				
Trombidiformes	1			1
Amphipods				
Hyaella azteca	1		1	
Worms				
Oligochaeta		3	1	5
Crayfish				
Pacifastacus leniusculus			2	
Orconectes virilis	3			
Flatworms				
Turbellaria		2	1	

Cutler Reservoir

There were very little data on BMIs until PacifiCorp's first five-year (covering the years 2003 to 2007) monitoring report (PacifiCorp 2008). In that report, PacifiCorp notes an assessment of stream BMIs conducted by UDWQ, which determined that the sections of the Little Bear River and Spring Creek near Cutler Reservoir were impaired based on biological criteria.

In several class studies by USU, the Logan River site was the least impaired station in the Cutler Reservoir system (Dees 2007; Stoller 2007). Samples collected in Swift Slough (the location where effluent from the Logan City WWTP is returned to the watershed) exhibited a very low biomass of benthic invertebrates compared to other systems. Macroinvertebrate populations in Cutler Reservoir were determined to be dominated by oligochaetes (worms) and chironomids (midge flies) (Dees 2007; Stoller 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 periodic low DO. As indicated in the TMDL study (UDWQ 2010), DO exceedances less than 3.0 mg/L were rare in UWDQ's extensive dataset. While DO concentration less than 3.0 mg/L is considered an impairment to aquatic life, there is no indication that these rare observations imply lethal conditions.

Based on another USU study, bird and fish foraging on benthic invertebrates in the open water sections of the reservoir could be limited by low prey density (Wurtsbaugh and Lockwood 2007). Key indicator macroinvertebrate Families Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (aka EPT taxa) were found to be low in abundance (Wurtsbaugh and Lockwood 2007). EPT taxa are generally the least tolerant of eutrophic conditions (Wang et al. 2007). Budy et al. (2006) reported finding EPT taxa in several fish diet samples, so there is at least some presence in the reservoir.

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

MOLLUSK COMMUNITY

Freshwater aquatic mussels are present in Cutler Reservoir. One specimen of a floater bi-valve (*Anodonta sp.*) was found in Cutler Reservoir during a reservoir drawdown period in 2013 (KnowledgeBase 2013). Also, the western pearlshell species (*Margaritifera falcata*) is known to exist in the Bear River and may be present in 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 the California floater (*Anodonta californiensis*) in Cutler Reservoir using an eDNA analysis in 2016 and 2017 (Rogers 2017). California floaters were confirmed in Cutler Reservoir during the 2019 full drawdown event, as were paper pondshells (UDWR 2019b).

AQUATIC NON-INDIGENOUS AND INVASIVE SPECIES

Cutler Reservoir is monitored regularly by UDWR for invasive shellfish like the Quagga mussel (*Dreissena bugensis*) and zebra mussel (*D. polymorpha*). As of March 2019, the status of invasive shellfish is listed as undetected for invasive mussels in Cutler Reservoir (UDWR 2019b and 2019c). PacifiCorp has also established and implemented an Aquatic Invasive Species (AIS) policy and protocols that consists of mandatory decontamination and isolation requirements for all in-water equipment used and work conducted in all waterbodies that are utilized as part of the power generation portion of the company. The requirements are in place for all company personnel, as well as all contractors working on PacifiCorp generation projects, including the Cutler Project.

The Non-indigenous Aquatic Species (NAS) information resource for the USGS provides information related to specific, generally invasive, non-indigenous species throughout the United States. Table 3-12 includes a list of the aquatic invertebrate NAS identified in Utah (USGS 2021) (note that several species on the NAS list are also discussed above as AIS because there is a degree of overlap between the two designations). Based on available information, none of these species are known to occur within the Project Boundary and Project Area. Non-indigenous fish in Cutler Reservoir are presented above as part of the description of the Cutler Reservoir fish

community, as nearly all of the fish in the reservoir are non-native. The more terrestrial non-indigenous species (amphibians and reptiles) are presented in Section 3.3.5, Wildlife and Habitat.

TABLE 3-12 NON-INDIGENOUS AQUATIC^a INVERTEBRATE SPECIES OF UTAH

COMMON NAME	SCIENTIFIC NAME
Freshwater jellyfish	<i>Craspedacusta sowerbyi</i>
Asellid isopod	<i>Caecidotea racovitzai</i>
Waterflea	<i>Daphnia lumholtzi</i>
Anchor worm	<i>Lernaea cyprinacea</i>
Signal crayfish	<i>Pacifastacus leniusculus</i>
Virile crayfish	<i>Faxonius virilis</i>
Red swamp crayfish	<i>Procambarus clarkii</i>
Asian clam	<i>Corbicula fluminea</i>
Zebra mussel	<i>Dreissena polymorpha</i>
Quagga mussel	<i>Dreissena rostriformis bugensis</i>
New Zealand mudsnail	<i>Potamopyrgus antipodarum</i>
Red-rim melania	<i>Melanoides tuberculata</i>
Chinese mysterysnail	<i>Cipangopaludina chinensis</i>

Source: USGS 2021

^a This table includes only the aquatic invertebrate species. The more terrestrial species (e.g., amphibians and reptiles) are presented in Section 3.3.5, Wildlife and Habitat.

3.3.5.2 ENVIRONMENTAL ANALYSIS

This section addresses the fish and aquatic resources found within the Project Boundary in terms of how they may be affected under proposed normal and extended operations. The continued operation of the Project would generally result in the persistence of conditions and trends described in Section 3.3.3.1, Affected Environment.

AQUATIC HABITAT

The aquatic habitat conditions are not expected to change under the new license that includes the normal and extended operating range. Some minor erosion may potentially be expected due to wave action, which in turn contributes to additional TSS and turbidity conditions already occurring in the tributary inflows to the reservoir. Water quality is also not expected to change (see Section 3.3.2, Water Resources). Water depth, poor water quality, and lack of cover will likely continue to limit the potential for the warm water fishery. Due to the shallow nature of the reservoir, temperature swings will potentially continue to occur in the summer and fall which

reduces fish habitat availability. Irrigation withdrawals will continue from April to October every year which limits aquatic habitat in the reservoir and the river downstream of the dam.

FISH COMMUNITY

Fish isolation surveys conducted as part of the 2019 drawdown investigations occurred between elevations of 4,389.9 and 4,392.0, as measured at Cutler Dam (Figure 3-22); note that these elevations range from approximately 13 to 15 feet below the lowest proposed extended operating range limit of the reservoir. During these surveys, some fish were observed in isolated pools, although few fish were observed in total, and an even smaller fraction of those fish were dead. In addition, most locations where fish isolation was observed during the 2019 drawdown would not be exposed in the proposed operating elevation ranges (either in normal or extended ranges).

Because UDWR has no plans to change management of the Cutler Reservoir fishery, there are no anticipated environmental changes expected concerning the reservoir's fish and aquatic community. This is primarily because there are no sensitive fish species or species of concern present in Cutler Reservoir and, with the exception of the Utah sucker, the fishery consists of non-native and non-game fish.

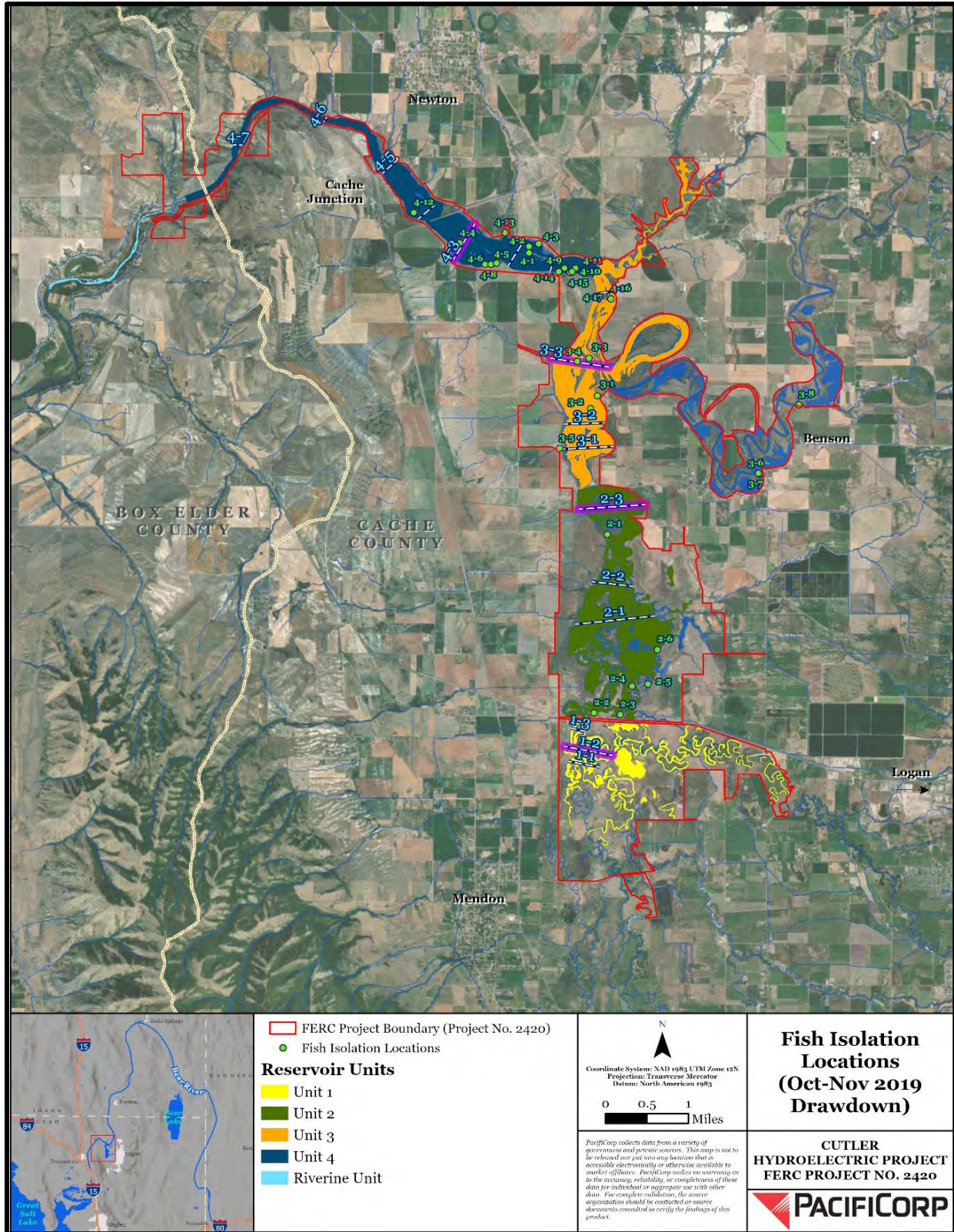


FIGURE 3-22 POTENTIAL FISH ISOLATION LOCATIONS IDENTIFIED DURING THE NOVEMBER 2019 FULL DRAWDOWN AT CUTLER RESERVOIR

BENTHIC MACROINVERTEBRATE COMMUNITY

Pre-drawdown benthic samples were collected on October 16 and 17, 2019, as part of the 2019 full drawdown investigations. Benthic samples post-drawdown (full drawdown) were collected on November 4 and 5, 2019. The pre-drawdown benthic samples were collected at or near full pool (4,407.5 feet), and benthic samples collected at full drawdown were taken at considerably lower reservoir elevations than PacifiCorp would operate for either normal or proposed extended operation ranges. Table 3-13 provides the depth changes at the shoreline ends of each transect that occurred pre- and post-drawdown event. One shoreline site (Site 4-3-4) was dewatered at the shoreline margin during the post-drawdown survey; that survey site was eliminated from further study (see also Attachment A for additional detail regarding removal of that site from the survey). BMI densities at the other transect sites are also included in Table 3-13.

Overall, more than 29,000 macroinvertebrates were collected prior to the reservoir drawdown. Of those, the families in greatest numbers were the aquatic earthworms (16,043) followed by non-biting midge flies (9,422 of subfamily Chironominae and 1,928 of subfamily Tanypodinae). During the post-drawdown survey, the number of macroinvertebrates captured was considerably higher than in the pre-drawdown survey at 41,326 individuals. However, transect-by-transect BMI densities overall were not significantly different ($p \leq 0.05$) between the pre-drawdown and post-drawdown sampling events with the exception of the two mid-reservoir transects. Sample sites at each shoreline end of the four transects illustrate that at many of the sites, BMI densities were greater post-drawdown than pre-drawdown. This was especially true with Chironominae (dipterans) at most sites and with Oligochaeta (worms) at one of the mid-reservoir sites (transect 3-3).

TABLE 3-13 COMPARISON OF BENTHIC MACROINVERTEBRATE INDEX AT CUTLER RESERVOIR SAMPLING SITES PRE- AND POST-DRAWDOWN (FULL DRAWDOWN) IN FALL 2019

BMI ORDER	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
TRANSECT	1-2-1	1-2-1	1-2-4	1-2-4	2-3-1	2-3-1	2-3-4	2-3-4	3-3-1	3-3-1	3-3-4	3-3-4	4-3-1	4-3-1	4-3-4	4-3-4 ^a
DEPTH (FEET)	1.25	2.0	5.5	3.0	4.0	1.0	3.75	2.0	4.0	1.0	8.5	6.0	2.5	1.0	6.0	0.0
BMI Taxa																
Nemata	22	0	0	0	0	0	0	0	0	0	0	22	0	0	0	
Oligochaeta	674	0	0	0	130	87	1,304	609	435	5,696	348	4,522	2022	130	0	
Acari	22	0	0	43	0	43	0	0	22	1,043	22	22	196	0	0	
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	
Dubiraphia	22	0	0	43	0	0	0	0	0	0	22	0	0	0	0	
Ceratopogonidae	0	43	0	0	0	0	0	0	0	0	43	0	0	0	0	
Chironominae	174	217	43	891	150	2,543	522	2,261	609	1,217	717	783	304	0	1,935	
Orthocladinae	65	0	43	43	20	22	0	87	0	0	22	43	22	0	0	
Tanypodinae	43	0	22	109	10	65	65	174	0	109	0	0	43	0	0	
Callibaetis	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	
Caenis	0	0	0	0	30	0	0	87	0	0	0	0	0	0	0	
Corixidae	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	
Lepidostoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gammarus	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	
Asellidae	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	
Pisidiidae	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	
T-Test ($p \leq 0.05$)		0.139		0.117		0.164		0.249		0.100		0.164		0.104		NA

BMI = benthic macroinvertebrate; NA = not applicable

^a Site was dewatered during drawdown

Overall, the differences between the 2019 pre-drawdown condition and the post-(full) drawdown for BMI were mainly in densities and distribution. However, there were greater numbers of BMIs observed in the two mid-reservoir transects during the post-drawdown sampling, which can likely be attributed to sediment disturbance and invertebrate drift during the water elevation change from full pool to the maximum drawdown elevation at the most upstream end (southern) of the reservoir and on the downstream end (northern) where water velocity increases at the reservoir empties into the Cutler Canyon. Again, the drawdown study occurred during extreme WSE changes that far exceed the potential up to 2.5-foot change of the proposed extended operation during the winter months (1 foot greater than the existing winter operation range).

Many peer-reviewed articles examine the effects of winter reservoir water level drawdowns with spring refill and the effects of that operating regime on the aquatic community. Studies for these articles focused on long-term winter drawdowns and effect on BMIs (Carmignani 2020; Carmignani and Roy 2017; Cott et al. 2008; Hayworth 2000; Jermalowicz-Jones 2016; Kaster 1976; McEwing and Butler 2010). Nearly all the studies focused on reservoir drawdowns greater than 5 meters where the water level was held until spring refill. In those cases, there were definite effects demonstrated on BMIs, shoreline habitat for fish and mollusks due to erosion, macrophyte die-offs, and freezing sediments.

Water level fluctuations such as these do not apply to Cutler Reservoir and PacifiCorp's proposal because the potential WSE change proposed is up to 2.5 feet (less than 1 meter) and varies up to full pool on an approximate 10-day cyclical basis rather than over long-term periods. Although the hydraulic model (Appendix G of PacifiCorp 2021a) predicted that the area of exposed reservoir bed along the shoreline could increase under the proposed extended operations (as described in Section 3.3, Resource Issues), actual observations of the shallow nearshore areas (i.e., transition zone) during the 2019 drawdown indicated that there would be very limited areas of exposed reservoir bank, and any potential areas of exposure would be expected to remain saturated throughout the cycle. The reasons for this difference in modeled versus actual exposed area are based on the limitations of the hydraulic model in the nearshore transition zones, as described in greater detail in Section 3.3. Further, any limited area of exposed but saturated reservoir bank would occur in areas that are already subject to water level fluctuations, and may have resulted in pre-adaptation of the BMI community to tolerate these conditions, given the

species that dominate these habitats (see also Attachment A for additional detail regarding this issue). Further, direct observations (see Attachment B) of these habitats from elevations lower than the lowest proposed operating elevation of the reservoir indicates that there are extremely limited areas of additional transition zone that could possibly be subject to potential exposure.

Given all the recent information related to the effects of reservoir drawdowns on benthic communities, it is important to note that the 2019 drawdown investigations at Cutler Reservoir were performed under the most extreme drawdown conditions possible (i.e., the reservoir was drawn down to the greatest degree possible in order to have minimal water present during the LiDAR data collection). In contrast, PacifiCorp's proposed operations would result in short-term, cyclical, reservoir fluctuations of 2.5 feet or less, which would result in minimal, if any, shoreline sediment exposure and would potentially have minor, temporary effects on the BMIs in the form of drift and relocation to other parts of the reservoir, especially given the current dominance of the community by chironomids, and their ability to burrow into sediments for additional protection as necessary.

The BMI community is driven by the substrate conditions and the water quality and is not expected to change unless water quality conditions improve with measures put in place to improve water quality in tributary inputs through the TMDL process.

MOLLUSK COMMUNITY

UDWR performed mollusk surveys on October 28, November 4, and November 8, 2019, as part of the 2019 drawdown investigations. Six sites were surveyed over the 3 days. On October 28, 2019, the UDWR crew surveyed Site 1 (Figure 3-23) and found 55 (47 live / 8 dead) paper pondshells (*Utterbackia imbecillis*), which is a non-native, widespread, and prolific species, located in approximately 2 feet of water with a silt/mud substrate. At Site 2, no mollusks were observed, and the substrate did not appear to be suitable for mussels. On November 4, 2019, the UDWR crew surveyed Site 3 and found 23 (8 live / 15 dead) paper pondshells located in silt/mud substrate near the channels. At Site 4, the UDWR crew found 272 (37 live / 235 dead) paper pondshells in the silt / exposed shoreline (note that on November 4, 2019 the reservoir was close to the full drawdown level, substantially lower than the lowest proposed operations water level). The final survey took place on November 8, 2019. At Site 5, the UDWR crew found 10 dead

paper pondshells and three dead California floaters (a native species and state species of concern) that appeared to have expired much earlier than the drawdown period. The California floater shells were in a riffle with approximately 6 inches of silt/mud and a hardened bottom. For the post-drawdown survey, the UDWR crew revisited Site 1 because the reservoir had reached its lowest point; they found five California floater shells in habitat similar to Site 5. They also found several smaller California floater specimens. The crew also surveyed Site 6, where they found four dead paper pondshells.

California floaters are considered a Species of Greatest Conservation Need with a Utah conservation status rank of S2 (imperiled, with a high risk of extirpation in the state); the introduced paper pondshell are widespread and prolific, and may be replacing native mollusk species (Richards 2017). UDWR provided a report on their mollusk survey and stated that although some stranding and mortality of paper pondshell and a small number of California floaters were observed, these observations occurred at reservoir elevations that are lower than the potential future operating range and the future range would not be considered detrimental to the mussel community (UDWR 2019b).

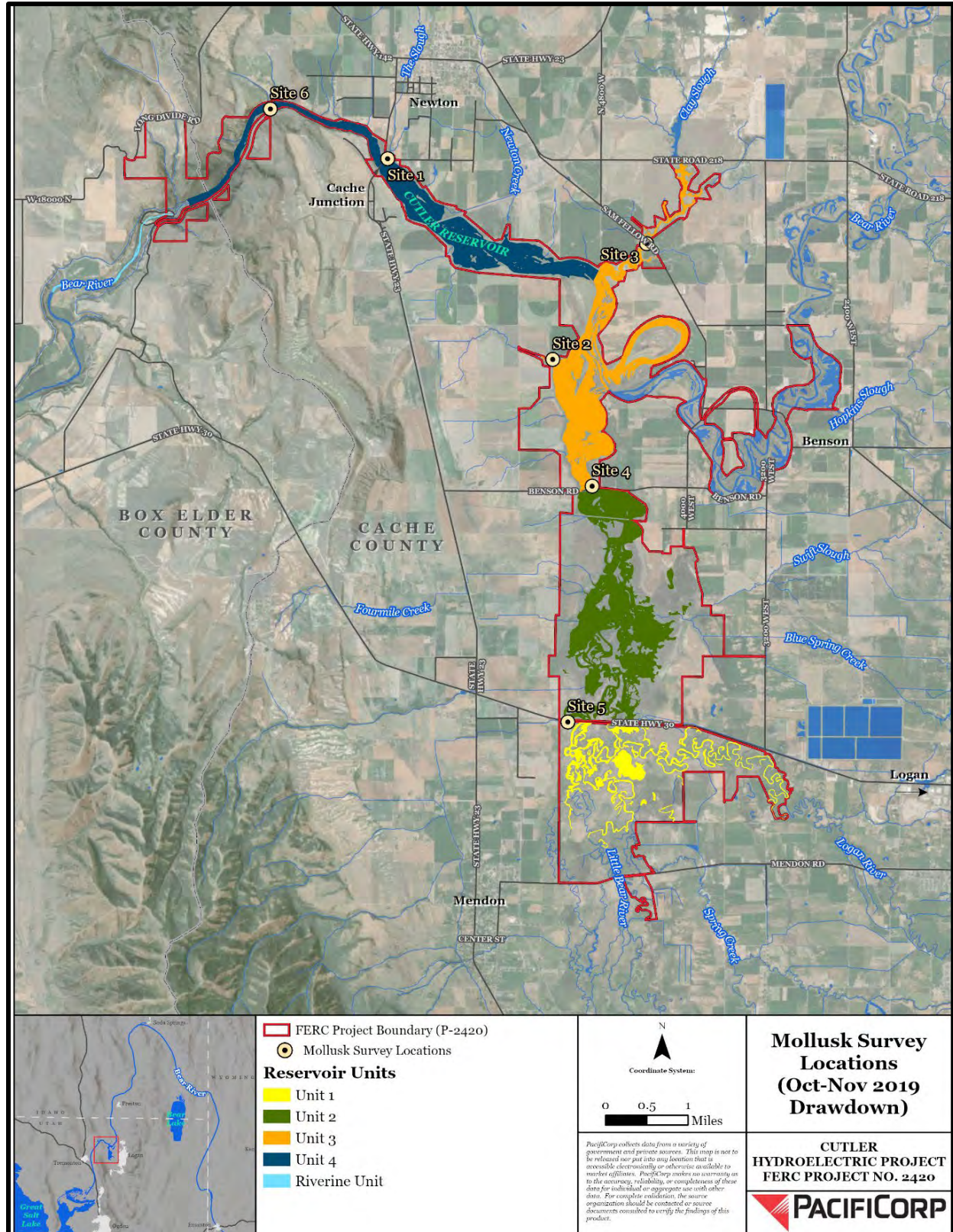


FIGURE 3-23 UTAH DIVISION OF WILDLIFE RESOURCES AQUATIC MOLLUSK SURVEY LOCATIONS

For the mollusk community, conditions are expected to remain the same under the new license. UDWR would continue to conduct periodic surveys, which would inform the status of the California floater. If any changes occur related to the status of AIS currently listed as undetected, UDWR could refine their position on how they view periodic WSE fluctuation effects.

SUMMARY OF POTENTIAL EFFECTS OF PROPOSED OPERATIONS

Current and ongoing Project and non-Project actions will likely contribute to turbidity and suspended sediment loads through sediment deposition and resuspension during minor reservoir elevation changes and wave action. Operations under the current license have potentially resulted in reservoir bank erosion from wave action. The proposed operations may continue to cause minor bank erosion because the reservoir operating band would increase slightly, and the surface elevations would change in short-term increments on the order of 6 inches greater than at present, potentially exposing shoreline areas to additional periodic wave action erosion. Fluctuating reservoir levels with more extreme drawdowns would occur periodically for maintenance on the dam and may also cause temporary fish isolation and short-term effects to BMI populations, especially in the shallower marsh locations. However, proposed extended operations would have minor effects on the aquatic community because planned reservoir WSE fluctuations would not exceed the existing conditions by more than an additional 12 inches of elevation change.

Greater reservoir fluctuations could affect littoral habitat, which is an important element of juvenile fish rearing and a productive zone for plankton and BMIs. However, reservoir elevation changes would occur during the winter months when the juvenile fish community is not likely present in large numbers, as observed in the 2019 full drawdown investigations (PacifiCorp 2021a). The proposed operations could also result in a temporary disruption in the food base for other reservoir inhabitants such as shorebirds and waterfowl on a short-term basis (see also Section 3.3.5, Wildlife and Habitat). Large fluctuating reservoir levels could affect freshwater mussel populations residing in the reservoir sediments. However, these extreme conditions would not occur on a regular basis over a new license term and occur only on rare occasions, normally in late fall when needed for maintenance of the dam.

3.3.5.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

The following sections discuss existing PM&E measures under the current license (FERC 1994); some of which are proposed to potentially continue under a new license, and additional measures proposed by PacifiCorp to include in the new license.

EXISTING MEASURES

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. This section addresses existing measures implemented by PacifiCorp related to fish and aquatic resources under the current FERC license.

Fish Habitat Structures

As part of the existing license measures, PacifiCorp installed fish habitat structures near Benson Marina and other locations in the Cutler Reservoir in cooperation with UDWR. However, after the final monitoring effort in 2000, UDWR determined that, because of the high effort per catch around the habitat structures, monitoring was initially discontinued and ultimately permanently suspended through agreement with UDWR. This measure is not proposed to continue in a future license period.

Remove Old Automobiles and Agriculture Debris

As part of a shoreline reclamation and erosion and sediment control program, PacifiCorp removed old automobile bodies and agricultural debris along the reservoir shoreline, which were an attempt by landowners to control shoreline erosion. Following removal, PacifiCorp established a vegetated shoreline buffer including shrub plantings, bank stabilization, and fencing to exclude agricultural use and further debris placement from the shoreline.

Stabilize 3 Miles of Shoreline between State Route 30 and State Route 23

To reduce shoreline erosion and turbidity, PacifiCorp installed a vegetated buffer adjacent to the reservoir between the State Route 30 and State Route 23 bridges to stabilize 5.5 miles of

shoreline. Deep rooting shrubs and willows were planted, and PacifiCorp reseeded over a 1,000 acres of tilled ground for grassland buffer and installed over 70 miles of cattle exclusion fencing.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. Because there would not likely be new additional effects to the aquatic community of Cutler Reservoir resulting from the proposed future operations as compared to the current operations, PacifiCorp proposes no PM&E measures specific to aquatic habitat other than continued water quality monitoring, operational compliance measures related to flow, and erosion control measures. These measures would be part of the updated Cutler RMP, the updated Project Operational Plan, and the new CESCO, all of which are described in Section 2.2.3, Proposed Environmental Measures [Proposed Action]. No changes are proposed for irrigation or other withdrawals at the dam.

3.3.5.4 UNAVOIDABLE ADVERSE EFFECTS

A number of long-term effects have occurred and would likely continue in the Project Area under the normal and proposed extended Project operations. Many of these are only indirectly related to Project operation. These include a continued influx of sediment, agricultural and industrial effluent, and nutrients via the numerous tributaries that enter Cutler Reservoir; wave action within the reservoir, which contributes to erosion and TSS; and a continuous withdrawal of irrigation water to meet the priority water rights of the BRCC and subsequent reduction in Bear River streamflow during the irrigation season from April to October. PacifiCorp's proposed extended operations is not expected to exacerbate any of the above unavoidable adverse effects.

3.3.6 BOTANICAL RESOURCES

This section addresses vegetation and noxious weeds within the Project Area. Threatened and endangered plants, including Ute ladies'-tresses, are described separately in Section 3.3.6, Threatened and Endangered Species. The Project Vicinity for botanical resources is defined as the Bear River watershed.

3.3.6.1 AFFECTED ENVIRONMENT

VEGETATION

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). Vegetation within the Project Area varies widely. The steep mountain slopes within and around Cutler Canyon around Cutler Dam contain xeric uplands with juniper woodland, sagebrush, and grasses (PacifiCorp 1991). Upstream of the canyon, Cutler Reservoir spreads out into flat land consisting of pasture, meadows, meandering river channels, marshes, wetland, agricultural land, and scattered riparian shrub and forest.

In 2019, vegetation within the Project Boundary was mapped and classified as part of the *Shoreline Habitat Characterization Initial Study Report* (referred to here as the Shoreline ISR [Appendix C of PacifiCorp 2021a]). The goal of the mapping and classification effort was to distinguish upland and wetland vegetation as well as identify areas of the invasive common reed, *Phragmites* (*Phragmites australis*). Vegetation was mapped using aerial drone imagery and LiDAR data collected in the fall of 2019, with field validation to ensure accuracy. Vegetation was classified into seven classes: sparse, upland, woody, *Phragmites*-dominated marsh, mixed marsh, rush-dominated marsh, and cattail-dominated marsh. Table 3-14 provides a description of each vegetation class and the amount of coverage within the Project Boundary; Figure 3-24 presents the location of the mapped vegetation types.

Most of the area—or approximately half—was classified as upland vegetation, which included all non-marsh habitat types including the extensive agricultural areas. The remaining area was primarily classified as wetland vegetation. Upland and wetland vegetation are described separately in the sections below.

TABLE 3-14 VEGETATION CLASSES WITHIN THE PROJECT BOUNDARY

VEGETATION CLASS	DESCRIPTION	ACREAGE	PERCENT OF VEGETATED AREA
Sparse	Areas with little to no vegetation. This may include roads, road shoulders, plowed agricultural fields, rock outcrops, alkali flats, or high-use livestock areas.	263.5	4.6
Upland	Areas characterized primarily by uplands, including areas dominated by bunchgrasses, upland shrubs, or agricultural pastures and fields. These areas are vegetated but not dominated by marsh vegetation types, although they may include areas of irrigated (surface- or sub-) wet meadows.	2,925.2	50.6
Woody	Areas characterized by woody vegetation. Woody vegetation types vary throughout the Project Area. Dominant woody species include Juniper (<i>Juniperus</i> sp.), Cottonwoods (<i>Populus</i> sp.), Willows (<i>Salix</i> sp.), and Russian Olive (<i>Elaeagnus angustifolia</i>).	277.4	4.8
Phragmites-Dominated Marsh	Marshy areas with almost total cover dominated by Phragmites. This weed species forms dense monocultures, making it possible to differentiate areas dominated by Phragmites from other types of marsh vegetation as part of this classification.	104.8	1.8
Mixed Marsh	Marshy areas where cattails, rushes, and other marshy vegetation are present without one type of vegetation being dominant.	303.0	5.2
Rush-Dominated Marsh	Marshy areas with almost total cover dominated by rush species (Juncaceae family). Other types of vegetation may occur in rush-dominated marsh at low cover percentages.	736.3	12.7
Cattail-Dominated Marsh	Marshy areas with almost total cover dominated by cattails (<i>Typha</i> sp.). Other types of vegetation may occur in cattail-dominated marsh at low cover percentages.	1,171.8	20.3
Total Vegetated Area		5,782.0	

Source: Shoreline ISR (Appendix C of PacifiCorp 2021a)

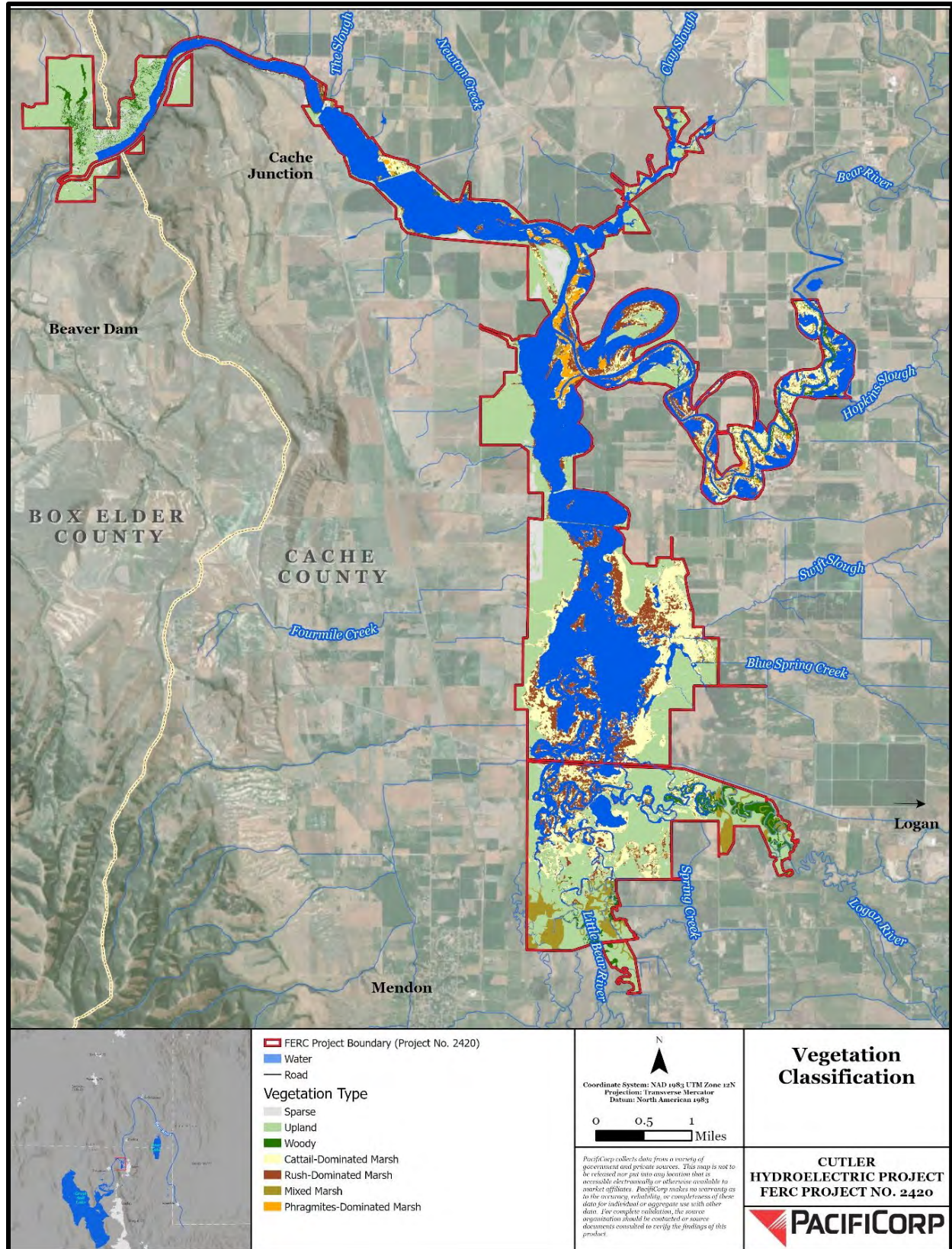


FIGURE 3-24 VEGETATION TYPES WITHIN THE PROJECT BOUNDARY

Wetland, Shoreline, and Littoral Vegetation

This section discusses vegetation present in the wetland, shoreline, and littoral areas within the Project Boundary. A substantial portion of the area within the Project Boundary is comprised of wetland vegetation (primarily along the reservoir shoreline and littoral zones), within streambank riparian areas along the Bear River and other reservoir tributaries, and in the extensive North and South Marsh areas.

The USFWS National Wetland Inventory¹⁸ (NWI; USFWS 2018) maps most of the wetland vegetation within the Project Boundary as herbaceous (43 percent), with the largest herbaceous wetland complexes being the North and South Marshes (see Figure 3-25 in Section 3.3.7, Wildlife and Habitat). Common submerged or floating aquatic plants in the littoral zone along the edge of the reservoir include sago pondweed (*Stuckenia pectinata*), *Lemna* spp., *Potamogeton* spp., and *Brasenia* spp.; submergent and floating plants in the reservoir may include *Myriophyllum* spp., *Ceratophyllum* spp., and *Elodea* spp. (Natureserve 2009).

Emergent marsh herbaceous vegetation is dominated by cattail (*Typha latifolia*) and hardstem bulrush (*Scirpus acutus*). Common species occupying less inundated wet meadow habitat may include common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), 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). As described in Section 3.3.6, Threatened and Endangered Species, Ute ladies'-tresses, which are ESA-listed as Threatened, are also found in the South Marsh.

Forested and shrub-dominated wetlands account for only 3 percent of NWI-mapped wetland vegetation within the Project Boundary and are primarily located along riverine portions of the Bear River and other reservoir tributaries. Forested wetlands include areas of riparian and floodplain forest often characterized by narrow-leaf cottonwood (*Populus angustifolia*), Fremont cottonwood (*Populus fremontii*), Lombardy poplar (*Populus nigra*), green ash (*Fraxinus*

¹⁸ The NWI is used here as a source of information for the extent and type of wetland vegetation within the Project Boundary. The NWI-mapped wetland and waterbody habitats are discussed in greater detail in Section 3.3.5, Wildlife and Habitat.

pennsylvanica), and shrub willows such as coyote (also known as sandbar or narrowleaf) willow (*Salix exigua*) (PacifiCorp 1991). Other trees common to forested and shrub riparian and floodplain habitats within the biophysical region include boxelder (*Acer negundo*), Rocky Mountain maple (*Acer glabrum*), crack willow (*Salix fragilis*), yellow willow (*Salix lutea*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include, water birch (*Betula occidentalis*), red osier dogwood (*Cornus sericea*), river hawthorn (*Crataegus rivularis*), and chokecherry (*Prunus virginiana*) (Natureserve 2009; USDA 2019).

Although most of the reservoir shoreline¹⁹ is mapped by the NWI as wetland vegetation, in reality much of the vegetation would likely be classified as mesic, or as a transitional community between wetland and upland, similar to the riparian areas successfully established along the shoreline. As described in Section 3.3.3, Geology, Soils, and Sediment, riparian buffers were created along at least 52 miles of the reservoir shoreline as part of the Cutler Resource Management Plan (RMP; PacifiCorp 1995a). The original conceptual planting list developed for the shoreline buffer areas (Table 3-15) presents the herbaceous and shrub riparian species that were originally planted in the shoreline buffer areas and, for the most part, currently persist there. Note that many of these species would not be classified as wetland vegetation by NWI.

The Cutler RMP five-year monitoring reports provide information on the condition of these shoreline buffer areas, including vegetation conditions. The most recent Cutler RMP monitoring report covering 2013 to 2017 (PacifiCorp 2018) identified that the majority of the 55 shoreline buffer segments surveyed were either in excellent condition (6 parcels) or good condition (41 parcels). These buffer areas exhibited a variety of healthy conditions, including few noxious weeds; and showed high functionality, including preventing erosion, filtering sediment and nutrients, and providing wildlife habitat. Eight of the shoreline buffers were identified as in fair or poor condition. Buffer parcels identified as fair had small and controllable levels of noxious weeds present. Those identified as poor were either un-vegetated or mostly dominated by noxious species.

¹⁹ The shoreline areas are any area adjacent to the reservoir above the Ordinary High-Water Line (OHWL).

TABLE 3-15 RIPARIAN SPECIES ORIGINALLY PLANTED IN RESERVOIR SHORELINE BUFFERS

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

Source: PacifiCorp 2002

Upland Vegetation

Upland vegetation types within the Project Boundary are listed in Table 3-16, with vegetation mapped and classified by NatureServe (2009) using remote sensing. The most abundant type of upland vegetation is agricultural land (83 percent) followed by Inter-Mountain Basin Semi-Desert Grassland (4 percent), Inter-Mountain Basin Big Sagebrush Shrubland (4 percent), and Great Basin Pinyon-Juniper Woodland (3 percent). With the exception of agricultural land, which is dispersed around the South and North Marshes, and Reservoir Units, the upland vegetation is primarily found adjacent to the Cutler Canyon Unit and near Cutler Dam. A more detailed description of dominant upland species found in the Project Vicinity is presented in the PAD (PacifiCorp 2019).

TABLE 3-16 UPLAND VEGETATION TYPES WITHIN THE PROJECT BOUNDARY

HABITAT TYPE	PACIFICORP UNIT LOCATION	DESCRIPTION	PERCENT OF UPLAND HABITAT IN PROJECT BOUNDARY
Inter-Mountain Basins Big Sagebrush Shrubland	Cutler Canyon	Lower elevations between mountains and foothills in Cutler Canyon and near Cutler Dam	3.7%
Rocky Mountain Bigtooth Maple Ravine Woodland	Cutler Canyon	Cool ravines, hills, slopes forests, woodlands	0.5%
Great Basin Pinyon-Juniper Woodland	Cutler Canyon	Dry mountain ranges and foothills at lower elevations	3.4%
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	Cutler Canyon	Lower elevation montane zone, variable depending on temperature and moisture	0.2%
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland	Cutler Canyon	Lower elevation cool ravines and north-facing slopes	0.3%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	Cutler Canyon	Lower elevation alluvial fans and flats; graminoids, shrubs, woody plants	0.2%
Inter-Mountain Basins Semi-Desert Grassland	Cutler Canyon	Dry, low elevation grasslands, swales, playas, alluvial flats, plains	4.2%
Introduced Upland Vegetation - Annual Grassland	Cutler Canyon, North Marsh, South Marsh	Invasive species, weeds	2.9%
Introduced Upland Vegetation - Perennial Grassland and Forbland	Cutler Canyon	Invasive species, weeds	0.1%
Developed-Open Space	North Marsh	Manicured lawns, ornamental shrubs and trees with occasional native vegetation	1.2%
Developed-Low Intensity	North Marsh	Manicured lawns, ornamental shrubs and	0.2%

HABITAT TYPE	PACIFICORP UNIT LOCATION	DESCRIPTION	PERCENT OF UPLAND HABITAT IN PROJECT BOUNDARY
		trees with occasional native vegetation	
Agriculture-General	Cutler Canyon, Reservoir, North Marsh, South Marsh	Cultivated crops, hay, pastures	83.1%

Source: NatureServe 2009

PacifiCorp allocates grazing leases as part of their Agricultural Lease Program (see Section 3.3.9.1, Land Use, for a more detailed description of grazing management). Vegetation conditions and noxious weeds are monitored annually in the grazing leases, with the most recent monitoring results reported in the *Resource Management Plan Five-Year Monitoring Report 2013-2017* (PacifiCorp 2018).

NOXIOUS WEEDS

Utah State University Extension maintains lists of noxious weeds for each county in Utah. See Table 3 in the Shoreline ISR (Appendix C of PacifiCorp 2021) for the complete list of noxious weeds for Box Elder and Cache counties. Table 3-17 below presents a list of those noxious weeds known to occur within the Project Boundary; the mapbook of weed occurrence locations are presented in Figure 4 of the Shoreline ISR. Occurrence data of weed species within the Project Boundary are from annual PacifiCorp weed monitoring and control efforts and incidental observations during surveys for Ute ladies'-tresses (see Section 3.3.6, Threatened and Endangered Species). Treatment of noxious weed species has occurred and is monitored as part of the annual monitoring of buffer areas.

As mentioned above, a goal of the Shoreline ISR was to identify areas dominated by *Phragmites*, a highly aggressive and invasive noxious weed species common to wetland and riparian areas (as its propagules travel efficiently through waterways) in the intermountain west. As presented in Table 3-17 and Figure 3-24, the vegetation mapping classified approximately 100 acres (or 2 percent of the vegetated area) as being dominated by *Phragmites*. These patches occur primarily along the reservoir shoreline. While surveys were not conducted for invasive submerged aquatic

vegetation, and no species are known to occur within the Project Boundary, species such as Eurasian water-milfoil (*Myriophyllum spicatum*) pose a threat to all waterbodies downstream of Bear Lake in Utah and Idaho. Eurasian water-milfoil is currently spreading downstream from Bear Lake, where it was likely introduced by a fouled boat or trailer (also see discussion of PacifiCorp AIS policy and protocols in Section 3.3.3, Fish and Aquatics).

TABLE 3-17 NOXIOUS WEED SPECIES KNOWN TO OCCUR IN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION
Bermudagrass	<i>Cynodon dactylon</i>	3
Canada Thistle	<i>Cirsium arvense</i>	3
Dyers Woad	<i>Isatis tinctoria</i>	2
Field Bindweed	<i>Convolvulus spp.</i>	3
Goatsrue	<i>Galega officinalis</i>	1B
Hoary Cress	<i>Cardaria spp.</i>	3
Houndstongue	<i>Cynoglossum officinale</i>	3
Jointed Goatgrass	<i>Aegilops cylindrica</i>	3
Musk Thistle	<i>Carduus nutans</i>	3
Perennial Pepperweed	<i>Lepidium latifolium</i>	3
Phragmites, common reed	<i>Phragmites australis ssp.</i>	3
Poison Hemlock	<i>Conium maculatum</i>	3
Purple Loosestrife	<i>Lythrum salicaria</i>	2
Puncturevine	<i>Tribulus terrestris</i>	3
Quackgrass	<i>Elymus repens</i>	3
Russian Olive	<i>Elaeagnus angustifolia</i>	4
Scotch Thistle	<i>Onopordum acanthium</i>	3
Tamarisk	<i>Tamarix ramosissima</i>	3

Source: Appendix C of PacifiCorp 2021a

Classification Key (UDAF 2019):

1B – Very high priority. Known to exist in the state in very limited populations and pose a serious threat.

2 – High priority. Species exist at levels where control or eradication may be possible.

3 – Species are widespread. Control efforts directed at reducing or eliminating new or expanding weed populations.

4 – Prohibited species. Pose a threat to the state through the retail sale or propagation in the nursery and greenhouse industry.

3.3.6.2 ENVIRONMENTAL ANALYSIS

This section discusses the potential effects of proposed Project operations on vegetation within the Project Boundary. Under proposed normal operations, the reservoir would operate in the same range as under current operations, from 4,407.5 to 4,406.5 feet (up to a 1-foot reservoir operating range fluctuation), which would occur for a minimum of 85 percent of the year (April through October) and throughout the irrigation season. For up to 15 percent of the year, typically

between November and March (excluding periods of high flow and extreme icing), PacifiCorp proposes to periodically fluctuate the reservoir up to an additional 1.5 feet for a total of 2.5 feet, from 4,406.5 to 4,405.0 (note that the current winter range allows fluctuations down to 4,406.0 feet, so 1 additional foot of operating range compared to the current winter range).

As described below, no effects on vegetation or noxious weeds are expected under normal or proposed extended operations.

VEGETATION

The proposed extended conditions would not increase the upper reservoir WSE, and vegetation adjacent to the shoreline would not be reduced by direct effects from periodic short-term reservoir water level fluctuations, especially those outside of the growing season as proposed. As described in the introduction to Section 3.3, Resource Issues, although the hydraulic model (Appendix G in PacifiCorp 2021a) predicted that proposed extended operations would potentially increase the amount of exposed reservoir bank along the shoreline, the observations made during the 2019 drawdown (also described in Section 3.3) indicate that in reality there would potentially be very limited, if any, areas of reservoir bed exposed at the lowest proposed WSE of 4,505.0 feet during extended operations. The reasons for this difference in modeled versus actual exposed area are based on the limitations of the hydraulic model in the shallow transition zones, as described in greater detail in Section 3.3. As a result, no changes are expected that would affect vegetation adjacent to the shoreline since the extended operations would be short-term (10-day cycles) and would occur at most during 15 percent of the year, typically in the winter months, and outside of the growing season.

No effects on upland vegetation are expected as the rate of change in water level fluctuations over the proposed 10-day cycles would not lead to large erosion or deposition events or changes in the water table that could influence upland vegetation under the proposed extended operating conditions compared to the current operating conditions (Appendix D of PacifiCorp 2021a).

As mentioned above, PacifiCorp allocates grazing leases as part of their Agricultural Lease Program, and leases are monitored annually. Under the new license, PacifiCorp would update and formalize the Grazing Management Plan, which could potentially improve management and

in turn vegetation conditions in the leased areas with updated grazing protocols. Protection measures, including new management plans, are presented below in Section 3.3.4.3, New Proposed PM&E Measures.

NOXIOUS WEEDS

Given the shallow and low-gradient bathymetry of Cutler Reservoir, part of the relicensing studies were intended to analyze potential changes to the shoreline wetted perimeter, given the potential for periodically exposing generally submerged areas of reservoir shoreline. In theory, any repeatedly exposed shoreline or littoral habitat could become colonized by invasive weeds. However, as described in Section 3.3, although the hydraulic model developed as part of the ISR (PacifiCorp 2021a) predicted an increase in exposed reservoir bed along the reservoir shoreline at the water level proposed for extended operations (note that a substantive portion of that predicted increase turned out to be a calculation error that was rectified in this FLA), empirical observations made during the 2019 experimental drawdown indicate that there would not be a substantial (if any) amount of shoreline exposed during proposed extended operations (see photographs in Attachment B of this Exhibit E).

Further, in any areas that were exposed during proposed extended operations, the introduction and spread of invasive species would be unlikely to occur, as extended operations would not occur during the growing season when invasive plants could become established. In addition, the cyclic nature of the proposed extended operating conditions would not be long enough for plants to establish and would occur when the landscape is frequently covered by ice or snow for much of the 10-day fluctuation period, further limiting potential weed establishment.

Areas higher in elevation than the littoral zone would also not be affected by the proposed extended operating conditions (as the upper reservoir elevation limit would not change), and increases in noxious weeds would not result in those areas. Therefore, the proposed Project would have no effect on invasive plant establishment and spread.

3.3.6.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

This section provides a description of existing, proposed, and recommended PM&E measures as related to botanical resources.

EXISTING MEASURES

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. Measures required in the current license (FERC 1994) relevant to botanical resources that are expected to be carried forward or required under a new license (with potential updates) are presented below, including management plans.

Under the current license, the following measures were required to be included in the Cutler RMP:

- Establish a 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.
- Vegetate buffer adjacent to reservoir between Highway 30 and Highway 23 bridges, stabilize 2 miles of shoreline by planting deep-rooted shrubs and willows, planting 12 woody vegetation pockets 0.5 to 2 acres in size, reseed 50 acres of tilled ground for grassland buffer, and install 6 miles of cattle exclusion fencing.

The above measures were incorporated into the Cutler RMP Vegetation Enhancement Program (PacifiCorp 1995a), and the implementation of these measures resulted in increases to vegetation within the Project Area, which are a part of the existing baseline conditions considered in this document. Further, establishment of an Agricultural Leasing Program, also part of the Cutler RMP, has resulted in vegetation improvements over the current license period.

The Cutler RMP is proposed to be updated from its current form under the new license. That is, PacifiCorp proposes to update the Cutler RMP and would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP. Aspects to be included in the new Cutler RMP relevant to this resource are summarized in the New Proposed Measures subsection below.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. All measures relevant to botanical resources will be incorporated into either the Cutler RMP or the CESCO. The PM&E measure number from Table 2-4 is provided for reference.

Resource Management Plan

An updated Cutler RMP is proposed to be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. The new Cutler RMP would be expected to include the following sub-components relevant to botanical resources:

- Shoreline management: Update vegetation management program within Cutler RMP; continue to maintain and monitor shoreline buffer vegetation (BOT-1).
- Weed management: Continue to manage and monitor weeds in the Project Boundary as part of updated vegetation management program; include new areas to target *Phragmites* and stabilize banks (BOT-2).
- Agricultural management: Review, update, monitor, and improve existing grazing management and agricultural lease programs within the Cutler RMP (LU-1); continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve and improve their function as necessary (LU-2).
- Ute ladies'-tresses management: Develop Ute ladies'-tresses management program, including monitoring, within the Project boundary in the Cutler RMP (TE-1); maintain current Ute ladies'-tresses habitat (TE-2).

Construction Erosion and Sediment Control Plan

A new CESCO will be developed that incorporates and codifies existing measures intended to protect water quality and other resources through avoiding and minimizing impacts of any new construction during the license term, and will include standard and Project-specific BMPs and requirements to address construction and ground disturbance-related erosion and sediment

activities (including post-construction revegetation where appropriate), with the goal of avoiding and minimizing impacts of any new construction during the license term (GEO-5). This new CЕСSР is to be developed after the Project receives a FERC license Order.

3.3.6.4 UNAVOIDABLE ADVERSE IMPACTS

Based on the potential effects assessed above and the proposed PM&E measures, no unavoidable adverse effects were identified for botanical resources.

3.3.6.5 CUMULATIVE IMPACTS

The FERC SD2 stated that, “Because noxious weeds and invasive plant species exploit exposed soils that may be caused by erosion and/or sediment deposition, affected by the project or other activities within the Bear River, Terrestrial Resources may be cumulatively affected” (Section 4.1.1 of FERC 2019b). Therefore, as indicated by FERC, cumulative effects of proposed Project operations were evaluated exclusively for noxious and invasive plants, and not for other botanical resources such as general vegetation.

The geographic scope of the terrestrial resources cumulative effects analysis for noxious weeds and invasive plants includes the Bear River basin from an upstream extent of the Bear River Hydroelectric Project P-20 (the Oneida Dam; see Figure 3-16 in Section 3.3.2, Water Resources) downstream to the Great Salt Lake. This geographic scope was chosen because the operation and maintenance of the Cutler Project in combination with the upstream and downstream land-use practices in the Bear River basin may provide suitable habitat for noxious weeds and invasive plant species in the Bear River. Regardless of the continued operation of the Cutler Project, *Phragmites* and other noxious weeds will likely continue to spread through and along the Bear River corridor, U.P. railroad tracks, and various other roads and linear disturbed areas that foster weed growth and spread.

Section 3.3.1.3, [Geology, Soils, and Sediment] Cumulative Effects, concluded that the proposed extended operating conditions would be expected to continue to cause limited indirect effects on sedimentation associated with recreational activities (e.g., wave action from watercraft).

However, these effects would be limited in geographic and temporal scope to the reservoir during the summer recreation season. Increases in erosion or sedimentation in the Bear River

basin downstream of the Project would not be expected. Therefore, cumulative effects for noxious weeds and invasive plants would be minimal and limited to the reservoir area.

3.3.7 WILDLIFE AND HABITAT

This section provides information on terrestrial wildlife and wildlife habitat including upland, wetland, littoral, and open water habitats within the Project Boundary. Terrestrial wildlife is defined herein as any species that is not exclusively aquatic, including birds, mammals, reptiles, terrestrial mollusks, and amphibians. Although referred to as “terrestrial,” this includes semi-aquatic wildlife species that may use both upland and wetland/waters habitat. Species and habitats that are exclusively aquatic—such as fish, benthic macroinvertebrates, and aquatic mollusks—are discussed in Section 3.3.5, Fish and Aquatics. Vegetation and plants are presented in Section 3.3.6, Botanical Resources, but are summarized here as needed as part of the wildlife habitat descriptions. Federally threatened and endangered species are described in Section 3.3.8, Threatened and Endangered Species. As of fall 2020, the UDWR no longer maintains the Utah Sensitive Species List; however, the Shoreline ISR (Appendix C of PacifiCorp 2021a) investigated special status wildlife species that may have suitable habitat within the Project Boundary. As such, other special status wildlife species (e.g., formerly listed as state Sensitive) are included in this section. The geographic scope for evaluating wildlife and wildlife habitat includes all land and waters within the Project Boundary.

3.3.7.1 AFFECTED ENVIRONMENT

HABITAT

The Project is located in the Central Basin and Range ecoregion, which is characterized by mountains, foothills, dry basins, valleys, mountain slopes, alluvial fans, shrubland, grassland, and forests (Woods et al. 2001). The Cutler Dam is located in the narrow, steep-sided Cutler 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 upstream from Cutler Canyon into relatively flat and rolling land consisting of pasture, meadows, meandering river channels, marshes, wetland, agricultural land, and forest.

Upland Habitat

Uplands provide key habitat elements for many wildlife species including areas for foraging, hunting, cover, breeding, and migrating. Uplands make up approximately 2,448 acres (42 percent) of the vegetated habitats within the Project Boundary. Upland habitat types located within the Project Boundary are listed in Table 3-18, including the management unit(s) where the habitat type is found (see Figure 1-1 for locations of management units). Habitat types were mapped and classified by NatureServe (2009) using remote sensing.

TABLE 3-18 UPLAND HABITAT TYPES WITHIN THE PROJECT BOUNDARY

HABITAT TYPE	MANAGEMENT UNIT LOCATION	DESCRIPTION	APPROXIMATE ACREAGE IN PROJECT BOUNDARY
Inter-Mountain Basins Big Sagebrush Shrubland	Cutler Canyon	Lower elevations between mountains and foothills in Cutler Canyon and near Cutler Dam	91
Rocky Mountain Bigtooth Maple Ravine Woodland	Cutler Canyon	Cool ravines, hills, slopes forests, woodlands	12
Great Basin Pinyon-Juniper Woodland	Cutler Canyon	Dry mountain ranges and foothills at lower elevations	84
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland	Cutler Canyon	Lower elevation montane zone, variable depending on temperature and moisture	4
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland	Cutler Canyon	Lower elevation cool ravines and north-facing slopes	7
Inter-Mountain Basins Semi-Desert Shrub-Steppe	Cutler Canyon	Lower elevation alluvial fans and flats; graminoids, shrubs, woody plants	6
Inter-Mountain Basins Semi-Desert Grassland	Cutler Canyon	Dry, low elevation grasslands, swales,	103

HABITAT TYPE	MANAGEMENT UNIT LOCATION	DESCRIPTION	APPROXIMATE ACREAGE IN PROJECT BOUNDARY
		playas, alluvial flats, plains	
Introduced Upland Vegetation - Annual Grassland	Cutler Canyon, North Marsh, South Marsh	Invasive species, weeds	70
Introduced Upland Vegetation - Perennial Grassland and Forbland	Cutler 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	Cutler Canyon, Reservoir, North Marsh, South Marsh	Cultivated crops, hay, pastures	2,035

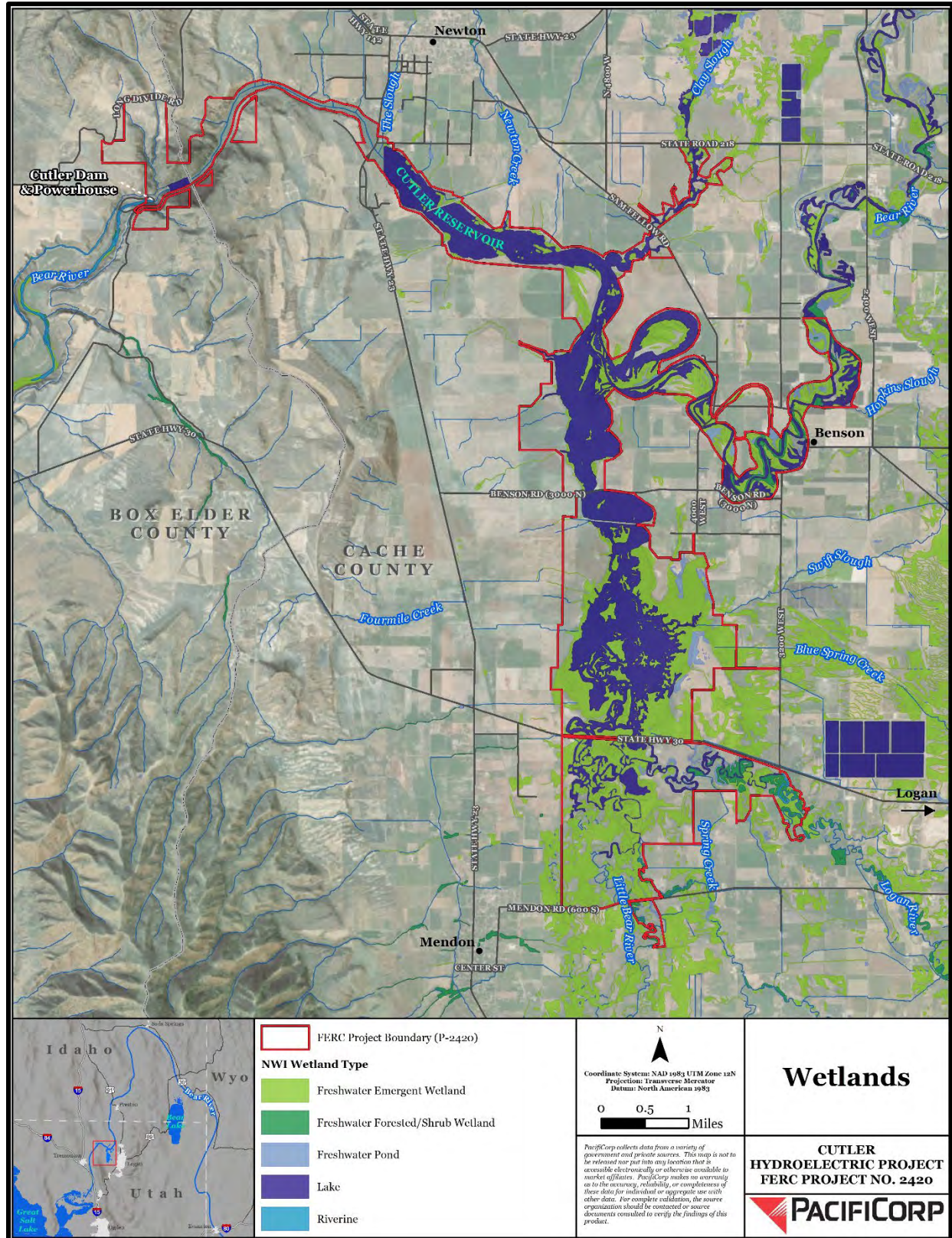
Source: NatureServe 2009

Wetland Habitat

This section provides an overview of the wetland and waters habitats, as mapped by the USFWS NWI Program (USFWS 2018), followed by more site-specific descriptions of the littoral and open water habitat found along the Cutler Reservoir shoreline.

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 numerous waterfowl and wildlife species. Open water habitats provide habitat for several freshwater fish and other food sources for terrestrial wildlife. These habitats and the presence of upland wildlife, waterfowl, and fish provide opportunities for hiking, hunting, fishing, and wildlife viewing. The large marshes coupled with dense herbaceous and emergent 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 3-25 and Table 3-19 present the acreage and location of NWI-mapped wetland and waters habitats within the Project Boundary. The NWI mapping is based only on aerial imagery interpretation and the classifications, and acreages may not precisely mirror current conditions within the Project Area. However, the information provides a useful, albeit preliminary overview of the wetland and water habitats available in the area.



**FIGURE 3-25 NWI WETLAND HABITAT IDENTIFIED WITHIN THE PROJECT BOUNDARY
BASED ON USFWS NWI DATA**

TABLE 3-19 PERCENT AND ACREAGE OF USFWS NWI WETLANDS WITHIN THE PROJECT BOUNDARY

WETLAND TYPE	PERCENT OF PROJECT	ACRES
Lake	50%	3,053.4
Freshwater Pond	3%	186.1
Riverine	1%	56.6
Freshwater Emergent Wetland	43%	2,597.9
Freshwater Forested/Shrub Wetland	3%	171.1
Total		6,065.1

Source: USFWS 2018

The most commonly occurring NWI type (note that the acreages of NWI wetlands, including open water, do not match other figures in this Exhibit E regarding surface area of open water as they were derived through entirely different means) 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. The littoral zone is the part of a lake or river that is close to the shoreline. The zone extends from the high-water mark to areas that are permanently submerged and sufficient sunlight enters the water to support plant growth. The littoral zone within the Cutler Reservoir includes both open water and emergent marsh vegetated reservoir bed along the shoreline. Due to their location within and along the reservoir shoreline, littoral and open water habitats are further described in a separate section below due to their higher potential for being affected by proposed reservoir operations.

Freshwater emergent (herbaceous) 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 that provides excellent habitat for waterfowl and wildlife. The largest emergent wetland complexes are the North and South Marshes (Figure 1-1). The herbaceous wetlands are dominated by cattail, bulrush, sedges, rushes, and the invasive reed canary grass and common reed (*Phragmites*). Species found in wetland habitats are presented in detail in Section 3.3.6, Botanical Resources.

Riverine habitats account for the smallest NWI wetland type (57 acres or 1 percent). These habitats consist of open water aquatic habitat with unconsolidated bottoms within a channel. The

system is bound on the landward side by uplands or wetlands. Substrates are variable and range from coarse to fine. Riverine habitat is further discussed later in this Exhibit E.

Forested and shrub-dominated wetlands account for the smallest portion of terrestrial vegetated 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 cottonwood, box elder, crack willow, poplar, green ash, and shrub willows and red-osier dogwood (PacifiCorp 1991).

Littoral and Open Water Habitat

As described above, littoral and open water habitat is a type of wetland/waters habitat. Given that littoral habitat is located along the margins of the reservoir where water is shallow (also referred to as the “transition zone” of the reservoir), it has the highest potential to be affected by proposed reservoir operations. Therefore, the area of littoral and open water habitat under current reservoir operations is described in greater detail here to provide a baseline that can be used to compare any changes in habitat area that might occur under proposed operations. The potential for proposed operations to affect littoral and open water habitat is evaluated below.

The littoral zone is the interface between the deeper water and the surrounding lands, and it receives and accumulates sediment and nutrients that can support a wide variety of plants and animals. The littoral zone provides important habitat for fish and wildlife, including providing important foraging habitat for many bird species during the breeding and non-breeding season. Waterfowl feed on a variety of submerged aquatic vegetation often found within the littoral zone.

Table 3-20 provides information on the change in surface area of open water at the upper (4,407.5 feet) and lowest possible (4,406.0 feet) WSEs under current operating conditions (as measured at Cutler Dam). The open water acreage presented in Table 3-20 is derived from the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a), where open water was modeled using LiDAR data (also see the description in Section 3.3). As such, the open water acreage presented in Table 3-20 is slightly higher than the total reservoir area stated in Section 1.0 and other Exhibit E sections, as it includes areas that are a mosaic of open water and flooded

wetlands/emergent marsh, given that these areas of flooded wetlands are difficult to parse out from true open water habitat using LiDAR-derived digital terrain data. In this case, these flooded wetland habitats actually function as open water habitats and therefore were left combined as “open water/flooded wetlands”. These open water/flooded wetland acreages reflect spring through fall conditions, as the existing winter WSE can be as low as 4,406.0 feet.

Under current operations, the changes in water level result in a fluctuation of the type of habitat within the littoral zone, but the littoral zone itself and the overall amount of littoral habitat do not change with the water level fluctuations. The hydraulic modeling conducted as part of the ISR predicted a decrease in open water/flooded wetland habitat at the 4,406.0 WSE, under current normal operations. However, as previously described, accuracy of the hydraulic model is more limited in the shallow (less than 6 inches deep) transition zone areas. Aerial drone photos taken during the 2019 drawdown of the reservoir shoreline when the elevation was more than a foot below WSE 4,406.0 at numerous locations around the reservoir show almost no exposed reservoir bed and very little additional reservoir shoreline/bank.

TABLE 3-20 MODELLED EXTENT OF OPEN WATER AND TRANSITION ZONE HABITAT AT THE LOW AND HIGH SURFACE WATER ELEVATIONS OF THE CURRENT OPERATING RANGE

MANAGEMENT UNIT	OPEN WATER AT WSE 4,407.5 (ACRES)	OPEN WATER AT WSE 4,406.0 ^a (ACRES)	PERCENT CHANGE IN OPEN WATER ^b	TRANSITION ZONE HABITAT AT WSE 4,406.0 (ACRES) ^c
Cutler Canyon	183	178	3%	3
Reservoir	1,185	1,008	15%	125
Bear River	430	371	14%	50
South Marsh	99	75	24%	17
North Marsh	994	822	17%	121
Reservoir Totals	2,891	2,454	15%	316

Source: These data were sourced from the hydraulic modeling discussed in Appendix G of PacifiCorp 2021a, and are corrected from the DLA version.

WSE = Water surface elevation

^a Open water was calculated at the lowest winter WSE of 4,406.0 to reflect the broadest change in open water under current normal operations.

^b Percent change in predicted open water is the percent difference of open water at the lower WSE 4,406.0 compared to the upper WSE of 4,407.5.

^c Predicted increase in transition zone habitat based on the predicted decrease in open water.

Throughout the reservoir, there are varying water depth classes that support different species of plants, animals, and invertebrates (Attachment G-14 of PacifiCorp 2021a); these water depth classes are representative of distinct habitat types. For example, many avian species utilize specific water depth classes in the reservoir for foraging. As water depths fluctuate with Project operations, the amount and availability of these water depth-driven habitat types also shifts.

A hydraulic model was prepared as part of the Hydraulic Modeling ISR to model water fluctuations during existing conditions (Appendix G of PacifiCorp 2021a). Data from that model is presented in Table 3-21 and provides the minimum and maximum amount (acres measured at the water surface) of various water depth classes over the 10-day period of the WSE fluctuation from WSE 4,407.5 to WSE 4,406.5 (this represents the lowest WSE during the fall and spring periods and is comparable to the proposed normal operating elevation range, rather than 4,406.0, which is the existing license lowest winter WSE). The table also shows the change in each depth class. Generally, the shallower depths (as previously noted, also the areas with the greatest model uncertainty) and the 50 to 200 centimeters depth class experience a more substantial change in amount of habitat available during the fluctuation period.

TABLE 3-21 EXTENT OF WATER DEPTH CLASSES UNDER EXISTING OPERATIONS^a

WATER DEPTH CLASS (CENTIMETERS)	MAXIMUM AREA (ACRES)^b	MINIMUM AREA (ACRES)	CHANGE IN AREA (ACRES)	CHANGE IN AREA (PERCENT)
0 to 4	63	33	30	48%
0 to 12	221	115	107	48%
0 to 15	275	155	120	44%
0 to 20	344	230	114	33%
0 to 30	493	407	86	17%
18 to 40	381	337	44	11%
0 to 40	691	578	113	16%
0 to 100	1,952	1,879	72	4%
0 to 150	2,458	2,256	202	8%
0 to 200	2,644	2,360	284	11%
50 to 200	1,907	1,335	572	30%
0 to 250	2,726	2,423	303	11%
0 to 300	2,778	2,466	312	11%
0 to 400	2,840	2,518	322	11%
0 to 500	2,878	2,547	331	12%
All Depths	2,907	2,581	327	11%

^a Existing operations is the fluctuation of water depths from WSE 4,407.5 to WSE 4,406.5 (although the range currently extends to 4,406.0 in winter) over a 10-day period.

^b As with the open water acreages presented in Table 3-20, open water acreages were modeled using the hydraulic modeling data conducted as part of the ISR and include open water and flooded wetland areas. However, maximum and minimum areas are larger than presented in Table 3-20 due to slight differences in the habitat analysis methods (e.g., differences in timing of the area measurement of each depth class).

Sensitive / Unique Wildlife Habitat Areas

Several areas of sensitive or unique wildlife habitat are monitored at least annually in accordance with the Cutler Resource Management Plan (RMP) and PacifiCorp's Vegetation Enhancement Program. These sites (as listed in the RMP [PacifiCorp 1995a]) include the spring in Cutler Canyon, two osprey nest platforms near Benson Marina, burrowing owl (*Athene cunicularia*) nest boxes, erosion control sedimentation basins, the ibis/gull/tern nesting colony located on islands in the North Marsh, the great blue heron (*Ardea herodias*) nesting colony in the South Marsh, and six pastures around the Logan River that serve as wildlife food and cover plots (PacifiCorp 2018). Results of the regular monitoring and reporting help track the effectiveness of mitigation measures for improving and protecting wildlife utilization of these habitats, and provide a snapshot as to the species diversity and relative abundance that may be present in the various unique wildlife habitat areas.

WILDLIFE

The Project is located within the Bear River watershed. The 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. The watershed supports habitat for more than 300 species of birds, 100 mammal species, approximately 20 reptile species, and 12 amphibian species (USFWS 2013).

Mammals

Small mammals that may occur in the Project Area include bats and rodents such as 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. A full list of mammals potentially occurring in the Project Area can be found in the PAD (PacifiCorp 2019).

Mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus nelsoni*) are managed by the State of Utah. 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. Year-round elk habitat is located southwest of the Project Boundary, and approximately 253 acres of winter elk habitat is located within the Project Boundary north of the Cutler Dam and Powerhouse (PacifiCorp 2019).

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. Nineteen reptiles and amphibians have the potential to be found in the Project Area (PacifiCorp 2018; Appendix C of PacifiCorp 2019) and include snakes, lizards, frogs, toads, and salamanders.

Mollusks

The Deseret mountainsnail (*Oreohelix peripherica*) is a terrestrial mollusk that was once listed as a species of concern for the state of Utah. The UDWR no longer maintains the Utah Sensitive Species List, and the Deseret mountainsnail is no longer classified as a sensitive species. UDWR

staff conducted surveys in 2020 for the snail on north-facing slopes of the south side of Cutler Canyon, above the reservoir / Bear River in the vicinity of Cutler Dam. The survey locations searched potential habitat and were based on historic records for the species. UDWR staff confirmed the Deseret mountainsnail was present in several locations (Appendix C of PacifiCorp 2021a). The locations and habitats where the snail was observed would not be affected by the proposed extended operations, and this species is not discussed further in this Exhibit E.

Birds

Approximately 170 species of birds are known to occur within the Bear River watershed including raptors, waterfowl, songbirds, and passerines. A full list of the birds can be found in the PAD (PacifiCorp 2019).

Some bird species such as the great blue heron (*Ardea herodias*), white-faced ibis (*Plegadis chihi*), snowy egrets (*Egretta thula*), Caspian terns (*Hydroprogne caspia*), Canada goose (*Branta canadensis*), several gull species, and sandhill crane (*Grus canadensis*) nest and roost in the marsh and feed in nearby pastures and agricultural fields. Numerous bird species including waterfowl, grebes, and pelicans rely on marshes at the reservoir for their primary foraging areas. Raptors such as eagles, hawks, owls, and falcons feed and nest throughout the Project Area including marshes, wetland areas, riparian areas, uplands, and rocky cliffs. Habitat is also present within the Project Boundary for upland game species including chukar (*Alectoris chukar*), Hungarian partridge (*Perdix perdix*), ring-necked pheasant (*Phasianus colchicus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), and wild turkey (*Meleagris gallopavo*). Birds that rely on shoreline habitat types, such as colonial nesting birds, are further discussed in the sections below due to their increased potential for exposure to changes in Project operations.

Colonial Nesting Waterbirds

Several islands exist throughout the reservoir and present suitable habitat for colonial nesting waterbirds such as ibis, gulls, egrets, and terns. Colonial nesting waterbirds are those species that gather in large assemblages during the nesting season and obtain all or most of their food from the water. The Cutler Reservoir and marsh areas have been designated as a Globally Important

Bird Area (IBA) by the National Audubon Society due to habitat suitability and use by white-faced ibis (*Plegadis chihi*), a globally imperiled species. During formal surveys from 2013 to 2017, over 5 percent of the global population of white-faced ibis was counted in Cutler Marsh (PacifiCorp 2018). The Global IBA designation and the large number of white-faced ibis that nest in the area make the islands a highly valuable habitat component of the Cutler Reservoir.

During existing operations, fluctuating water levels do not result in the formation of any land bridges to the colonial nesting bird islands (note that the location of this colonial nesting activity can change from year to year between the islands and sometimes disappears completely for a year or two before it returns). Therefore, the islands can currently only be accessed by wildlife and predator species via flying, swimming, or walking across ice during frozen conditions. Based on concerns expressed during scoping that the proposed extended operating conditions could result in additional access and increase predator presence on the islands, an additional analysis was conducted as part of the Shoreline Study and correlated ISR (Appendix C of PacifiCorp 2021a) to determine if predators currently access the islands under existing operating conditions and WSEs. The results of the study inform the existing conditions related to predator access to the islands and are therefore presented here.

Remote cameras were placed in 19 locations near core colonial bird nesting areas from February 25 to July 2, 2020, to determine if predators were accessing the nesting areas by swimming, wading, or walking across ice. The study was intended to determine if predators access the core colonial nesting bird areas under existing operating conditions and did not attempt to determine the frequency or rate of predator presence. During this time frame, operational conditions were within the required range limits, and the water level did not drop below 4,406.73 feet at Cutler Dam (the operational range at the beginning of the study period was 4,407.5 feet to 4,406.0 feet as allowed December to March and transitioned to the normal elevation range of 4,407.5 feet to 4,406.5 feet just a few weeks after the study started).

The analysis returned 119 images that documented the presence of predators at 10 of the 19 sites. Large portions of the reservoir were frozen from February 25 to March 1, and 40 of the predator images documented predators walking over ice during this time period. The remaining images documented predators swimming in open water. At 6 of the 10 sites where predator detections occurred, the only predator detections were of predators walking over ice. Predators documented

included (mostly) raccoons and an American mink. This fieldwork confirms that small terrestrial predators currently access the islands during both frozen and open water conditions under current reservoir operations.

Special Status Wildlife Species

A desktop analysis and literature review was conducted as part of the Shoreline ISR to determine the special status terrestrial wildlife that may be present within the Project Boundary, and are dependent on open water and riparian/wetland habitats. Sources used to identify special status wildlife species include the Utah Sensitive Species List²⁰, the USFS Intermountain Region Sensitive Species list, and the USFWS list of migratory birds (Appendix C of PacifiCorp 2021a). A complete list of these species can be found in the Shoreline ISR.

Data on habitat requirements was then further examined for each species. If suitable habitat was present for a species within the Project Boundary, and that habitat was determined to be subject to potential changes due to proposed extended Project operations, that species was moved forward for further analysis. Species were not moved forward for analysis if any of the following were true: the species utilizes habitat that would not be affected by changing water levels; the species migrates and is not present in the area during the winter months; or the species hibernates in upland terrestrial habitats during the winter months. Species that either migrate or hibernate in uplands during the winter months (November through March) were removed because proposed extended operations would not occur during this time period, and therefore those species were not anticipated to experience any direct effects from the Project. A detailed description of how the initial list of special status wildlife species was formulated can be found in the Shoreline ISR (Appendix C of PacifiCorp 2021a).

The final list of species that rely on the potentially affected wetland, riparian, or littoral habitats and that have the potential to be affected by changing WSEs due to the proposed reservoir operations is provided in Table 3-22. The 55 species listed in the table are all classified as migratory birds that are present during the non-breeding season. There are no mammals, reptiles,

²⁰ As of fall 2020, the UDWR no longer maintains the Utah Sensitive Species List; as such, there are no state-listed threatened or endangered species for the State of Utah.

amphibians, or mollusks identified as sensitive species within the Project Area that could be potentially affected by the proposed extended operations.

Following the identification of the avian species listed in Table 3-22, weekly field surveys were conducted between November 2020 through March 2021 to identify species occurrence at the Cutler Reservoir. Surveys were conducted at six survey units that covered approximately 20 percent of the reservoir. The surveys were intended to determine which species of the 55 identified are actually present in the area during the winter months, and their abundance within the surveyed area. Details on survey methods can be found in the Shoreline USR (Appendix B of PacifiCorp 2021b).

Forty-one species were observed during the surveys. Thirty-six of the species were identified as potentially present during the desktop analysis and were already listed in Table 3-22. The table also provides the number of birds observed for each of the 36 species. The other five species observed were near or flying over the survey units and include black-billed magpie (*Pica hudsonia*), red-winged black bird (*Agelaius phoeniceus*), ring-necked pheasant, rough-legged hawk (*Buteo lagopus*), and sandhill crane. These upland species do not rely on aquatic habitat for foraging, and would not be affected by changing water levels. Therefore, they are not discussed further in this analysis.

TABLE 3-22 WILDLIFE SPECIES POTENTIALLY AFFECTED BY PROJECT OPERATIONS

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
Birds			
American Avocet <i>Recurvirostra americana</i>	Forage shallow open waters (0-20 centimeters deep); present substantially more in shallow open waters than other habitats, including short emergent habitat.	Migratory	27
American Coot <i>Fulica americana</i>	Forage in aquatic habitat as well as upland habitat. Generally, utilize water less than 6 meters deep to dive for submerged vascular plants and aquatic invertebrates. Tend to prefer habitat close to cover, typically along stands of emergent vegetation. Also forage on dry land, including agricultural fields and other areas far from water.	Migratory	3,367

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
American Pipit <i>Anthus rubescens</i>	Forage on the ground and can be found along streams, ponds, and wetlands. Will wade into shallow water to forage.	Migratory	0
American White Pelican <i>Pelecanus erythrorhynchos</i>	Forage in water with islands for resting and nesting.	Migratory	6
American Wigeon <i>Mareca americana</i>	Forage in shallow wetlands, mudflats, and slow-moving water, water's edge, upland habitat near water, or in areas where they can steal food from other diving ducks.	Migratory	882
Bald Eagle <i>Haliaeetus leucocephalus</i>	Roosts in large trees. Generally nests in mature or old-growth trees within 2 kilometers of water.	R4 Sensitive, Migratory	13
Barrow's Goldeneye <i>Bucephala islandica</i>	Forage by diving along shorelines that are generally less than 4 meters deep. Prefer open water without emergent or submergent vegetation.	Migratory	3
Belted Kingfisher <i>Megasceryle alcyon</i>	Forage in streams, rivers, lakes, ponds, wetlands and reservoirs with abundant fish and aquatic vertebrates or invertebrates. Typically capture prey within the top 60 centimeters of the water.	Migratory	2
Black-crowned Night-heron <i>Nycticorax</i>	Use a wide variety of wetland habitat. Prefer shallow water (less than 9 centimeters deep) with emergent vegetation to wade for aquatic vertebrates and invertebrates. Typically found along the edges of the water body, often hunting from vegetation hanging over the water.	Migratory	0
Black-necked Stilt <i>Himantopus mexicanus</i>	Forage in shallow water up to the height of their breast, generally around 11 centimeters deep.	Migratory	0
Blue-winged Teal <i>Anas discors</i>	Forage in shallow water and mudflats by placing their bill, head, or whole body underwater to glean insects from submerged vegetation. Foraging water depths vary widely by food availability and season, on average water is 30 centimeters deep.	Migratory	0

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
Bonaparte's Gull <i>Chroicocephalus philadelphia</i>	Forage in a range of aquatic habitat, including wetlands, lakes, ponds, rivers, and oceans. Feed by diving into water or dipping into the surface of the water to grab fish and other small aquatic organisms.	Migratory	0
Bufflehead <i>Bucephala albeola</i>	Forage in open, shallow, water (less than 3 meters deep) where they dive for invertebrates avoiding diving into areas with dense stands of emergent or submergent vegetation.	Migratory	5
Cackling Goose <i>Branta hutchinsii</i>	Forage for both submergent vegetation as well as on short vegetation in upland habitat.	Migratory	0
California Gull <i>Larus californicus</i>	Forage in open habitat including farmland, marshes, meadows, garbage dumps, streams, and rivers.	Migratory	1,233
Canada Goose <i>Branta canadensis</i>	Forage in lakes, slow-moving rivers, marshes, mudflats, ponds, grassy fields, pastures, and agricultural fields.	Migratory	4,428
Canvasback <i>Aythya valisineria</i>	Forage in a variety of aquatic habitat, often diving to reach submerged vegetation and invertebrates diving for food in water between 0.5 and 2 meters deep.	Migratory	9
Cinnamon Teal <i>Anas cyanoptera</i>	Forage in wetland habitat, flooded areas, and marshes where they forage for aquatic vegetation and invertebrates on the surface of the water or just below the surface of the water; typically in areas less than 20 centimeters deep.	Migratory	2
Clark's Grebe <i>Aechmophorus clarkii</i>	Forage in fresh or salt water of varying depths.	Migratory	26
Common Goldeneye <i>Bucephala clangula</i>	Forage in aquatic habitat including coastal bays, estuaries, lakes, rivers, and ponds; along shallow shorelines less than 4 meters deep that have little emergent or submergent vegetation.	Migratory	115
Common Loon <i>Gavia immer</i>	Forage in large water bodies with islands and fish.	R4 Sensitive, Migratory	0
Common Merganser <i>Mergus merganser</i>	Forage in lakes, reservoirs, rivers, bays, and estuaries; typically in shallow water (less than 4 meters).	Migratory	264

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
Double-crested Cormorant <i>Phalacrocorax auritus</i>	Forage in water less than 10 meters deep with little emergent vegetation diving into mid-water or lower to catch fish.	Migratory	2
Eared Grebe <i>Podiceps nigricollis</i>	Forage in shallow wetlands, ponds and lakes, diving for fish up to 5 meters in the water.	Migratory	42
Franklin's Gull <i>Leucophaeus pipixcan</i>	Forage in flocks over wet pastures, grasslands, and fields searching for grains and insects along the ground.	Migratory	0
Gadwall <i>Anas strepera</i>	Forage in both deep and shallow wetlands, at and below the surface of the water; generally forage on submerged vegetation and seeds by head dipping or tipping.	Migratory	1,679
Great Blue Heron <i>Ardea herodias</i>	Forage in aquatic habitat, wading along the edges of water among emergent vegetation for fish and aquatic vertebrates, and occasionally in upland habitat for small mammals. Forage in water up to 40 centimeters deep.	Migratory	10
Greater Yellowlegs <i>Tringa melanoleuca</i>	Forage in aquatic habitat, generally wading in shallow water no higher than their belly (about 11 centimeters).	Migratory	0
Green-winged Teal <i>Anas carolinensis</i>	Forage in shallow water near shorelines, typically in water less than 12 centimeters deep.	Migratory	50
Herring Gull <i>Larus argentatus</i>	Forage in aquatic habitat near shallow water and exposed shores for aquatic vertebrates and fish.	Migratory	0
Hooded Merganser <i>Lophodytes cucullatus</i>	Forage in aquatic habitat, generally in open waters of rivers, lakes, creeks, and flooded forests; typically in areas with water less than 1.5 meters deep.	Migratory	0
Horned Grebe <i>Podiceps auritus</i>	Forage in small to medium freshwater ponds and marshes; in shallow water (less than 6 meters).	Migratory	0
Killdeer <i>Charadrius vociferus</i>	Forage on the ground in open habitat and shallow water, wading into the water's edge for invertebrates.	Migratory	0
Lesser Scaup <i>Aythya affinis</i>	Forage in the open water of shallow wetlands and lakes that are generally less than 5 meters deep, diving for aquatic invertebrates near the bottom substrate.	Migratory	192

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>	Forage in shallow water, mudflats, wetlands, and wet meadows probing for food in water 0 to 16 centimeters deep.	Migratory	0
Mallard <i>Anas platyrhynchos</i>	Forage in aquatic freshwater habitat, generally in shallow water near emergent vegetation; tipping their heads into the water to grab vegetation, invertebrates, and occasionally small vertebrates. Prefer water less than 40 centimeters deep.	Migratory	758
Marsh Wren <i>Cistothorus palustris</i>	Forage at or near the surface of water and among the emergent vegetation for invertebrates.	Migratory	1
Northern Pintail <i>Anas acuta</i>	Forage in shallow (less than 30 centimeters deep) freshwater wetlands and upland agricultural fields. They dabble or dive for vegetation, seeds, and invertebrates.	Migratory	206
Northern Shoveler <i>Anas clypeata</i>	Forage in freshwater wetlands in open water often skimming the surface of the water with their bills for invertebrates and vegetation.	Migratory	121
Osprey <i>Pandion haliaetus</i>	Forage in salt or freshwater habitat in both shallow and deep water; biggest requirement is the presence of fish.	Migratory	0
Pied-billed Grebe <i>Podilymbus podiceps</i>	Forage in open water by diving for submergent vegetation and dabbling among emergent vegetation.	Migratory	33
Red-breasted Merganser <i>Mergus serrator</i>	Forage in shallow (less than 5 meters) freshwater and saltwater wetland and estuarine habitat; in open water where they can dive for fish.	Migratory	11
Red-necked Phalarope <i>Phalaropus lobatus</i>	Forage in freshwater and saltwater marshes, lakes, wetlands, ponds, and flooded fields by swimming, wading, and walking in aquatic habitat where they hunt for invertebrates.	Migratory	0
Redhead <i>Aythya americana</i>	Forage in marshes, lakes, coastal lagoons, and shallow wetlands less than 1 meter deep. They dabble, dip, and dive for vegetation and invertebrates.	Migratory	133
Ring-billed Gull <i>Larus delawarensis</i>	Forage in fresh or saltwater habitat, utilizing deeper water for plunging into	Migratory	700

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
	the surface of the water, or shallower water for wading, feeding on land near water or among plowed fields.		
Ring-necked Duck <i>Aythya collaris</i>	Feed within flooded emergent vegetation and open water with submerged plants; generally, in water less than 1.5 meters deep. Feed by taking shallow dives, but also tip and dabble at the surface for plants and invertebrates.	Migratory	1
Ross's Goose <i>Chen rossii</i>	Forage in small groups, often with snow geese in open areas with short vegetation including agricultural areas, fields, and meadows near wetlands used for roosting.	Migratory	0
Ruddy Duck <i>Oxyura jamaicensis</i>	Forage in open areas of shallow water, usually within 2 meters of emergent vegetation during the breeding season. In the non-breeding season, they forage in open water with submergent vegetation, typically diving for invertebrates.	Migratory	10
Snow Goose <i>Chen caerulescens</i>	Forage in freshwater and brackish marshes, slow-moving rivers, lakes, impoundments, and farm fields.	Migratory	59
Trumpeter Swan <i>Cygnus buccinator</i>	Forage in freshwater ponds, lakes, or marshes with abundant aquatic vegetation.	R4 Sensitive, Migratory	119
Tundra Swan <i>Cygnus columbianus</i>	Forage on aquatic plants and grasses in water up to 1 meter deep and in open agricultural fields occasionally.	Migratory	50
Virginia Rail <i>Rallus limicola</i>	Forage in shallow water (typically 0–15 centimeters deep) or mudflats near and among emergent vegetation.	Migratory	0
Western Grebe <i>Aechmophorus occidentalis</i>	Forage in open fresh or saltwater/brackish lakes and marshes diving for fish.	Migratory	20
Wilson's Snipe <i>Gallinago delicata</i>	Forage in wet soils on land and in shallow water, generally in water less than 4 centimeters deep probing for larval insects and other invertebrates.	Migratory	3
Wood Duck <i>Aix sponsa</i>	Forage in flooded timber and shallow wetlands with dense emergent	Migratory	0

SPECIES NAME	HABITAT	STATUS ^a	NUMBER OBSERVED ^b
	vegetation in areas 18–40 centimeters deep along the edges of flooded areas.		

Sources: *Shoreline Initial Study Report* (Appendix C of PacifiCorp 2021a) and *Shoreline Updated Study Report* (Appendix B of PacifiCorp 2021b)

ISR = Initial Study Report; USFS = U.S. Forest Service; USFWS = U.S. Fish and Wildlife Service

^a Special status designation for each species: Migratory = USFWS migratory bird; R4 Sensitive = USFS Intermountain Region sensitive species

^b Observed during surveys as part of the Shoreline USR data collection and analysis conducted November 2020 through March 2021. Observation count data indicate the total number observed on all surveys combined, and that the individuals noted were likely counted from one week to the next; therefore, the combined survey data should not be considered to show individuals of each species actually present over the winter study period.

Of the total number of individuals observed across all species during the study period (14,582), 89.5 percent (13,047) of the observations were from seven species (American coot, American widgeon, California gull, Canada goose, gadwall, mallard, and ring-billed gull), and 73.4 percent (10,707) were from only four species that made up the vast majority of all observations over the 23-week observation period (American coot, California gull, Canada goose, and gadwall). Nineteen species were never observed; a single individual (a great blue heron) was the only bird observed at all sites collectively for the entire month of January. A total of 132 observations were made of the two Sensitive species (bald eagle and trumpeter swan) during the study period.

Invasive Wildlife Species

The USGS NAS information resource (USGS 2021) provides information related to non-indigenous species throughout the United States. The USGS defines an NAS is a species that enters a body of water or aquatic ecosystem outside of its historic or native range. This section only reviewed the semi-aquatic NAS wildlife species (e.g., amphibians); fully aquatic NASs are described in Section 3.3.3, Fish and Aquatics, including aquatic invasive species managed under PacifiCorp’s AIS policy.

Of the NAS species listed for Utah, the American bullfrog (*Lithobates catesbeianus*) is the only species considered invasive, and that is known to occur within the Project Boundary (PacifiCorp 2018). It is also the only amphibian listed on the NRCS list of invasive species for Utah (NRCS 2011).

3.3.7.2 ENVIRONMENTAL ANALYSIS

The proposed extended operations would fluctuate the reservoir WSE an additional 1.0 to 1.5 feet to a WSE of 4,405.0 feet during the lower-flow, non-irrigation season months (typically November to March, depending on river flow and temperature conditions). This section discusses the potential effects on wildlife that could result from the proposed operating conditions.

HABITAT

No habitats would be permanently impacted as the proposed extended operations would only occur during appropriate conditions outside the irrigation season (typically between November and March) over an approximate 10-day operations cycle. Fragmentation of habitats would not result from the extended operations due to the short-term nature of the proposed operations flow range regime. The potential temporary, periodic effects of proposed operations are discussed below by habitat type.

Upland Habitat

No effects on upland habitats within the Project Boundary are expected as the rate of change in water level would not lead to large bank erosion or deposition events that could influence uplands under the proposed extended operating conditions compared to the current operating conditions (also see Land Use ISR, Appendix D of PacifiCorp 2021a).

Wetland Habitat

Negligible effects on wetland habitats are expected within the Project area. As discussed above, the category of “wetland habitat” is broad, and includes wetlands associated with Cutler Reservoir, tributary streams, and the Bear River downstream of Cutler Dam. Although open water and littoral habitat are a type of wetland habitat associated with Cutler Reservoir, potential effects on this habitat is discussed in greater detail in the Littoral and Open Water Habitat subsection below.

The rates of change in water level would not lead to large erosion or deposition events that could influence wetlands under the proposed extended operating conditions compared to the current

operating conditions (Appendix D of PacifiCorp 2021a). Although WSEs would potentially be lower during the proposed extended operations compared to existing/proposed normal operations, these conditions would only persist for up to 10 days at a time during the operations cycle; this temporary change is not expected to considerably increase or decrease wetland extents or effect wetland habitat quality, particularly because it would occur during the winter months outside of the growing season.

Littoral and Open Water Habitat

The potential for proposed operations to cause increased bank erosion was evaluated above and determined that proposed operations would be unlikely to cause increased erosion along the reservoir shoreline; however, proposed operations would allow the continued recreational use of motorboats and jet skis, which are known to contribute to a certain amount of reservoir shoreline erosion due to wave action. Hydraulic modeling results indicate that the proposed extended operating conditions would not result in a significant increase in bed sediment erosion and would not lead to a significant amount of net bed scour or deposition within the reservoir (Appendix G of PacifiCorp 2021a).

The proposed extended operations could occur from November through March, and it is likely that much of the surface water of the reservoir would be frozen for a large portion of this time frame. The amount and location of ice on the reservoir during proposed extended operations is expected to be similar to conditions during existing operations, and any changes in the amount of ice or exposed reservoir shoreline is expected to be negligible, as the extended operating range would not be used during extreme ice-forming periods.

The remainder of this section discusses potential changes in the extent of open water, and depth classes, as associated with avian winter habitat in Cutler Reservoir, as indicated by the hydraulic modeling of the proposed extended operating conditions (Appendix G). The proposed extended operating range would lower the WSE, resulting in changes to the location of the shoreline, the amount of open water, and the amount and location of the various water depth habitat classes. The overall depth and gradient of Cutler Reservoir is shallow. As a result, the horizontal distance between the existing and proposed minimum pool shorelines could potentially be greater in

lower gradient areas. In turn, these changes could potentially affect the spatial and temporal distribution of species-specific suitable habitat within the Project Boundary.

Table 3-23 provides the modeled area of open water/flooded wetland and transition zone habitat at the current and proposed upper WSE of 4,407.5 feet, the current/proposed normal lowest (winter) WSE of 4,406.0 feet, and the proposed extended WSE of 4,405.0 feet within the five management units shown in Figure 1-1. As described above, the acreage of open water/flooded wetland areas were derived from LiDAR data as part of the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a) and include open water as well as flooded wetlands. Details on the hydraulic model, including accuracy limitations in the shallow transition zones, are described in Section 3.3.

The hydraulic model predicted that the proposed normal operations could result in an approximately 15 percent change in shallow transition area from full pool WSE of 4,407.5 to the proposed low WSE of 4,406.0 (which is the same amount of change as under current reservoir operations). The model also predicts that proposed extended operations could potentially result in an additional 7 percent change in area of open water and transition zone at WSE 4,405.0 compared to the current/proposed low WSE of 4,406.0. However, although the model predicted a decrease in the area of open water during proposed extended operations, this is not expected to result in substantive, if any, corresponding increase in the area of exposed reservoir bed. As described in Section 3.3, the hydraulic model accuracy decreases in the shallow transition zones within the reservoir, and observations during the 2019 experimental drawdown did not document a notable (and in many photographs was undetectable) increase in exposed reservoir bed or bank (see photographs presented in Attachment B to this Exhibit E, taken at or below the proposed extended operation low WSE 4,405.0). As previously noted, these modelled changes are not visually apparent in the aerial photo series taken near the approximate high WSE level and several inches below the lowest extended operating range WSE of 4,405.0 feet. Therefore, compared to current conditions there would be no changes to the overall amount of the littoral zone habitat under the proposed normal operating conditions, while the proposed extended operations could potentially result in seasonal, episodic effects to the amount of shallow transition area and reservoir shoreline within the littoral zone.

TABLE 3-23 MODELED EXTENT OF OPEN WATER HABITAT AND TRANSITION ZONE UNDER THE CURRENT/PROPOSED NORMAL COMPARED TO PROPOSED EXTENDED OPERATIONS

MANAGEMENT UNIT	OPEN WATER AT WSE 4,407.5 (ACRES)	CURRENT / PROPOSED NORMAL OPERATIONS			PROPOSED EXTENDED OPERATIONS		
		OPEN WATER AT WSE 4,406.0 ^a (ACRES)	CHANGE IN OPEN WATER ^b (PERCENT)	TRANSITION ZONE HABITAT ^c AT WSE 4,406.0 (ACRES)	OPEN WATER AT WSE 4,405.0 (ACRES)	ADDITIONAL CHANGE IN OPEN WATER ^a (PERCENT)	ADDITIONAL TRANSITION ZONE HABITAT ^c AT WSE 4,405.0 (ACRES)
Cutler Canyon	183	178	3%	5	171	4%	7
Reservoir	1,185	1008	15%	177	902	11%	106
Bear River	430	371	14%	59	363	2%	8
South Marsh	99	75	24%	24	70	6%	5
North Marsh	994	822	17%	172	777	5%	45
Totals	2,891	2454	15%	437	2,283	7%	171

Source: These data were sourced from the hydraulic modeling discussed in Appendix G of PacifiCorp 2021a, and are corrected from the DLA version.

WSE = Water surface elevation

^a Open water was calculated at the lowest winter WSE of 4,406.0 to reflect the broadest change in open water under current normal operations.

^b Percent change in predicted open water is the percent difference of open water under current proposed operations (lower WSE 4,406.0 compared to the upper WSE of 4,407.5) and proposed extended operations additional change (lower WSE 4,405.0 compared to the current lower WSE of 4,406.0).

^c Predicted increase in transition zone habitat based on the predicted decrease in open water.

As described above, the hydraulic model calculated water levels and surface areas for the existing/proposed normal operating conditions and the proposed extended operating conditions over a 10-day WSE fluctuation period. Those data were broken down into 16 water depth classes that represent habitat types for migratory bird species listed in Table 3-22, as each species utilizes a specific water depth class for foraging during the non-breeding season.

To assess potential changes to the water depth classes (as opposed to surface area), the output from the hydraulic model was used to indicate where each water depth class was located under proposed normal versus extended operating scenarios. The resulting polygons were then compared to calculate the extent of overlap in suitable habitat between the two operating scenarios. The modeled results for each depth class are presented in figures and graphs in the Shoreline USR (Figure 5 through Figure 20, Appendix B of PacifiCorp 2021b) to illustrate the changes spatially and temporally. The results indicate the greatest change between the two operating regimes generally would potentially occur between days 5 and 9, and there is little differentiation between the two operating scenarios at both the beginning and end of each 10-day period.

The spatial data are summarized in Table 3-24 for the modeled 10-day WSE fluctuation period when water levels could change and habitat locations could therefore shift. The minimum and maximum amounts—measured in acres at the surface of the water—of the 16 water depth classes are provided for proposed normal versus extended operating conditions. The *Change in Area* columns indicate the degree to which habitat types could potentially increase or decrease for each operating scenario over the proposed 10-day period. The table also compares the two scenarios and calculates the difference in minimum and maximum acreages of each water depth class, and provides the difference of the shift of water depths experienced under each scenario.

In summary, under the proposed extended operating conditions, the modeling in the Shoreline ISR predicted the following potential changes:

- The **minimum** acreage would be maintained, or slightly increase, for water depth classes from zero up to 40 centimeters.
- The **minimum** acreage would decrease for the remaining deeper water depth classes.

- The **maximum** acreage would increase for water depth classes between zero to 100 centimeters, with substantial increases for depth classes zero to 20 centimeters, zero to 30 centimeters, zero to 40 centimeters, and 18 to 40 centimeters.
- The **maximum** acreage would decrease for the remaining deeper water depth classes under the proposed conditions.
- The changes in the area of each water depth class over the 10-day period would be greater under the proposed conditions compared to existing conditions for all depth classes except for zero to 12 centimeters.

These effects on the water depth classes would be short-term, occurring periodically over 10-day periods during the extended operations (typically November through March). Depth classes zero to 30 centimeters, zero to 40 centimeters, 18 to 50 centimeters, and 50 to 200 centimeters were modelled to potentially experience up to a 25 percent or greater change from current/proposed normal to proposed extended conditions. The remaining depth classes were modelled to potentially experience less than a 25 percent change under proposed extended conditions.

TABLE 3-24 MODELED EXTENT OF WATER DEPTH CLASSES UNDER PROPOSED OPERATIONS

WATER DEPTH CLASS (CENTIMETERS)	PROPOSED EXTENDED OPERATIONS (ACRES)				PROPOSED NORMAL AND EXTENDED OPERATIONS COMPARED (ACRES)			
	MINIMUM AREA (ACRES)	MAXIMUM AREA (ACRES)	CHANGE IN AREA (ACRES)	CHANGE IN AREA (PERCENT)	MINIMUM AREA VARIANCE (ACRES)	MAXIMUM AREA VARIANCE (ACRES)	CHANGE IN AREA VARIANCE (ACRES)	CHANGE IN AREA (PERCENT)
0–4	33	69	37	53%	0	7	7	5%
0–12	130	222	92	41%	15	1	-14	-7%
0–15	166	302	135	45%	12	27	15	1%
0–20	230	447	217	49%	0	103	103	15%
0–30	408	811	403	50%	1	318	317	32%
0–40	578	1,019	441	43%	0	329	329	27%
18–40	312	650	338	52%	-26	269	295	41%
0–100	1,859	1,954	95	5%	-21	2	23	1%
0–150	2,022	2,452	430	18%	-234	-7	228	9%
0–200	2,098	2,637	539	20%	-262	-7	255	10%
50–200	853	1,898	1,045	55%	-482	-9	473	25%
0–250	2,148	2,718	570	21%	-275	-8	267	10%
0–300	2,182	2,770	588	21%	-284	-8	276	10%
0–400	2,229	2,832	603	21%	-289	-8	282	10%
0–500	2,246	2,870	624	22%	-301	-8	293	10%
All Water Depths	2,284	2,899	616	21%	-297	-8	289	10%

Note: As with the open water acreages presented in Table 3-20, open water acreages were modeled in this table using the hydraulic modeling data conducted as part of the ISR (Appendix G of PacifiCorp 2021a) and include open water and flooded wetland areas. However, maximum and minimum areas are larger than presented due to slight differences in the habitat analysis methods (e.g., differences in timing of the measurement of the area of each depth class).

Sensitive / Unique Wildlife Habitats

Proposed operations are not expected to affect any of the sensitive or unique wildlife habitats listed above. Potential effects on two of the sensitive habitats—ibis/gull/tern nesting colony located on islands in the North Marsh, and the great blue heron nesting colony located in the South Marsh—are further discussed below in the Colonial Nesting Birds subsection.

Under the proposed extended operations, PacifiCorp would continue to monitor the sensitive and unique habitat areas. Though no effects to these habitats are expected, any effects observed would be addressed in accordance with the pending new Project management plans described in Section 3.3.5.3, [Protection, Mitigation, and Enhancement Measures] New Proposed Measures.

WILDLIFE

The proposed extended operations of the reservoir could potentially affect wildlife, including migratory bird and waterfowl habitat, and mammals and herptiles (reptiles and amphibians) that use littoral and shallow areas of the reservoir. The following potential effects were evaluated:

- Proposed operations may expose more shoreline, thus modifying waterfowl and shorebird habitat compared to current conditions;
- Potential changes to the amount of and composition of riparian areas may affect wildlife that use these areas for cover, migration, and food.

Mammals

Because bats hibernate during the winter months when the proposed extended operations would occur, the proposed Project would have no effect on bats. Upland habitats would not be affected, and use of those areas by mammals are anticipated to be unchanged/unaffected. The winter ranges for mule deer and elk overlap a portion of the Project Boundary near the Cutler Dam. No effects on habitats in this area are anticipated; therefore, there would be no effect to deer and elk. Although shifts in littoral habitat could occur during the proposed extended operations, sufficient suitable habitat is available throughout the Project Boundary for mammal species using littoral

habitat. Any modifications to mammal species use of habitats resulting from the proposed extended operations would be negligible.

Reptiles and Amphibians

No effects on snakes, lizards, and upland toads are anticipated. Due to their ectotherm (sometimes termed cold-blooded) biology, these reptiles and amphibians are inactive in upland areas during cold winter months and enter a state of brumation, similar to hibernation. These species would likely be inactive during the majority of the proposed extended operating conditions, and their habitats would not be affected.

Minor effects could potentially occur on toads, frogs, and salamanders that utilize the wetlands and littoral habitats at the reservoir from November through March, when the proposed extended operating conditions would occur. These amphibians are also inactive during cold winter months. Inactive species located above the OHWL are anticipated to have no effect during the extended operations, as habitat conditions would not be affected.

Any species that utilize open water at the shoreline and the littoral zone below the OHWL from November to March could be affected due to the reduced shoreline and shift of open water during the extended operating conditions. Because of the cold temperatures and frozen water experienced during these months, it is anticipated that most of the amphibians would be inactive during this time frame. Some shifts of habitat utilization could occur, with individuals moving to more suitable habitats within the reservoir that experience less variation during extended operating conditions. Any effects to amphibian species would occur to individuals and population level impacts are not anticipated.

Birds

Because the proposed extended operating conditions would only occur when conditions allow outside of irrigation season (typically during the winter months from November through March), any potential effects would primarily be on those species that are present during winter and non-breeding time frames. Effects on breeding birds would likely be minor, as March is typically outside of or the beginning of nesting season for most birds in Utah. Birds that utilize and rely primarily on upland habitats would not be affected as no impacts to those habitats are

anticipated. Birds that occasionally utilize the reservoir and open water habitats would be negligibly affected as sufficient suitable habitat is available throughout the Project Boundary, and the birds would continue to be able to access suitable habitat. Species that rely heavily upon the wetland, riparian, and littoral habitats are discussed in the next sections.

Colonial Nesting Waterbirds

Although the proposed extended operations would occur during the winter months and mostly outside the nesting season for most species, extended operations could potentially occur through March, especially in years when colder temperatures delay the onset of higher water flow in the system, which could overlap the beginning of the nesting season (recall that the extended range operations cannot be utilized during higher flows, and start to decrease in effectiveness starting around 2,500 cfs).

Hydraulic modeling of the proposed extended operating conditions (Appendix G, PacifiCorp 2021a) indicates that no land bridges would form at the lower WSE of 4,405.0 feet, and no additional access would be created for predators to the islands where colonial nesting waterbirds are present. Therefore, it is assumed that predator access to the islands would continue at existing levels. Given that the proposed extended operations would typically occur outside of the breeding season and that no land bridges would be formed, there would be no potential effects on breeding birds located on islands within the reservoir due to predator access.

Special Status Wildlife Species

The proposed extended operating conditions would potentially alter WSEs and could directly affect the habitat near the shoreline including wetland, riparian, and littoral habitats. Wildlife that utilize these habitats may also be affected by the proposed operating conditions.

As presented above Proposed operations are not expected to affect any of the sensitive or unique wildlife habitats listed above, each of the species identified in Table 3-22 utilizes specific water depth classes for foraging during the non-breeding season. The proposed extended operating conditions would potentially decrease the WSE, shifting the acreage and location of each water depth class compared to the current operating conditions. This, in turn, could potentially affect

the extent and spatial and temporal distribution of species-specific suitable habitat in the Study Area (Appendix B of PacifiCorp 2021b).

Under the proposed extended operating conditions, a potential shift in habitat usage for all species that currently utilize the reservoir could be expected given the modelled temporary and short-term potential changes in habitat location at all water depth classes (Attachment G-14, Appendix G of PacifiCorp 2021a). Generally, the wider range of the depth class, the more overlapping habitat that would be present when compared to existing and proposed operating conditions (Figure 5 through Figure 20, Appendix B of PacifiCorp 2021b). Narrower ranges typically had little overlapping areas. Thus, species that have preferred habitat with narrow depth class ranges could potentially be more affected by the proposed extended operations due to shifts in habitat locations throughout the reservoir.

For most of the areas analyzed, even during the period where the location of the habitat was the most dissimilar, habitat was often located within the same general area under the proposed extended operating range (Figure 5 through Figure 20, Appendix B of PacifiCorp 2021b). Thus, waterbirds potentially utilizing the reservoir during the proposed extended operating conditions would be able to locate suitable habitat at any given time and adjust their habitat usage. This small shift in habitat location is not expected to negatively affect avian populations, particularly given that 74 to 90 percent of the documented winter season usage occurred with four to seven bird species, respectively, including some of the most common overwintering species at Cutler: American Coot, California Gull, Canada Goose, and Gadwall. Further, a single Great Blue Heron individual was the only bird observed for a month (January) during all weekly habitat occupancy surveys.

Table 3-25 summarizes the potential effects for non-breeding migratory bird species that are known to occur within the Project Area during proposed extended operating conditions. This information is based on the foraging habitat requirements for each species in Table 3-22 and the data provided in Table 3-23 and Table 3-24. Species that were not observed during field surveys are not included in Table 3-25 or analyzed further in this section because it is assumed that the proposed extended operating conditions and any potential changes in habitat would have a negligible effect on those species should they occur or pass through the Project Area.

As summarized in Table 3-25, in areas throughout the reservoir, it is anticipated that the location of specific depth classes and preferred habitat for various avian species could potentially shift under the proposed extended operating conditions. Birds would potentially have to adjust their locations accordingly to their preferred habitat, or there would be a temporary displacement of the birds from the reservoir until the appropriate water depth classes were restored within the cyclic 10-day operating period. Any species utilizing areas with a great amount of overlap between existing and proposed conditions would not have to potentially change their habitat use to a great extent, although some shifts may be expected. Under the modelled proposed operating conditions, species using habitats in shallower depth classes would potentially have more suitable habitat over the 10-day period, and species utilizing deeper areas in the reservoir would potentially have less suitable habitat over the 10-day period.

The amount of habitat available under both operating conditions is only dissimilar for short periods of time, with the amount of habitat across the entire reservoir returning to its original level during the beginning and end of each 10-day WSE fluctuation cycle. This short-term loss of habitat is not likely to affect usage of the reservoir for species over the long-term, particularly as avian species are among the most mobile wildlife species, such that potential short-term shifts to nearby appropriate habitat would likely have negligible impacts to affected bird populations.

Results of the avian field surveys conducted as part of the Shoreline USR in November 2020 through March 2021 indicate that most of the birds observed during the surveys appear to utilize the reservoir as temporary habitat during migration as they were only observed during November and late-February to March. These species would be present for only a portion of the winter, limiting how often they could potentially be affected by changing water levels in the reservoir. Furthermore, winter temperatures often led to the reservoir becoming completely, or almost frozen, limiting its suitability for waterbirds. It is expected that the reservoir would be in a frozen condition for a portion of the winter, resulting in less use by waterbirds and decreased impacts from proposed operating conditions.

The changes to habitat and water depth classes that could potentially occur as a result of the proposed extended operating conditions are anticipated to have short-term, negligible to minor effects on avian species that may be present within the Project Boundary.

TABLE 3-25 EFFECTS ON HABITAT AND SPECIES DURING PROPOSED OPERATING CONDITIONS

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–4 centimeters	Wilson’s snipe	Habitats would shift to different areas with little overlap between existing and proposed operating conditions. During most days in the 10-day cycle of proposed extended operations, more habitat of this water depth class would exist in the Project Area than under current conditions.	Wilson’s snipes are declining at the local (surrounding states) and national level. The proposed operating conditions would add more habitat and may result in a beneficial impact on Wilson’s snipes, especially given the limited habitat availability throughout the reservoir.
0–12 centimeters	Green-winged teal	Habitats would shift to different areas with little overlap between existing and proposed operating conditions. During most days in the 10-day cycle of proposed extended operations, the same amount or more habitat of this water depth class would exist in the Project Area than under current conditions.	Green-winged teals are declining at the local (surrounding states) and national level. The amount of habitat would mostly stay the same or increase and may result in a beneficial impact on green-winged teal, especially given the limited habitat availability throughout the reservoir.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–15 centimeters	Snow goose	Habitats would shift to different areas with little overlap between existing and proposed operating conditions. During most days in the 10-day cycle of proposed extended operations, the same amount or more habitat of this water depth class would exist in the Project Area than under current conditions.	<p>There are no known population trends for snow geese in the Project vicinity. Given that snow geese appear to be utilizing the reservoir as resting habitat and the reservoir will continue to provide resting habitat even at its lowest levels, no impacts to snow geese are expected.</p> <p>Snow geese are likely to continue to utilize areas with suitable resting habitat under the proposed operating conditions.</p>
0–20 centimeters	American avocet Cinnamon teal	Habitats would shift to different areas with little overlap between existing and proposed operating conditions. Throughout the 10-day cycle of proposed extended operations, the same amount or more habitat of this water depth class would exist in the Project Area than under current conditions	American avocet population trends are stable. Cinnamon teal are declining in Idaho, Wyoming, and across the United States but are increasing in Utah, suggesting that Utah habitat might be important for the population. The proposed extended operating conditions would potentially provide the same or more habitat and may therefore result in a beneficial impact on American avocet and cinnamon teal, especially given the currently limited habitat availability throughout the reservoir.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–30 centimeters	Northern pintail Trumpeter swan	There would be the same amount or substantially more habitat of this water depth class, in mostly the same areas, over the 10-day cycle of proposed extended operations.	No known population trends for trumpeter swans exist in the Project vicinity. Northern pintail are declining locally (surrounding states) and nationally. The proposed conditions would provide the same or more habitat and may result in a beneficial impact on northern pintails and trumpeter swans.
0–40 centimeters	Great blue heron Mallard Marsh wren	There would be the same amount or substantially more habitat of this water depth class, in mostly the same areas, over the 10-day cycle of proposed extended operations.	Great blue heron and mallard population trends are stable. Marsh wren population trends are increasing. The proposed conditions would provide the same or more habitat and may result in a beneficial impact on these species.
18–40 centimeters	Gadwall	During most days in the 10-day cycle of proposed extended operations, the same amount or more habitat of this water depth class would exist in the Project Area than under current conditions.	Gadwall population trends are stable to slightly increasing. The proposed conditions would provide the same or more habitat and may result in a beneficial impact on gadwall.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–100 centimeters	Redhead Tundra swan	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. During most days in the 10-day cycle of proposed operations, the same amount or slightly less habitat of this water depth class would potentially exist in the Project Area than under current conditions.	<p>Redheads are declining in Idaho, Wyoming, and across the United States but are increasing in Utah, suggesting that Utah habitat may be important for the population. The proposed conditions would reduce the amount of habitat available during the 10-day period. Given the large numbers of redhead and importance of habitat in Utah, this could negatively impact redhead populations.</p> <p>No population trend data is available for tundra swans. However, given the large amount of habitat available and limited decrease in habitat across the entire reservoir, impacts to tundra swans would likely be minimal.</p>
0–150 centimeters	Ring-necked duck	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. Under proposed conditions, the same amount or less habitat of this water depth class would exist in the Project Area than under current conditions.	Ring-necked ducks have increasing population trends locally (surrounding states) and nationally. Given that only a single ring-necked duck was observed during field surveys and a large amount of habitat would be available throughout the reservoir, impacts would likely be minimal for this species.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–200 centimeters	Ruddy duck	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less habitat of this water depth class relative to current operations for most of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable.	Ruddy duck populations are stable. Given the limited number observed during the field survey and the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for this species.
50–200 centimeters	Canvasback	There would be the same or significantly less habitat of this water depth class relative to current conditions for most of the 10-day cycle of the proposed extended conditions, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Canvasback populations are stable, but no data is available for Utah. Given the limited number observed during the field survey and the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for this species.
0–250 centimeters	American white pelican	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less of this water depth class relative to current operations for much of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Pelican populations are greatly increasing locally (surrounding states) and nationally. Given the limited number observed during the field survey and the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for this species.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–300 centimeters	Bufflehead Western grebe	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less of this water depth class relative to current operations for much of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Bufflehead population trends are increasing, though no data is available for Utah. Western grebe populations appear to be stable. Given the limited number observed during the field surveys and the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for these species.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–400 centimeters	Barrow’s goldeneye Clark’s grebe Common goldeneye Common merganser	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less of this water depth class relative to current operations for much of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Barrow’s goldeneye populations are declining locally (surrounding states) and nationally. Given the limited number observed during the field survey and the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for this species. Common goldeneye populations are increasing, though no data is available for Utah or Idaho. Given the large amount of habitat that would be available, potential impacts from a temporary reduction in habitat would likely be minimal for this species. Clark’s grebe and common merganser populations are stable. Given the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for these species.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
0–500 centimeters	Eared grebe Lesser scaup Pied-billed grebe Red-breasted merganser	There is a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less of this water depth class relative to current operations for much of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Eared grebes, lesser scaups, and pied-billed grebes have stable populations. Red-breasted mergansers have a decreasing population nationally, but no data is available at the state level. Given the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for these species.
All Water Depths	American coot American wigeon Bald eagle Belted kingfisher California gull Canada goose Double-crested cormorant Northern shoveler Ring-billed gull	All of the units have a large amount of overlap between the current operating conditions and the proposed extended operating conditions. There would be less of this water depth class relative to current operations for much of the 10-day cycle of the proposed extended operations, with most of the acreage reduction occurring on the margins and the central areas remaining suitable or expanding inward.	Northern shoveler and ring-billed gull population trends are stable, while bald eagle, Canada goose, and double-crested cormorants have increasing population trends. Given the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for these species. American coots, American wigeons, belted kingfishers, and California gulls have declining population trends. Given the large amount of habitat that would be available, impacts from a temporary reduction in habitat would likely be minimal for these species.

Invasive Wildlife Species

As described in the Affected Environment section, the American bullfrog is the only semi-aquatic invasive species known to occur within the Project Boundary. Effects on this species would be similar to those described above for impacts to other amphibians. Proposed operations would also not promote the introduction or spread of this species into the Project Boundary. The remaining NAS are not known to occur in the area, and there would be no effect on those species.

3.3.7.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

This section provides a description of existing, proposed, and recommended PM&E measures as related to wildlife and wildlife habitat.

EXISTING MEASURES

A summary of existing PM&E measures is included in Section 2.1.4, Existing Environmental Measures. Measures required in the current license (FERC 1994) relevant to wildlife and wildlife habitat that are expected to be carried forward or required under a new license (with potential updates) are presented below including management plans.

Current License Articles

- License Article 401: Sets operating range and compliance limits in order to balance the needs of wildlife, recreation, irrigation, and power generation.
- License Article 402: Develop a Resource Management Plan.

Under the current license, the following measures were required to be included in the Cutler 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.

- Vegetate buffer adjacent to reservoir between Highway 30 and Highway 23 bridges, stabilize 2 miles of shoreline by planting deep-rooted shrubs and willows, plant 12 woody vegetation pockets 0.5 to 2 acres in size, reseed 50 acres of tilled ground for grassland buffer, and install 6 miles of cattle exclusion fencing.

The above measures were incorporated into the Cutler RMP Vegetation Enhancement Program (PacifiCorp 1995a), and PacifiCorp has implemented numerous measures to reduce bank erosion and improve water quality, including shoreline buffers, bank stabilization efforts, and erosion control sediment basins within the shoreline buffers. Implementation of these measures resulted in increases to vegetation within the Project Area, which are a part of the existing baseline conditions considered in this document.

Further, establishment and implementation of the Agricultural Lease Management Plan has greatly improved and increased wildlife habitat in areas that were formerly managed strictly to meet agricultural production priorities, and now are managed to improve wildlife habitat across over 1,000 acres of habitat within the Project Boundary.

The Cutler RMP is proposed to be updated from its current form under the new license. That is, PacifiCorp proposed to update the Cutler RMP and would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP. Aspects to be included in the new Cutler RMP relevant to this resource are summarized in the New Proposed Measures subsection below.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is included in Section 2.2.3, Proposed Environmental Measures. Details regarding the new proposed measures and management plans relevant to wildlife and wildlife habitat are presented here. A new Cutler RMP would be developed that incorporates many of the measures in the current Cutler RMP; all of the proposed PM&E measures relevant to wildlife will be incorporated into the new Cutler RMP which would be developed after the Project receives a FERC license Order. The new Cutler RMP is expected to include the following sub-components, relevant to wildlife and habitat:

- Wildlife monitoring
 - As part of Cutler RMP, develop and implement long-term avian monitoring program within Project Boundary (WILD-1). PacifiCorp proposes to discuss cooperative measures between potentially interested NGOs and UDWR to facilitate the long-term avian monitoring components, once initial implementation is complete.
 - Continue to cooperate with UDWR and other interested stakeholders on special status species management (i.e., implement monarch butterfly way stations, long-term avian monitoring) (SS-1).
- Wildlife habitat
 - Maintain wildlife habitat improvements, including erosion control check dams, throughout Project Boundary (WILD-2).
 - Shoreline management: Update vegetation management program within the Cutler RMP; continue to maintain and monitor shoreline buffer vegetation (BOT-1).
 - Weed management: Continue to manage and monitor weeds in the Project Boundary as part of updated vegetation management program; include new areas to target *Phragmites* and stabilize banks (BOT-2).
 - Agricultural management: Review, update, monitor, and improve existing grazing management and agricultural lease programs within the Cutler RMP (LU-1); continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve and improve their function as necessary (LU-2).

3.3.7.4 UNAVOIDABLE ADVERSE IMPACTS

Based on the potential effects assessed above, it is possible that effects to open water and transition area habitat resulting in short-term shifts of depth classes could potentially affect some avian species. Given there are no depth classes (i.e., foraging habitat types) that would be eliminated during the proposed extended operations, and because most avian species can quickly

adapt to localized shifting habitat conditions, any adverse effects to species present over the proposed extended operating range period are anticipated to be negligible. Furthermore, with the application of the proposed PM&E measures, no unavoidable adverse effects are anticipated for wildlife or wildlife habitats resulting from implementation of the proposed operations range.

3.3.8 THREATENED AND ENDANGERED SPECIES

This section reviews the federally listed T&E species found in the Project Vicinity that have potential suitable habitat or known occurrences within the Project Boundary. The Project Vicinity for T&E species is defined as Cache and Box Elder counties in Utah. For the purpose of this assessment, T&E species include any animal or plant species federally listed as threatened, endangered, candidate, or proposed, under the federal ESA. As of fall 2020, the UDWR no longer maintains the Utah Sensitive Species List; as such, there are no longer any state-listed sensitive, threatened, or endangered species for the state of Utah. However, the Shoreline Habitat Characterization ISR (Appendix C of PacifiCorp 2021a) investigated special status wildlife species that may have suitable habitat within the Project Boundary. As such, other special status wildlife species (e.g., species previously listed as state Sensitive) are included in Wildlife and Habitat.

This section also does not address other species of concern that are not ESA-listed, such as birds that are federally protected under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act, or are designated by USFWS as Birds of Conservation Concern, or species of concern identified by BLM or USFS. These non-ESA listed species of concern are discussed in Fish and Aquatics, and Wildlife and Habitat, for aquatic and terrestrial species, respectively.

3.3.8.1 AFFECTED ENVIRONMENT

The USFWS Information for Planning and Conservation (IPaC) tool for Cache and Box Elder counties identifies five federally listed species that could potentially occur in the Project Vicinity, all of which are listed as threatened (USFWS 2021; Table 3-26). Only one species, a plant, has suitable habitat and documented occurrences within the Project Boundary: the Ute ladies'-tresses orchid (*Spiranthes diluvialis*). There is no suitable habitat within the Project Boundary for the remaining four federally listed species (Canada lynx [*Lynx canadensis*],

yellow-billed cuckoo [*Coccyzus americanus*], Lahontan cutthroat trout [*Oncorhynchus clarkii henshawi*], and Maguire primrose [*Primula maguirei*]), and their presence within the Project Boundary is highly unlikely. Therefore, the Ute ladies'-tresses is the only T&E species further discussed in this section.

There is no USFWS-designated Critical Habitat in the Project Vicinity (USFWS 2021). Critical Habitat is proposed for western yellow-billed cuckoo in Utah outside of the Project Vicinity, along the Duchesne and Green rivers in Uintah and Duchesne counties, and along the Green River in Grand and Emery counties (Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo, 85 Fed. Reg. 39 [February 27, 2020]). There is also no EFH designated in the Project Vicinity.

TABLE 3-26 FEDERALLY LISTED SPECIES POTENTIALLY OCCURRING IN THE PROJECT VICINITY

COMMON NAME	SCIENTIFIC NAME	STATUS	SUITABLE HABITAT	SUITABLE HABITAT / DOCUMENTED IN PROJECT BOUNDARY
Canada lynx	<i>Lynx canadensis</i>	Federally threatened	Coniferous or mixed forests, with thick undergrowth for hunting, old growth with deadfall for denning and resting; Extirpated from Utah	No/No
Western yellow-billed yuckoo	<i>Coccyzus americanus</i>	Federally threatened	Forage in large stands of riparian woodlands greater than 25 contiguous acres at least 330 feet wide below 7,000 feet in elevation	No/No
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>	Federally threatened	Coldwater rivers and streams; In Utah, only known to occur (by introduction) in far western Box Elder County on the Nevada border ^a	No/No
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	Federally threatened	Vegetated shoreline and wet-mesic meadow habitat near springs, lakes, or perennial streams or rivers	Yes/Yes South Marsh Management Unit
Maguire primrose	<i>Primula maguirei</i>	Federally threatened	Cool, moss-covered dolomite cliff tops, notches, and boulders where some soil has accumulated; Endemic to Logan Canyon	No/No

Source: USFWS, 2021

^a This information comes from the *Lahontan Cutthroat Trout Fact Page and Distribution Map* (UDWR n.d.).

Ute ladies'-tresses was listed as threatened by the USFWS in 1992 due to its small population and low reproductive rate, as well as the danger of habitat loss and modification (USFWS 2004). The *Ute Ladies'-Tresses Recovery Plan* (USFWS 1995) lists impacts to wetland and riparian habitats through stream channelization, water diversions, and other wetland and stream alterations as one of the primary reasons for the species' decline.

This showy, terrestrial orchid typically has one stem approximately 5 to 20 inches tall with few-to-many white flowers clustered in a whorled spike at the top. The leaves are linear-lanceolate and can reach 11 inches long. Habitat is limited to riparian and wet meadows near lakes, rivers, or streams, sometimes with a gravelly substrate. Flowering typically begins in late July and, depending on conditions, persists into early September (NRCS 2009). Reproduction is thought to be exclusively by seed (Fertig et al. 2005), but much of this species basic biology remains unknown.

A large population of Ute ladies'-tresses occurs very near but just outside the Project Boundary in the Bear River Land Conservancy (BRLC) Mendon Meadow Preserve, and a smaller population occurs within the Project Boundary in the South Marsh Management Unit (Figure 3-26). The Ute ladies'-tresses population within the Project Boundary was most recently documented in the *Threatened and Endangered Species Initial Study Report* (referred to here as the T&E ISR, which is included as Appendix B of PacifiCorp 2021a) completed as part of the Project relicensing process. The study involved pedestrian surveys of all potential suitable habitat within the Project Boundary, primarily the riparian and wet meadow habitats in the South Marsh, North Marsh, and Bear River management units within the Project Boundary (see Figure 3-18).

The T&E ISR documented two small groups of individual Ute ladies'-tresses in the South Marsh Management Unit of the Project. A total of 58 occurrences were recorded over the three survey years, although many occurrences consisted of multiple orchids. There were no documented occurrences anywhere else within the Project Boundary, despite extensive searches during the second and third study seasons. The locations of occurrences (with a 1,000-foot buffer) are

presented in Figure 3-26.²¹ The study did not document occurrences in the surface-irrigated wet meadows or shoreline habitat along Cutler Reservoir, Bear River, Little Bear River, or Logan River. It should be noted that because most surveys for Ute ladies'-tresses report the number of flowering plants, such counts tend to underestimate the number of total plants, as they do not include vegetative or below-ground dormant plants (which can be difficult to impossible to find in the grassy wet meadows that the species inhabits at Cutler). As such, it is expected that the actual number of individual orchids within the Project Boundary is potentially higher than was documented in the 2018-2020 surveys. However, the nearby and closely monitored Mendon Meadow population (whose numbers fluctuate from hundreds to thousands of individuals from year to year, e.g., from 3,000 to 300 in subsequent years) appears to have more suitable habitat, although the precise habitat parameters are not known. The Mendon Meadows site is more sub-irrigated than the Cutler site, but the two areas are otherwise quite similar. The Cutler site appears to be more of a fringe population than the Mendon Meadows site.

Most of the orchid occurrences were found in sub-irrigated wet meadows where soils remained moist to wet in later summer (e.g., August). All occupied sub-irrigated habitat was located higher than the water surface elevation of Cutler Reservoir, and at such a distance (e.g., generally greater than 1 mile) that it was assumed to be independent of the WSE in the reservoir. The sub-surface hydrology in occupied habitat was assumed to be driven by lateral movement of groundwater sources (e.g., from the local foothills, within and outside the Project Boundary delivering water to adjacent lands), as well as surface water and groundwater associated with the Little Bear River and other tributaries entering the reservoir from the south that is associated with water delivery to nearby agricultural lands. The hydrologic observations of Ute ladies'-tresses habitat within the Project Boundary were consistent with (although in lower volume) the hydrology that supports the Mendon Meadows population of the species, which occurs in a sub-irrigated wet meadow located to the southwest of the Cutler plants and is associated with groundwater from the Wellsville Mountains and foothills.

²¹ Federal regulations require that locations of threatened and endangered plant species be treated as privileged and confidential to protect the sites and species. Therefore, exact locations have not been provided.

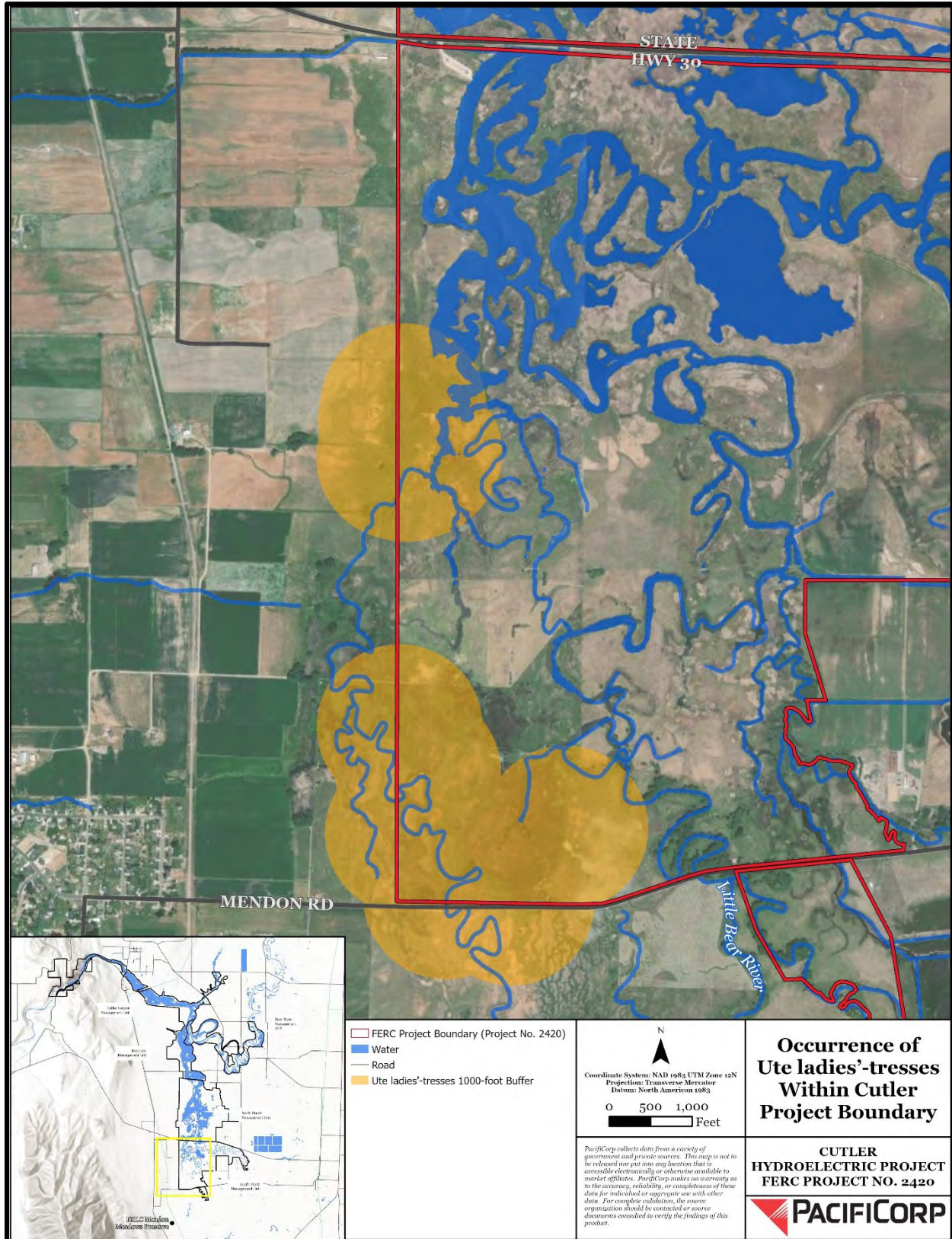


FIGURE 3-26 UTE LADIES'-TRESSES OCCURRENCE WITHIN THE PROJECT BOUNDARY

Ute ladies'-tresses was found in two sub-irrigated wet meadow habitat types. Habitat type 1 is a wet meadow that occurs along the margins of low-lying swales supporting cattails (*Typha latifolia*) and Olney's three-square bulrush (*Scirpus americanus*). These swales appear to be historic river channels that may flow intermittently or have standing water in the spring. In these habitats, Ute ladies'-tresses occur in the transition zone between the cattail-bulrush habitat and adjoining upland areas. Depending on the topography of the swale and adjacent upland, the transition between cattail-bulrush habitat and uplands can occur over a short horizontal distance (i.e., less than 20 feet). Habitat type 2 is also a wet meadow with a seasonally high water table, where soil conditions were dry to moist during the August 2020 survey. The topography is flat, supporting a large seasonally wet meadow characterized by Nuttall's sunflower (*Helianthus nuttalli*), creeping bentgrass (*Agrostis stolonifera*), Baltic rush (*Juncus balticus*), Indian paintbrush (*Castilleja exilis*), and western ragweed (*Ambrosia psilostachya*). No occurrences were found in cattail or bulrush habitat, which the T&E ISR concluded was too wet and densely vegetated to support Ute ladies'-tresses.

Pastures within the Project Boundary (and at Mendon Meadows) with occupied Ute ladies'-tresses habitat have been grazed by livestock over the life of the current license period. Potential effects of grazing to this species are therefore discussed below.

3.3.8.2 ENVIRONMENTAL ANALYSIS

This section describes potential effects of the Project to Ute ladies'-tresses and their habitat. Potential effects to other sensitive plant and wildlife species are discussed in Botanical Resources, and Wildlife and Habitat, respectively.

Three potential effects of the proposed Project were evaluated:

1. The potential for reservoir WSE fluctuations during operations to cause changes to hydrology in wetland habitats adjacent to the reservoir;
2. The potential for invasive weed establishment on exposed shoreline or substrate during the fluctuations, which could lead to habitat degradation and competition with Ute ladies'-tresses if the weeds were to spread into areas of suitable habitat; and

3. Habitat management (grazing, which is used to maintain wildlife habitat objectives) in the South Marsh Management Unit of the Project where the occupied habitat is located.

No additional construction, operation, or maintenance activities are expected to have any effect on this species or habitat.

PROPOSED RESERVOIR OPERATIONS

Under existing operations, the water level in Cutler Reservoir (the operating range) fluctuates between 1 and 1.5 feet seasonally (Section 2.1.3, Existing Project Operations). Under the proposed Project operations, during the irrigation season (typically April to October) the reservoir would fluctuate the same as under current operations (up to 1 foot). During the period outside the irrigation season, when inflows are not high (typically November to March), the reservoir could fluctuate in an operating range that would be potentially an additional 1.0 to 1.5 feet lower than the proposed normal/current operation regime for approximate 10-day cycles (referred to as the extended operating range). Given that there is no change to reservoir levels proposed during the growing season for Ute ladies'-tresses and given the distance from the reservoir shoreline to the Cutler habitats that contain Ute ladies'-tresses, it is not expected that the proposed extended operating range would have any impact to Ute ladies'-tresses or their wetland habitat.

Further, all occupied, sub-irrigated habitat documented for Ute ladies'-tresses is not only located at a distance from direct impacts resulting from reservoir shoreline fluctuations, it is also located at higher elevations than the nearest shoreline and related surface water elevation of Cutler Reservoir. While the reservoir is assumed to allow for the establishment and maintenance of adjacent wetland and riparian habitat beyond what would occur naturally, these habitats are below the elevation of the occupied Ute ladies'-tresses habitats, and hydrology in the occupied habitats is driven by groundwater sources rather than from the reservoir.

INVASIVE WEED ENCROACHMENT

The proposed operating range WSE fluctuations are not expected to allow invasive weeds to establish given that any areas of shoreline exposed during extended operations are expected to be very limited, and the fluctuation periods consist of short-term changes over 10-day periods that

would only occur during the winter months, outside of the growing season. In addition, aerial photos taken at WSEs that range a few more inches than the proposed extended operating range did not show any areas of exposed substrate (see photographs in Attachment B to this Exhibit E, and in the USR [PacifiCorp 2021b]). The Project would also develop a weed management plan, which would include best management practices (BMPs) to avoid and/or minimize establishment of invasive weeds in or near Ute ladies'-tresses habitat.

GRAZING

PacifiCorp allocates grazing leases as part of their Agricultural Lease Program in the South Marsh Management Unit. The grazing leases are monitored annually, with the most recent monitoring results reported in the *Cutler Resource Management Plan Five-year Monitoring Report 2013-2017* (PacifiCorp 2018).

Ute ladies'-tresses may not compete well with other vegetation and, as such, grazing outside of the flowering-fruiting period for short periods, followed by longer rest periods, is considered desirable for the species to reduce competition from other vegetation (NRCS 2011). Further, studies cited in the 2005 *Rangewide Status Review of Ute Ladies'-Tresses* (Fertig et al. 2005) have documented that occupied habitats tend to have short vegetative cover maintained by grazing, periodic flooding, or mowing. In line with this finding, haying and grazing is used to manage vegetation in the nearby BRLC Mendon Meadows Preserve, which has a significantly larger and denser population of Ute ladies'-tresses, although the Mendon site differs in some important underlying factors as well, particularly in regard to site hydrology and perhaps other unknown habitat features.

In the South Marsh Management Unit, grazing in the occupied habitats (located in the southwest and west sides of the South Marsh unit) has typically been from June 1 to August or September, depending on the precipitation received and management objectives. Given that grazing typically does occur during at least a portion of the flowering period, it is possible that consistent heavy grazing could adversely affect individual Ute ladies'-tresses or the entire South Marsh population (Figure 3-26), either by trampling or herbivory, preventing fruit production. However, the grazing management model that PacifiCorp uses for these pastures aims to minimize impacts on the orchid, as it emphasizes relatively short-duration and moderate intensity grazing, punctuated

by rest cycles. Further, grazing exclusively outside of the flowering period is not considered feasible, as it would require potentially trucking cows out of the South Marsh pastures in late July and back in September, which can be prohibitively expensive. Instead, grazing would need to be excluded from occupied habitats altogether, and as noted previously the complete lack of grazing as a moderate disturbance would potentially introduce new impacts to the population.

Mowing is also not possible in the occupied habitats due to the undulating terrain and wet ground. However, without grazing or mowing to maintain shorter vegetation, other plants may grow taller and denser, thereby creating less favorable habitat for Ute ladies'-tresses. As such, there is likely a narrow threshold between vegetation management (e.g., grazing or mowing) being beneficial versus potentially causing a detrimental effect on the South Marsh population. As described in the Protection, Mitigation, and Enhancement section below, an updated Grazing Management Plan is proposed to be developed under the new license that could include guidance on grazing timing and intensity, or analyze and monitor exclusion fencing, to both assess and minimize impacts to the South Marsh population.

It is clear, however, that not enough is known about the Ute ladies'-tresses life history to conclusively create a management approach for it at Cutler, including even such basic information as what factors influence flowering rates, whether vegetative propagation is an important form of reproduction for the orchid, what the ideal hydrologic regime is, and what impact herbivores (insect or mammalian) may have on it (Eve Davies, personal communication, 2021a). For example, regarding flowering rates, some years the Mendon population will have thousands of flowering individuals, and sometimes only hundreds, with potentially ten-fold variation in flowering stems from one year to the next (Eve Davies, personal communication, 2021b). This uncertainty is reflected in the development of appropriate PM&E measures in below.

USFWS RECOVERY PLAN

The T&E ISR field surveys and results are consistent with the *Ute Ladies’-Tresses Recovery Plan* (USFWS 1995) objectives listed, as detailed below with each relevant objective followed by findings from the T&E ISR:

- Obtain information on life history, demographics, habitat requirements, and watershed processes that will allow specification of management and population goals and monitoring progress.
 - The T&E ISR documented a new population of Ute ladies’-tresses previously undocumented prior to 2018.
- Manage watersheds to perpetuate or enhance viable populations of the orchid.
 - The T&E ISR also determined that current and proposed Project operations maintain the water level in Cutler Reservoir and, in turn, potentially (combined with lateral hydrologic sources) enhance hydrologic conditions in adjacent wetland and riparian habitats available for Ute ladies’-tresses within and outside of the Project Boundary.
- Protect and manage Ute ladies’-tresses populations in wet meadow, seep, and spring habitats.
 - As noted in the T&E ISR, PacifiCorp will continue to manage and monitor the occupied habitat in the South Marsh Management Unit to minimize impacts to Ute ladies’-tresses.

3.3.8.3 PROTECTION, ENHANCEMENT AND MITIGATION MEASURES

An updated Resource Management Plan (RMP) is proposed to be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. Section 2 presents all of the PM&E measures proposed to be implemented for the Project under a new license. Existing measures that would continue under the new license, and proposed new measures are described in greater detail below as related to the protection of Ute ladies’-tresses orchids and their habitat.

EXISTING MEASURES

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. Measures required in the current license (FERC 1994) that are expected to be carried forward or required under a new license (with potential updates), including license articles and management plans, are presented below.

- Article 402: Cutler RMP filed in 1995. Management actions relevant to the protection of Ute ladies’-tresses include: grazing and vegetation management in the South Marsh Resource Management Area. The current Cutler RMP is proposed to be revised and updated, but a similar program is expected to continue to function as the guidance for resource management for the Project. New or updated proposed management plans relevant to Ute ladies’-tresses are presented below in New Proposed Measures.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is included in Section 2.2.3, Proposed Environmental Measures. All of the proposed PM&E measures relevant to Ute ladies’-tresses and their habitat will be incorporated into the new Cutler RMP, which would be developed after the Project receives a FERC license Order. The new Cutler RMP would be developed to incorporate many of the measures in the current Cutler RMP, and is expected to include the following sub-components, relevant to the protection of Ute ladies’-tresses and their habitat. The measure number from Table 2-4 is provided for reference:

- Develop Ute ladies’-tresses management program, including monitoring, within the Project Boundary in the Cutler RMP (TE-1)
- Maintain current Ute ladies’-tresses habitat (TE-2).
- Measures that would further maintain or improve Ute ladies’-tresses habitat:
 - Shoreline management: Update vegetation management program within the Cutler RMP; continue to maintain and monitor shoreline buffer vegetation (BOT-1)

- Weed management: Continue to manage and monitor weeds in the Project Boundary as part of updated vegetation management program; include new areas to target *Phragmites* and stabilize banks (BOT-2).
- Agricultural management: Review, update, monitor, and improve existing grazing management and agricultural lease programs within the Cutler RMP (LU-1); continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve and improve their function as necessary (LU-2).

The proposed Ute ladies'-tresses management program, as a sub-component of the Cutler RMP, could help to focus each of the management aspects noted above to specifically address potential issues affecting the orchid, and add an ongoing monitoring component as discussed below.

PacifiCorp has proposed to cooperate with BRLC on additional monitoring of the Cutler population given the work that the BRLC is continuing to do regarding population monitoring and possibly other life history work at the nearby (and much larger) Mendon Meadows population. The Cutler plants may actually represent the remaining fringe of a single, larger population that is currently centered at the Mendon Meadows Preserve (although the orchids may also exist, unknown, on other nearby private lands as well). Additional monitoring may help elucidate this.

3.3.8.4 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable adverse impacts are expected to Ute ladies'-tresses or any other T&E species as a result of proposed operations and associated fluctuations in WSEs. While continued grazing in the South Marsh may affect individual Ute ladies'-tresses plants, conversely, completely removing grazing from the habitat may negatively affect this population of Ute ladies'-tresses. Further, given proposed updates to grazing management under a new license and other proposed PM&E measures, and implementation of a new Cutler Ute ladies'-tresses Management Plan, the South Marsh population is not expected to be adversely affected.

3.3.9 RECREATION

This section describes recreation facilities and opportunities within the Project Boundary and the surrounding region. The proposed Project Boundary encompasses approximately 9,277 acres (FERC 2009). With the exception of three parcels located in Cutler Canyon and 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. Table 3-27 presents the issue identified in FERC SD2 (FERC 2019b) related to recreation resources.

TABLE 3-27 RECREATION RESOURCE ISSUES IDENTIFIED IN FERC SCOPING DOCUMENT 2

ISSUE	WHERE ASSESSED	CUMULATIVE EFFECTS ANALYSIS
Effects of proposed changes to Project operation and maintenance on recreational use in the Project Area, including the adequacy of existing recreational facilities to provide access to the reservoir if reservoir level fluctuations increase.	<ul style="list-style-type: none">• <i>Recreation Resources Initial Study Report</i> (Appendix I of PacifiCorp 2021a)• FLA Exhibit E Section 3.3.7, Recreation	No

3.3.9.1 AFFECTED ENVIRONMENT

This section discusses the baseline existing conditions of the recreation resources within the Project Area and in the Project Vicinity, which is defined as within an approximate 50-mile radius of the Project encompassing northwest Utah, southeast Idaho, and southwest Wyoming. Existing recreation facilities, recreation opportunities, and recreation needs were assessed in the *Recreation Resources Initial Study Report* (Appendix I of PacifiCorp 2021a; referred to here as the “Recreation ISR”).

REGIONAL RECREATION AREAS

The Bear River passes through varied terrain in the states of Utah, Wyoming, Idaho, and back into Utah before emptying into the Great Salt Lake. With lower-lying valleys and desert ranges in the western portion, including the Great Salt Lake, and rugged mountains and plateaus on the eastern side, 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 hot summer climate, access to water is 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,²² angling, and camping adjacent to area waterbodies including lakes, rivers, and reservoirs. Major recreation areas include national forests, wilderness areas, wildlife refuges, Bear Lake, 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, which are characteristic of the Intermountain West, and multitude of available recreation areas attract recreationists year-round (Figure 3-27). During the summer when it is typically hot, valley reservoirs, rivers, and nearby forest campgrounds experience heavy use by watersport 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 in addition to ice skating, ice fishing, and snowmobiling. Fishing, hiking, biking, and bird-watching activities occur throughout the area across three seasons and year-round for some enthusiasts.

²² Non-motorized boating includes uses such as canoeing, kayaking, rafting, sail boating, and standup paddle boarding.

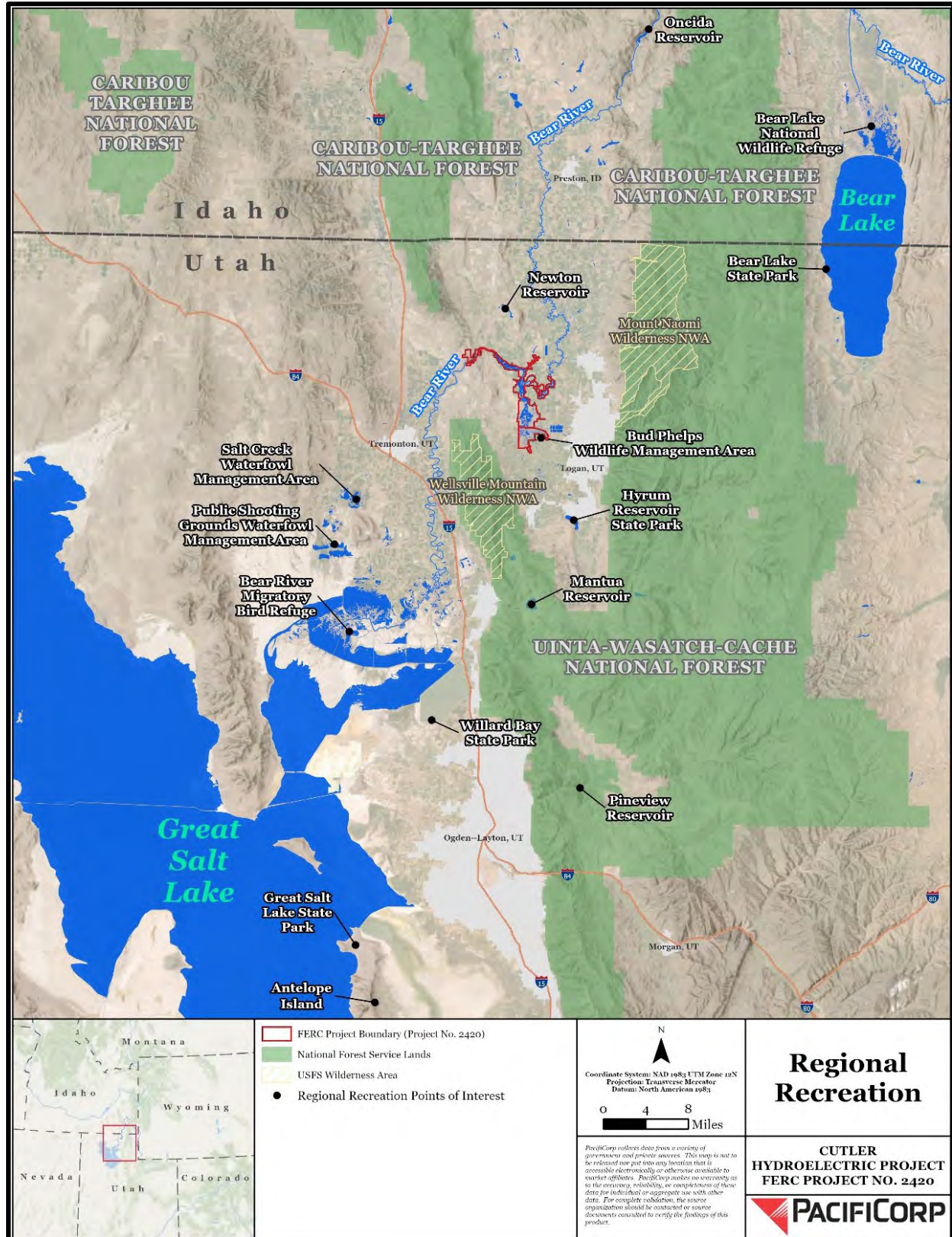


FIGURE 3-27 REGIONAL RECREATION AREAS IN UTAH AND IDAHO

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 south end 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 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). One of the premier hawk migratory observation sites in North America is located along the upper ridgeline of the wilderness area, giving unparalleled viewing opportunities to hawk and birding enthusiasts every fall (Audubon Society n.d._b).
- 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 use includes hikers, trail runners, campers, and hunters who use the area's 65 miles of trails (wilderness.net 2018).

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 (USFS 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.

Great Salt Lake

The Great Salt Lake is located southeast of the Project Boundary, with its nearest edge approximately 20 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 boating and waterfowl hunting. It is generally not used for waterskiing, fishing, or swimming. Two state parks, Antelope Island and Great Salt Lake, are located at the southern end of the lake and include day-use facilities.

Waterfowl hunting is a popular activity at the Great Salt Lake and surrounding wetlands, primarily at locations associated with the relatively large diked areas where incoming fresh water can be retained during periods (seasonally and annually) of high water. Popular waterfowl hunting areas include the Salt Creek Waterfowl Management Area, Farmington Bay Waterfowl Management Area, Public Shooting Grounds Waterfowl Management Area, and the Bear River Migratory Bird Refuge, described below.

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, approximately 22 miles from the Project. The Refuge is managed by the USFWS. 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.

Bear Lake National Wildlife Refuge

Bear Lake National Wildlife Refuge is located approximately 40 miles northeast from Cutler Reservoir and comprised of 17,600 acres at the north end of Bear Lake in Idaho, covered primarily with marsh and open water areas. It is managed as a migratory bird nesting and hunting area by the USFWS. 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.

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 the waterfowl 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 (mid-September to mid-March [UDWR 2020a]). During the waterfowl²³ hunting season, Salt Creek Waterfowl Management Area provides opportunities for waterfowl hunting, upland game²⁴ hunting, furbearer²⁵ trapping and hunting, camping, and use of motorized and non-

²³ "Waterfowl" means ducks, including mergansers, geese, brant, and swans (UDWR 2020a).

²⁴ "Upland game" means pheasant, quail, chukar partridge, gray partridge, greater sage-grouse, ruffed grouse, dusky grouse, sharp-tailed grouse, cottontail rabbit, snowshoe hare, white-tailed ptarmigan, and the following migratory game birds: American crow, bandtailed pigeon, mourning dove, white-winged dove, and sandhill crane (UDWR 2020b).

²⁵ "Furbearer" means species of the Bassariscidae, Canidae, Felidae, Mustelidae, and Castoridae families, except coyote and cougar (UDWR 2020c).

motorized boats. No vehicular access is allowed at other times of the year; fishing and dove and deer hunting are also prohibited.

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. Hunting use increased in this 13,063-acre management area 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.

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.

STATE RECREATION AREAS

Five 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. These areas include 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 Wildlife Management Area (WMA), managed by UDWR, is the closest recreation area to the Cutler Project that is not a part of the Project.

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).

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).

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, approximately 17 miles west of Salt Lake City. It contains approximately 162 acres including a marina and an area along the access road and shoreline (PacifiCorp 2019). Amenities include a year-round boat launch, 340 boat slips, restrooms, and a scenic viewpoint (GSL Marina 2021). 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).

Hyrum Reservoir

The Little Bear River feeds the 475-acre Hyrum Reservoir located beside the town of Hyrum, approximately 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 the Utah Division of Parks and Recreation since 1959. Of the park's 291 acres, 40 acres are developed for public use on two separate sites. One site includes two 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).

Bear Lake State Park

Bear Lake State Park is approximately 30 miles from Cutler Reservoir. Due to its large size and the extensive number of facilities around it, Bear Lake 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. Bear Lake is located at 5,900 feet in elevation 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 a full-service marina, campgrounds, and numerous day use sites. There are numerous boat launch facilities open to the public. Bear Lake is deep, which allows for extensive motor boating, fishing, and large boat sailing. The deep waters support a coldwater fishery popular with anglers year-round; four species of fish are endemic to Bear Lake and are found nowhere else. Water quality and clarity is outstanding, making Bear Lake attractive to swimmers and watersport enthusiasts of all types. Annual visitation to Bear Lake State Park has steadily grown from 229,669 in 2010 to a high of 638,808 in 2020, which is a 178 percent increase (Utah DNR 2021).

Bud Phelps Wildlife Management Area

The Bud Phelps WMA is adjacent to the Project Boundary at the south end of Cutler Reservoir and includes 150 acres of wetland, marsh, and associated habitats. The area is managed by UDWR and provides opportunities for hunting, birding, and wildlife viewing. Wildlife management in this area necessitates seasonal recreation closures to benefit wildlife (UDWR 2019d; Audubon Society n.d._a).

COUNTY, MUNICIPAL, AND OTHER RECREATION AREAS

There are several additional recreation areas managed by local and federal agencies within the Project Vicinity.

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 include boating; primitive camping; and fishing for perch, bluegill, sunfish, and rainbow trout.

Mantua Reservoir

Mantua Reservoir is located along U.S. 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 USFS-operated campground near the reservoir.

Pineview Reservoir

Pineview Reservoir is located on the Ogden River approximately 8 miles east of Ogden and 50 miles south of Cutler Reservoir. USFS provides recreation facilities and management. The reservoir has a surface area of 2,476 acres and a shoreline of 25 miles. Numerous campgrounds, marinas, stores, and picnic areas are located along the reservoir, 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. The water is often calm, so activities such as waterskiing, wakeboarding, and swimming are also popular (Utah.com 2021).

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. Logan Canyon is approximately 8 miles east of the south end of Cutler Reservoir. 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 (adjacent to Crystal Hot Springs less than 20 miles from the Project), and Plymouth.

EXISTING RECREATION OPPORTUNITIES INSIDE THE PROJECT BOUNDARY

A Recreation Resource Study was conducted in 2020 to identify the existing recreation opportunities, facilities, and visitor use that may be affected by Project operation and to develop measures that could be implemented to mitigate Project effects and/or enhance recreation activities. The Recreation ISR is included as Appendix I of the 2021 Project ISR (PacifiCorp 2021a). Results of the study are summarized in this Exhibit E section.

The Project offers a broad range of no-fee recreation opportunities available to the public year-round. Recreation facilities are restricted to day-use only. 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 hunting and trapping regulations.

Recreation facilities are increasingly utilized by organized groups for educational science programs (PacifiCorp 2018). This includes primary schools, secondary schools, and university classes as well as research projects. Lands and waters within the Project Boundary provide an ideal outdoor classroom to investigate terrestrial and aquatic ecosystems. In addition, numerous user groups host events at the Project Boundary 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 for most activities. The permit informs permittees of special requirements, resource constraints, and insurance requirements.

Recreation Facilities

Under the current license, PacifiCorp implemented a recreation site development program to improve public access and develop recreation facilities within the Project Boundary (PacifiCorp 2002). As part of this program, PacifiCorp developed and maintains 13 recreation facilities within the Project Boundary (Figure 3-28). The 13 sites include two hiking trails; there are also three blueway (water) canoe trails within the Project Boundary. The recreation facilities provide a range of amenities (Figure 3-28). The condition of the amenities was evaluated at each recreation site in 2020 (Figure 3-29), along with visitor impacts (Table 3-30). Visitation to recreation facilities is limited to daylight periods only. Camping is not permitted at any of the Project recreation facilities. Recreation facility hours of operation are as follows:

- April 1 to September 30, 5:00 a.m. to 10:00 p.m.
- October 1 to March 31, 5:00 a.m. to 7:00 p.m.

Annual facility maintenance typically includes the following:

- 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, and prohibitions on drones and tobacco/cannabis use)

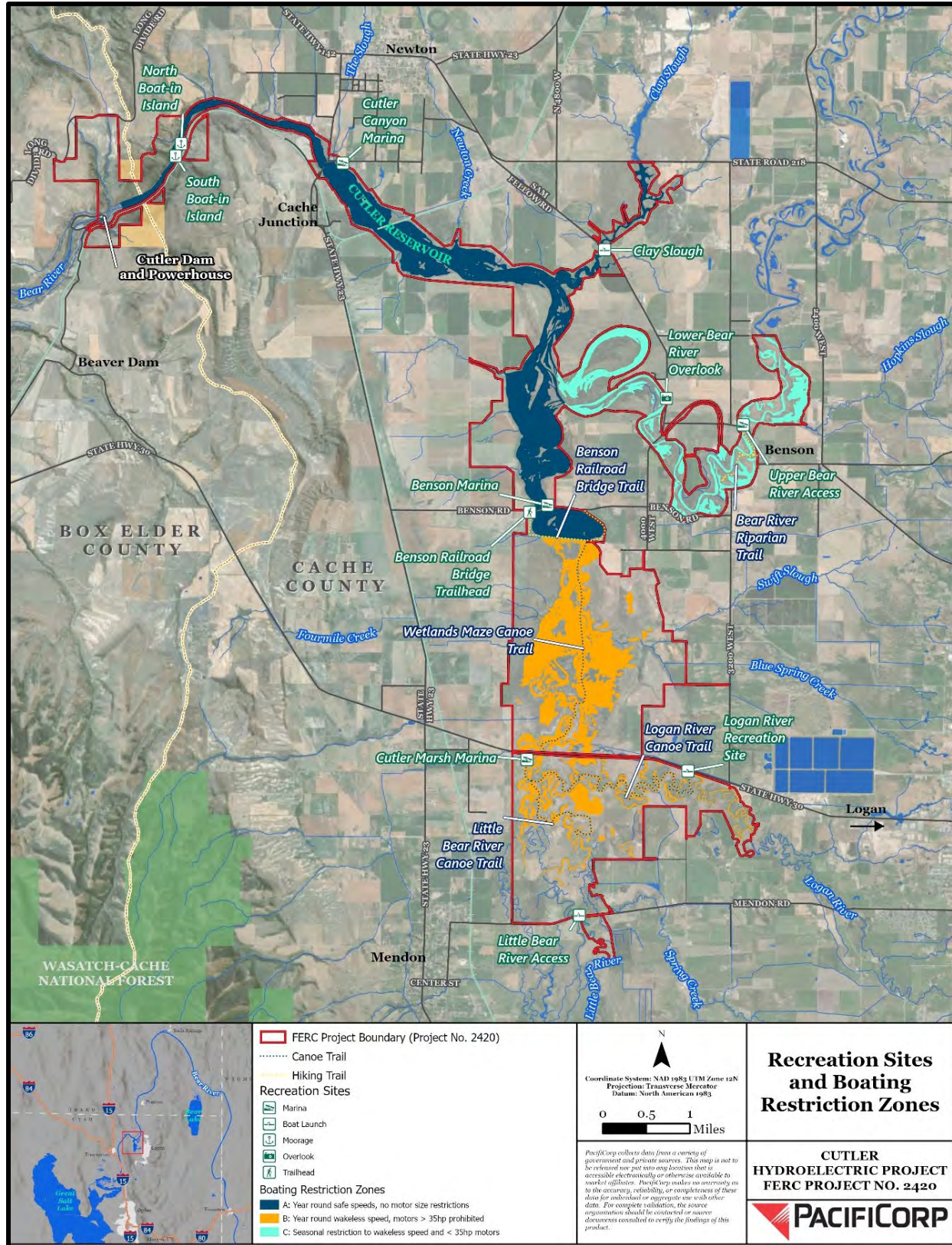
Under the current license, PacifiCorp conducts annual monitoring and files a Cutler Resource Management Plan (RMP) Monitoring Report with FERC in five-year increments. The report provides, in part, monitoring results of recreation facility condition and visitor use. PacifiCorp monitors recreation facility conditions regularly in the spring, summer, and fall seasons.

Monitoring frequency and annual start and stop dates vary by recreation facility. Monitoring is limited during the winter period. PacifiCorp will continue recreation monitoring in the current license period as described in the current Cutler RMP five-year monitoring report (PacifiCorp 2018). The next Cutler RMP monitoring report will be filed 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.

A recreation site assessment was conducted in 2020 as part of the Recreation ISR to assess site conditions, impacts of visitor use, and accessibility. A summary of the study results is as follows:

- Recreation Site Condition
 - Most of the sites evaluated are in good to excellent condition.
 - Cutler Marsh Marina was in the best condition.
- Visitor Use Impacts
 - Visitor use impacts were minimal across the recreation sites inventoried.
 - Impacts included minor vandalism, small amounts of littering, graffiti, a fire ring, as well as bare ground and loss of vegetation.
- Accessibility Assessment at Recreation Sites
 - Overall, recreation sites provide opportunities for persons with disabilities and generally meet Americans with Disabilities Act of 1990 (ADA) standards.
 - Recreation sites with vehicular access contain parking, restrooms, and at least one picnic table designed to comply with the ADA.
 - Steep topography at some recreation sites limits the ability to provide ADA-compliant access to the shoreline (one area, the Lower Bear River Overlook Site, is too steep for any access and was designed only as a viewing/picnicking area, not to provide river access).
 - Some potential improvements were identified, such as the following:
 - More signage designating handicap parking spaces; and
 - A National Park Service (2019) inventory identified specific improvements at some sites (railings on docks, concrete lip on walkways, etc.).



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

FIGURE 3-28 MAP OF PROJECT RECREATION FACILITIES AND BOATING RESTRICTION ZONES

TABLE 3-28 CUTLER HYDROELECTRIC PROJECT RECREATION FACILITY AMENITIES

SITE NAME	DAY-USE ONLY	PARKING SPACES	TRAILER PARKING SPACES	RESTROOMS	PICNIC TABLE	BAR-B-CUE GRILL	PAVILION	SWIMMING AREA	DOCK	CONCRETE BOAT RAMP	CARRY-IN BOAT LAUNCH	ANGLING	TRAIL	ENTRANCE SIGN	REGULATORY SIGN	INFORMATION BOARD	TRASH RECEPTACLE	IN-SITE PATHS	ENTRANCE ROADWAY
Bear River Riparian Trail	X	X		X									X						
Benson Marina	X	23	5	2	7	4	1	1	2	1		X		1	7	2	2	1	2
Benson Railroad Bridge Trailhead	X	4											1		1	1	1	1	
Benson Railroad Bridge Trail	X	X										X	X	1	1	1			
Clay Slough	X	4		1							X	X		1	1	1	1	1	1
Cutler Canyon Marina	X	12	10	2	2	2	X		1	1		X		1	4	1	1	1	2
Cutler Marsh Marina	X	19	10	2	6	2	1		1	1		X		2	6	2	2	1	1
Little Bear River Access	X	4		X							X	X		1	2	1	1		
Logan River Recreation Site	X	5		1					1		X	X		1	5	1		1	1
Lower Bear River Overlook	X	4		1	1									1	3	1	1		1
North Boat-in Island	X								X			X							
South Boat-in Island	X								X			X							

SITE NAME	DAY-USE ONLY	PARKING SPACES	TRAILER PARKING SPACES	RESTROOMS	PICNIC TABLE	BAR-B-CUE GRILL	PAVILION	SWIMMING AREA	DOCK	CONCRETE BOAT RAMP	CARRY-IN BOAT LAUNCH	ANGLING	TRAIL	ENTRANCE SIGN	REGULATORY SIGN	INFORMATION BOARD	TRASH RECEPTACLE	IN-SITE PATHS	ENTRANCE ROADWAY
Upper Bear River Access	X	10	3	2					1	1		X	1	1	3	1	1		1

Notes:

An X indicates that the amenity is present at the facility.

A number value indicates that the amenity is present and how many are present.

TABLE 3-29 CONDITION OF RECREATION AMENITIES

RECREATION FEATURE	BENSON RAILROAD BRIDGE TRAIL	BENSON MARINA	BENSON RAILROAD BRIDGE TRAILHEAD	CLAY SLOUGH	CUTLER CANYON RECREATION SITE	CUTLER MARSH MARINA	LITTLE BEAR RIVER ACCESS	LOGAN RIVER RECREATION SITE	LOWER BEAR RIVER OVERLOOK	UPPER BEAR RIVER ACCESS	AVERAGE CONDITION
Entrance sign	3	3	NP	4	4	4	4	3	3	3	3.4
Regulatory sign	3	3	3	4	3	4	2	3	3	3	3.1
Information board	2	2	2	3	3	4	2	3	2	4	2.7
Picnic tables	NP	4	NP	NP	3	4	NP	NP	4	NP	3.8
Grills	NP	3	NP	NP	4	4	NP	NP	NP	NP	3.7
Trash receptacle	NP	4	4	4	4	4	4	NP	4	4	4.0
Pavilion/shelter	NP	4	NP	NP	NP	4	NP	NP	NP	NP	4.0

RECREATION FEATURE	BENSON RAILROAD BRIDGE TRAIL	BENSON MARINA	BENSON RAILROAD BRIDGE TRAILHEAD	CLAY SLOUGH	CUTLER CANYON RECREATION SITE	CUTLER MARSH MARINA	LITTLE BEAR RIVER ACCESS	LOGAN RIVER RECREATION SITE	LOWER BEAR RIVER OVERLOOK	UPPER BEAR RIVER ACCESS	AVERAGE CONDITION
Restroom	NP	4	NP	4	4	4	4	4	4	4	4.0
In-site paths	NP	4	4	2	4	4	NP	4	NP	NP	3.7
Standard parking spaces	NP	4	4	4	4	4	4	4	4	4	4.0
Trailer parking spaces	NP	4	NP	NP	4	4	NP	NP	NP	4	4.0
Entrance roadway	NP	4	4	4	4	4	4	4	4	4	4.0
Boat ramp	NP	3	NP	NP	4	4	NP	NP	NP	4	3.8
Dock	NP	2	NP	NP	2	4	NP	4	NP	4	3.2
Designated swimming area	NP	4	NP	NP	NP	NP	NP	NP	NP	NP	4.0
Designated trails	NP	NP	4	NP	NP	NP	NP	NP	NP	NP	4.0
Average condition	2.7	3.5	3.6	3.6	3.6	4.0	3.4	3.6	3.5	3.8	3.6

Source: Appendix I of PacifiCorp 2021a

1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent; NP= amenity not present for rating at recreation site

TABLE 3-30 USE IMPACT OF RECREATION FEATURES

VARIABLE	QUESTION	BENSON RAILROAD BRIDGE TRAIL	BENSON MARINA	BENSON RAILROAD BRIDGE	CLAY SLOUGH	CUTLER CANYON RECREATION	CUTLER MARSH MARINA	LITTLE BEAR RIVER ACCESS	LOGAN RIVER RECREATION SITE	LOWER BEAR RIVER OVERLOOK	UPPER BEAR RIVER ACCESS	TOTAL IMPACTS
Facilities	Have the restrooms, picnic tables, pavilion, signs, and/or docks been vandalized?	N	Y	N	N	Y	Y	Y	N	N	N	4
Litter	In general, is litter found at this site?	Y	Y	N	N	N	Y	N	N	Y	N	4
Dump	Does this site get used as a dump (not just litter from camping)?	N	N	N	N	N	N	N	N	N	N	0
Fire rings	Are there user-created fire rings present?	Y	N	N	N	N	N	N	N	N	N	1
Bare ground	Does the site show signs of extensive use and loss of ground vegetation outside the designated site?	Y	Y	N	Y	N	N	Y	N	N	N	4
ATV/OHV	Does the site show signs of ATV/OHV use?	N	N	N	N	N	N	N	N	N	N	0

VARIABLE	QUESTION	BENSON RAILROAD BRIDGE TRAIL	BENSON MARINA	BENSON RAILROAD BRIDGE	CLAY SLOUGH	CUTLER CANYON RECREATION	CUTLER MARSH MARINA	LITTLE BEAR RIVER ACCESS	LOGAN RIVER RECREATION SITE	LOWER BEAR RIVER OVERLOOK	UPPER BEAR RIVER ACCESS	TOTAL IMPACTS
Vehicle access barriers	Are there management-placed barriers to prevent vehicle access to parts of the site?	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	0
	Have people moved the vehicle access barriers?	NA	N	N	N	N	N	N	N	N	N	0

Source: Appendix I of PacifiCorp 2021a

ATV = all-terrain vehicle; N = no; NA = not applicable; OHV = off-highway vehicle; Y = yes

Boat Launches

PacifiCorp developed and maintains four boat ramps within the Project Boundary: Upper Bear River Access Site (Photo 3-1), Benson Marina (Photo 3-2), Cutler Canyon Marina (Photo 3-3), and Cutler Marsh Marina (Photo 3-4). The latter three locations, located on Cutler Reservoir, provide a concrete boat ramp and adjacent dock for launching trailered boats on the 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 additional launches are within the Project Boundary: Clay Slough (Photo 3-5), Little Bear River Access (Photo 3-6), and the Logan River Access recreation site (Photo 3-7). These sites are designed for carry-in boat access and do not have a concrete boat ramp.



PHOTO 3-1 UPPER BEAR RIVER ACCESS SITE AND BOAT LAUNCH



PHOTO 3-2 BENSON MARINA RECREATION SITE AND BOAT LAUNCH



PHOTO 3-3 CUTLER CANYON MARINA RECREATION SITE AND BOAT LAUNCH



PHOTO 3-4 CUTLER MARSH MARINA RECREATION SITE AND BOAT LAUNCH



PHOTO 3-5 CLAY SLOUGH HUNTER ACCESS RECREATION SITE



PHOTO 3-6 LITTLE BEAR RIVER ACCESS SITE



PHOTO 3-7 LOGAN RIVER ACCESS RECREATION SITE

Canoe Trails

There are three canoe trails (Blueway trails, defined as a trail network based on rivers, canals, lakes, and reservoirs) within the Project Boundary: Little Bear River canoe trail, Logan River canoe trail, and the Wetlands Maze canoe trail. All three canoe trails are located in the South Boater Zone. Project boat launches provide access to each of the canoe trails. PacifiCorp conducts routine canoe trail monitoring, including trail marker monitoring between March 1 and November 30 annually depending on ice cover (PacifiCorp 2018).

Boater Use Zones

PacifiCorp, Utah State Parks, and UDWR have adopted three boater use zones for Project waters, as codified by law in Utah State Administrative Code (Figure 3-28): North Boater Zone A, South Boater Zone B, and Bear River Boater Zone C (PacifiCorp 2018). 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 horsepower (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. Boating restrictions are enforced by the local sheriff, state park rangers, and UDWR conservation officers per Utah Admin. Code R651-205-17 (2014).

Utah Boating Regulations

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 [2016]). 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 an extra oar or paddle 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 mussel or zebra mussel infested water within the last 30 days, or that the boat has been properly decontaminated.

Shoreline Management

PacifiCorp has not implemented a shoreline-specific management plan other than the shoreline management described above, 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).

Hiking Trails

The Project Area contains two hiking trails: the Benson Railroad Bridge Trail (Photo 3-8) and the Bear River Riparian Trail. The railroad bridge is a popular location for anglers and divides the North Boating Zone A from the South Boating Zone B. PacifiCorp maintains these trails for non-motorized use. Parking is available at the respective trailheads.

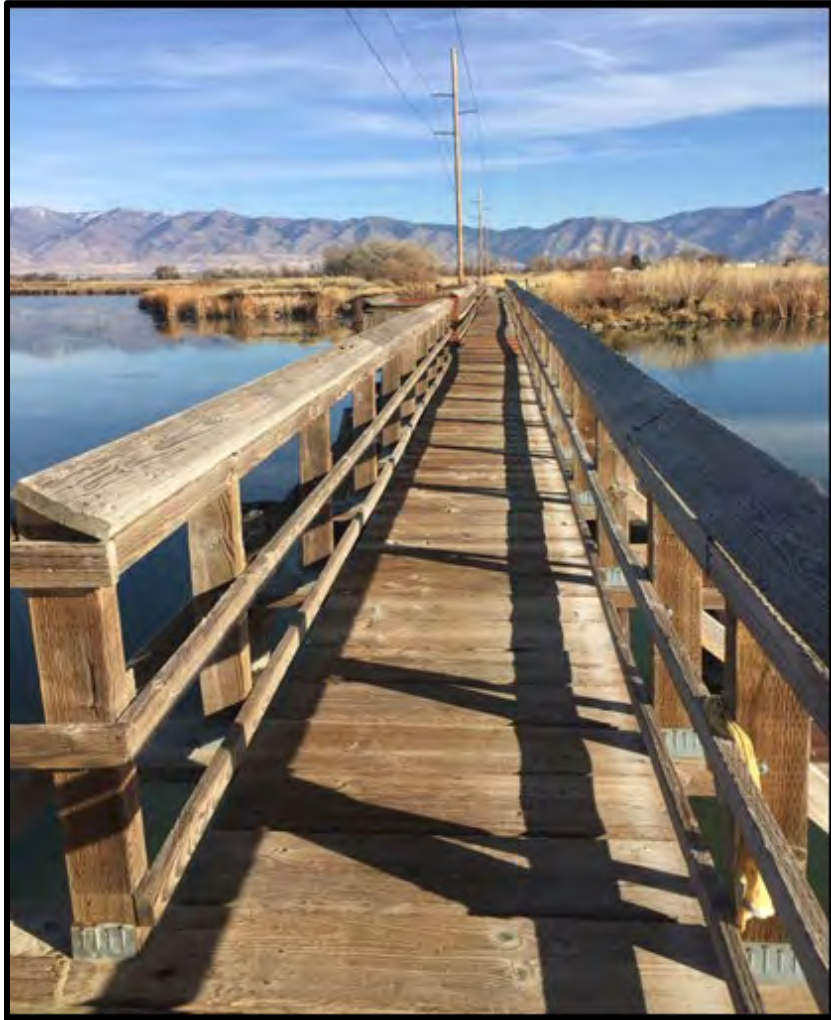


PHOTO 3-8 BENSON RAILROAD BRIDGE TRAIL AND FISHING BRIDGE

Important Bird Areas

Cutler Reservoir and Marsh were designated as an Audubon IBA in 2009 (BAS 2018). The IBA includes all lands within the Project Boundary plus sovereign lands of the Bear River, the 150-acre Bud Phelps WMA, and the 146 acres owned by Bridgerland Audubon Society (Audubon Society n.d._a) known as the Amalga Barrens Sanctuary. 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 within the Project Boundary. The IBA and a list of documented bird species is described in more detail in Section 3.3.4, Botanical Resources, and Section 3.3.5, Wildlife and Habitat, respectively.

Hunting, Fishing, and Trapping

Hunting, fishing, and trapping within the Project Boundary is regulated by UDWR. 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.

Trapping within the Project Boundary is permitted by written permission only. PacifiCorp implemented special regulations that limit the type of trapping and the season allowed on Project lands. UDWR 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, large and smallmouth bass, and walleye (Utah DNR 2017a). Fish species in the Project are further described in Section 3.3.3. Night fishing for channel catfish is popular near Benson Marina. The UDWR has established specific fishing regulations for Cutler Reservoir (UDWR 2018c).

Visitor Use

Visitor use of recreation facilities was collected in 2020 as part of the Recreation ISR (Table 3-31). Vehicle and trail counters were installed at seven sites to estimate recreation use (Table 3-32). A summary of results follows:

- The Project had 45,158 total vehicles and an estimated 116,962 visitors for the seven combined recreation sites where traffic and trail counters were installed from April 23 through November 1 (Table 3-32 and Table 3-33).
- Benson Marina had the highest estimated visitation (Table 3-34; Figure 3-29).
- Benson Railroad Bridge Trail had more use than the Bear River Riparian Trail with 8,260 visitors compared to 680 visitors. Use was highest in May with 2,207 visitors.
- The daily average number of vehicle visits for the seven sites where traffic counters were installed (266 during the peak season and 208 during the non-peak season) was less than the 474 total parking spaces available within the Project Boundary.
- The highest use was recorded in July for the recreation sites combined; June and August had the second highest use (Figure 3-30).
- May through August had the highest use for all individual sites; use was similar across these months for most sites (Figure 3-31). Benson Marina, Cutler Canyon Marina, and Little Bear River Access had a more dramatic use spikes in July.
- FERC provided the approved SPD, which authorized the requisite Cutler Relicensing Study Plans and allowed planned studies to begin in March 2020 at approximately the same time that the COVID-19 global pandemic initially began to sweep across much of the United States; the Recreation ISR notes potential uncertainties on recreation studies, including visitor counts and resultant data, that may have been introduced as a result of the pandemic, although all noted patterns fit those observed across much of the country at that time, generally with higher visitor counts than expected, based on comparisons with previous FERC Form 80 data (Appendix I, PacifiCorp 2021a).

TABLE 3-31 VISITOR USE COUNTS AT CUTLER RECREATION SITES (2020)

NUMBER	DESIGNATED RECREATION SITES	TYPE OF COUNTER
1	Bear River Riparian Trail	Trail counter
2	Benson Railroad Bridge Trail	Trail counter
3	Benson Marina	Vehicle counter
4	Clay Slough	Vehicle counter
5	Cutler Canyon Marina	Vehicle counter
6	Cutler Marsh Marina	Vehicle counter
7	Little Bear River Access	Vehicle counter

NUMBER	DESIGNATED RECREATION SITES	TYPE OF COUNTER
8	Logan River Recreation Site	Vehicle counter
9	Upper Bear River Access	Vehicle counter

Source: Appendix I of PacifiCorp 2021a

TABLE 3-32 VEHICLE COUNTS AT CUTLER RECREATION SITES (2020)

RECREATION SITE	APRIL*	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
Benson Marina	749	2,827	2,888	3,385	2,928	2,203	1,750	16,730
Clay Slough	**	**	475**	572	627	394	284	2,352
Cutler Canyon Marina	176	831	784	1,093	1,005	586**	344	4,819
Cutler Marsh Marina	234	1,021	894**	952	760	601	802	5,264
Little Bear River Access	264	964	964	1,077	963	790	949	5,971
Logan River Access	301	1,148	1,096	1,034	1,005	937	**	5,521
Upper Bear River Access	**	636	790	824	693	838	720	4,501
Total	1,724	7,427	7,891	8,937	7,981	6,349	4,849	45,158

Source: Appendix I of PacifiCorp 2021a

*April data collection limited to April 23–30, 2020

**Vehicle counter error identified. Data removed from calculations at sites listed below for respective dates:

Clay Slough Access April 23 to June 8

Cutler Canyon Marina September 1

Cutler Marsh Marina June 7 and June 16

Logan River Access October 1 to October 31

Upper Bear River Access April 23 to May 8

TABLE 3-33 ESTIMATED VISITOR COUNTS AT CUTLER RECREATION SITES (2020)

RECREATION SITE	APRIL*	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
Benson Marina	1,798	7,094	7,798	9,140	7,906	5,428	4,199	43,361
Clay Slough Access	**	**	1,281**	1,543	1,692	973	680	6,169
Cutler Canyon Marina	421	2,101	2,115	2,950	2,712	1,439**	824	12,563
Cutler Marsh Marina	560	2,559	2,414**	2,569	2,051	1,475	1,924	13,551
Little Bear River Access	632	2,395**	2,603	2,907	2,599	1,944	2,278	15,357
Logan River Access	722	2,864	2,958	2,792	2,713	2,292	**	14,341
Upper Bear River Access	**	1,616	2,133	2,223	1,871	2,047	1,728	11,618
Total	4,134	18,629	21,302	24,123	21,543	15,598	11,633	116,962

Source: Appendix I of PacifiCorp 2021a

Visitor counts are based on occupancy rates of 2.4 people per vehicle in April, May, September, and October and 2.7 people per vehicle in June through August.

*April data collection limited to April 23–30, 2020

**Vehicle counter error identified. Incorrect counts removed from calculations at sites listed below for respective dates:

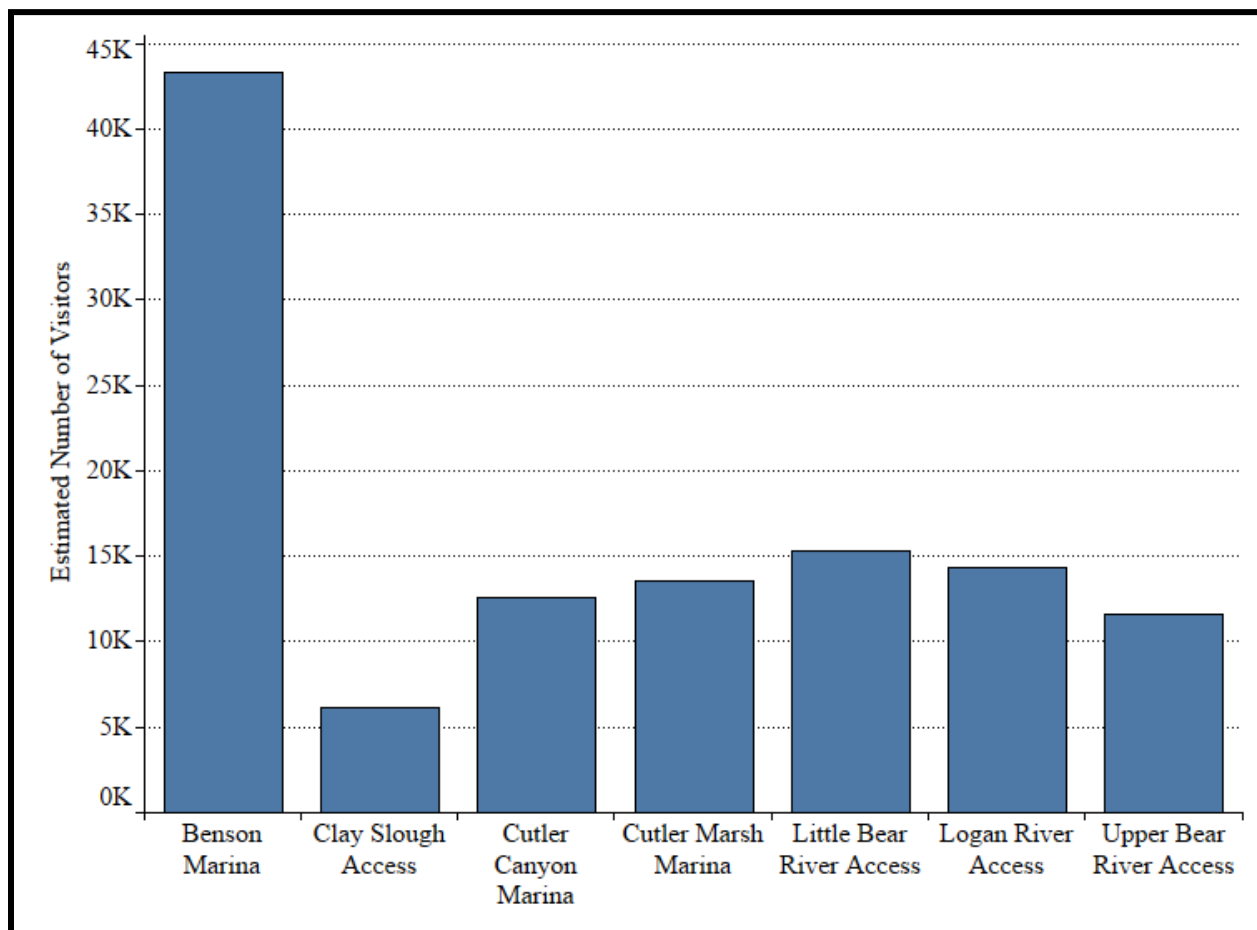
Clay Slough Access May 8 to June 8

Cutler Canyon Marina September 1

Cutler Marsh Marina June 7 and June 16

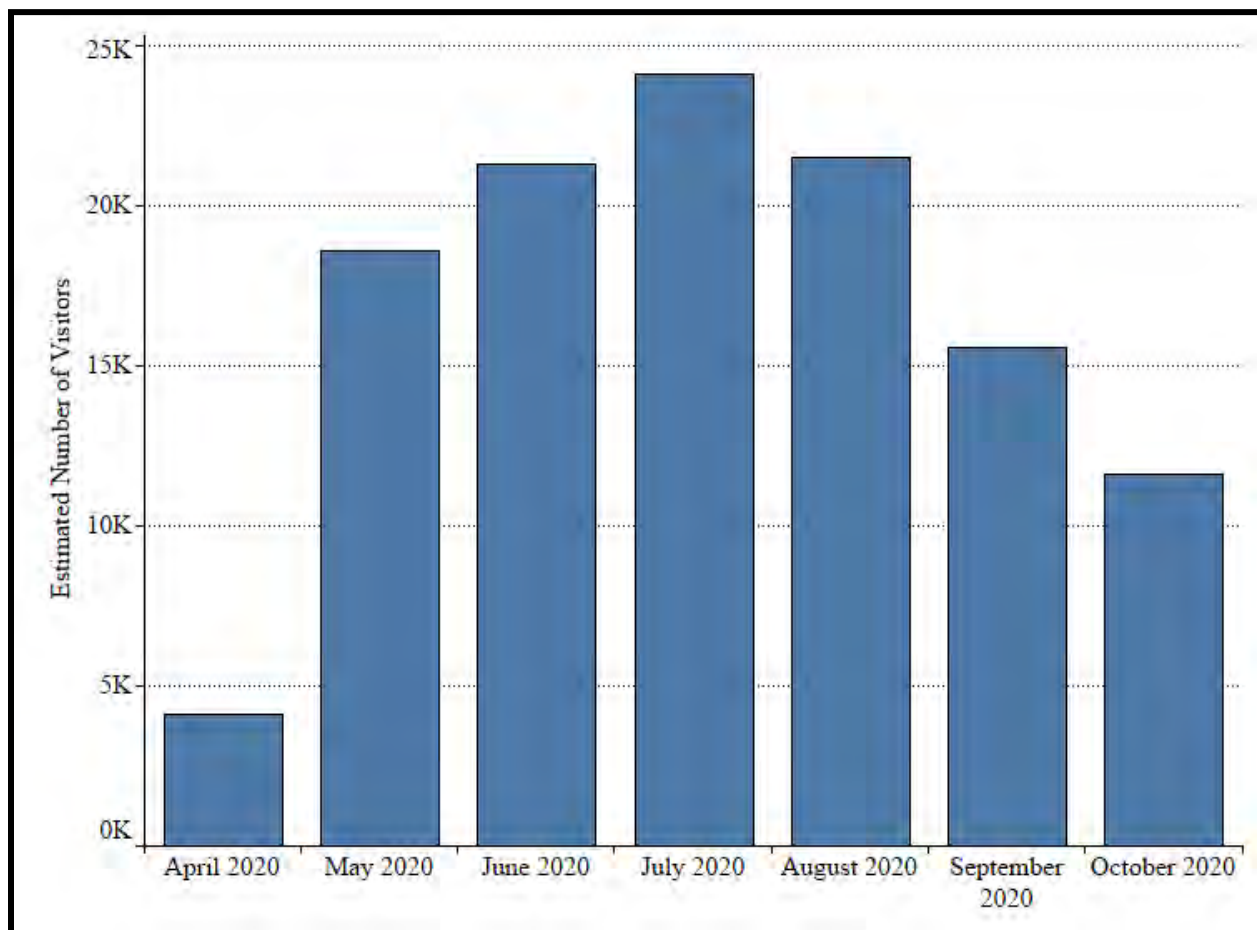
Little Bear River Access May 21

Logan River Access October 1 to October 31



Source: Appendix I of PacifiCorp 2021a
K = thousand

FIGURE 3-29 TOTAL ESTIMATED VISITORS BY RECREATION SITE, APRIL–OCTOBER 2020

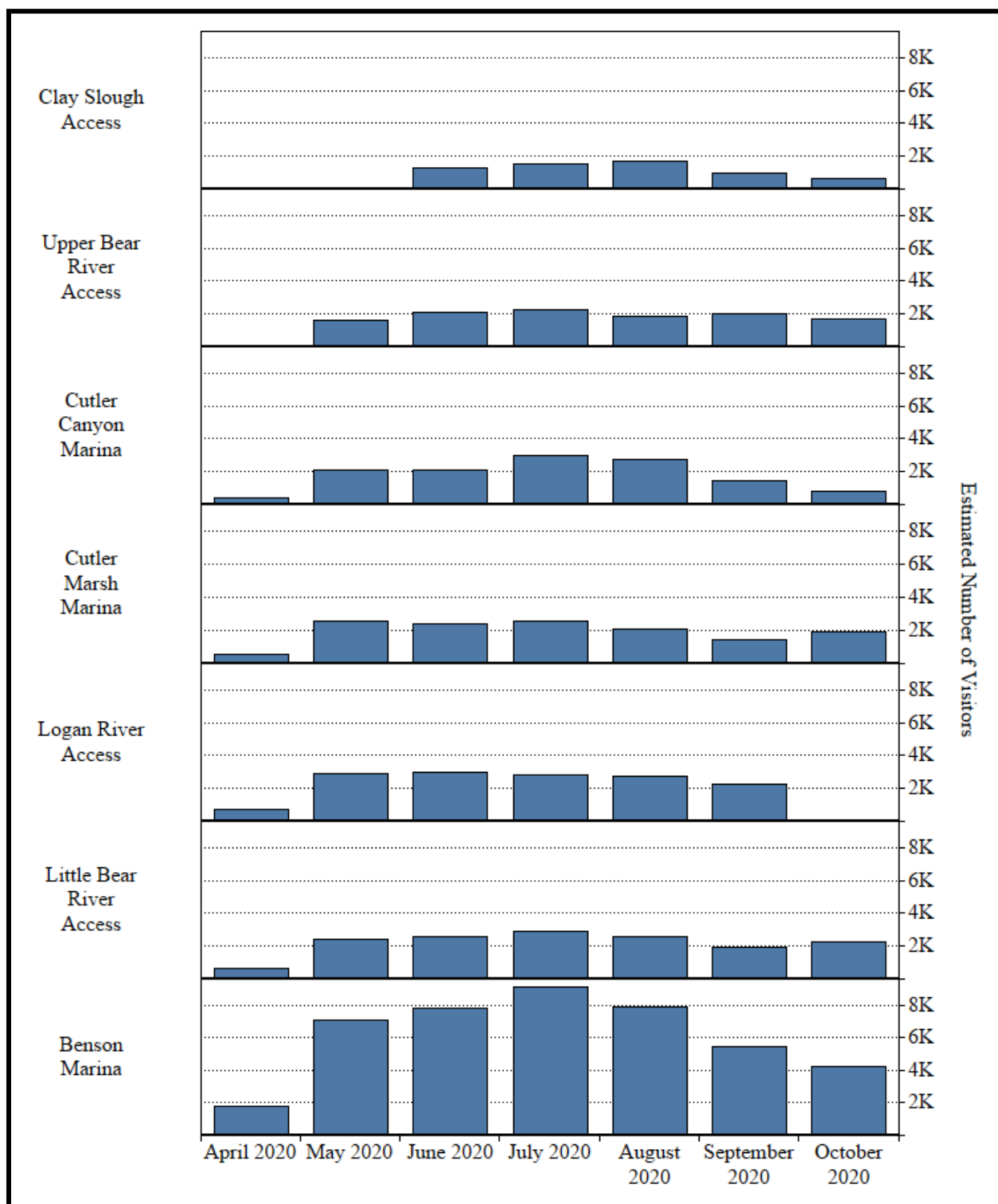


Source: Appendix I of PacifiCorp 2021a

K = thousand

April data collection limited to April 23–30, 2020

FIGURE 3-30 MONTHLY ESTIMATED VISITORS FOR COMBINED RECREATION SITES, APRIL–OCTOBER 2020



Source: Appendix I of PacifiCorp 2021a

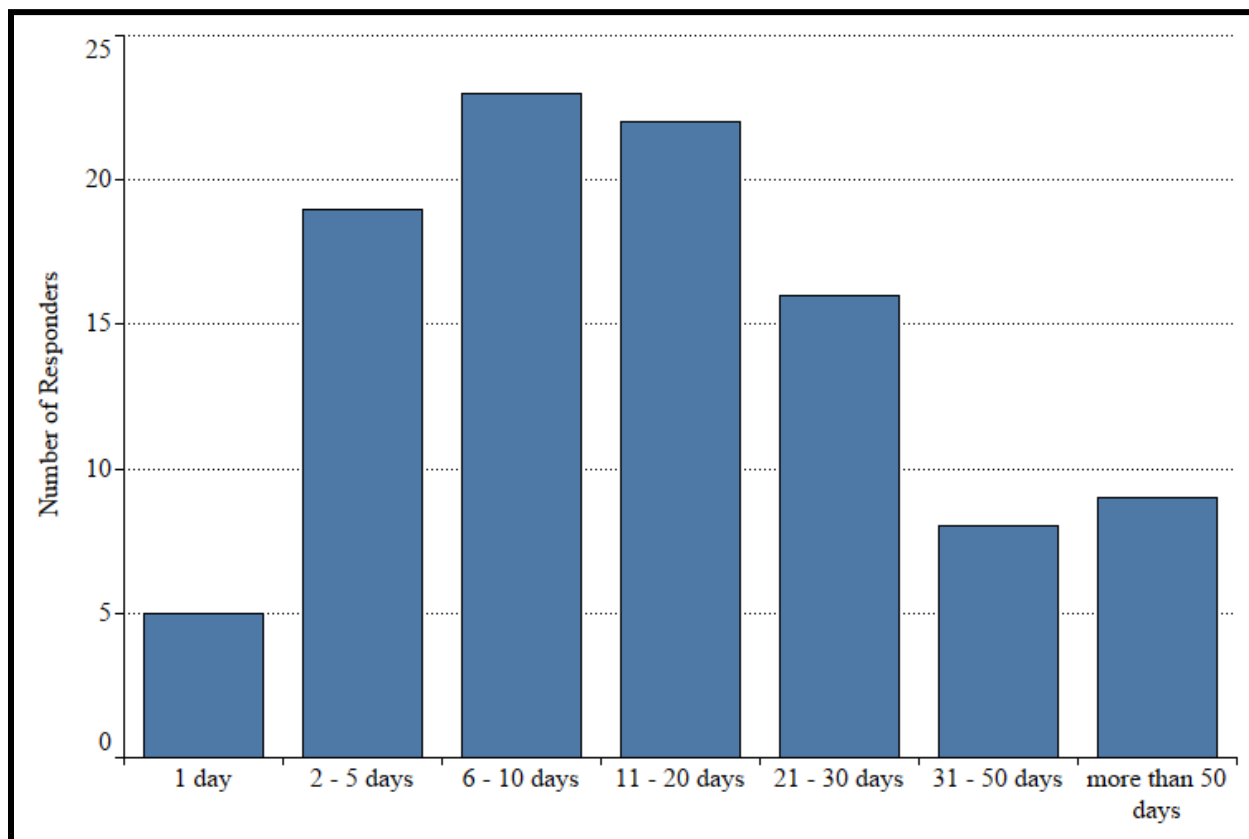
K = thousand

FIGURE 3-31 MONTHLY ESTIMATED VISITORS BY RECREATION SITE, APRIL–OCTOBER, 2020

A visitor survey available online was developed as part of the Recreation ISR to assess recreation use patterns and needs in the Project Area. The visitor survey was launched on April 30, 2020. A link to the visitor survey was distributed to 238 stakeholders signed up to receive electronic notifications associated with the Cutler relicensing process. The visitor survey was completed by 121 individuals (Appendix I of PacifiCorp 2021a).

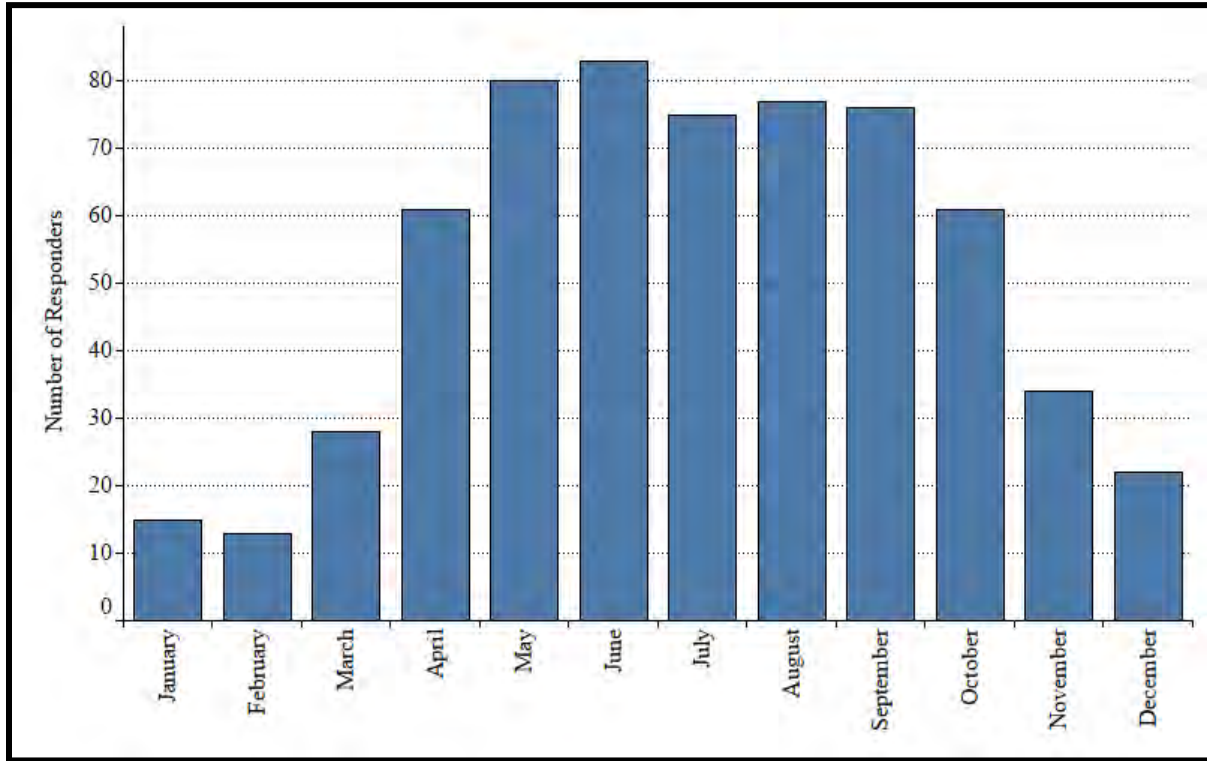
On average, respondents had been visiting the Project Area for 22 years, and most visited multiple times annually (Figure 3-32). Spring and summer were the most popular seasons to visit (Figure 3-33). Saturday was the most popular day to visit, with Friday and Thursday close behind in popularity (Figure 3-34). More respondents visited the Project Area between 8 a.m. and noon, with a typical visit lasting 2 to 4 hours (Figure 3-35 and Figure 3-36). The majority of visitors came to recreate on Cutler Reservoir (59 percent of respondents); 50 percent of respondents said they visited because the recreation site(s) were close to work or home; 48 percent visited to spend time with family or friends; and 42 percent visited because they like the recreation sites. The three most popular activities at the Project were bird and wildlife viewing, non-motorized boating, and hiking or walking (Table 3-34).

Structured in-person interviews were also conducted as part of the Recreation ISR. Five interviews took place with representatives of recreation organizations and individuals with direct knowledge of recreation in the Project Area. Interviewees had been using the Project Area for recreation for 3 to over 35 years. Interviewees agreed that the number of recreation sites and the amenities available were adequate to support the recreation demands. Some individuals expressed concern that the developed recreation sites accommodate heavier use than Cutler Reservoir should support. They observed increased use of the area in 2020 during the COVID-19 pandemic. Overall, interviewees had noticed an increase of motorized boat use over time.



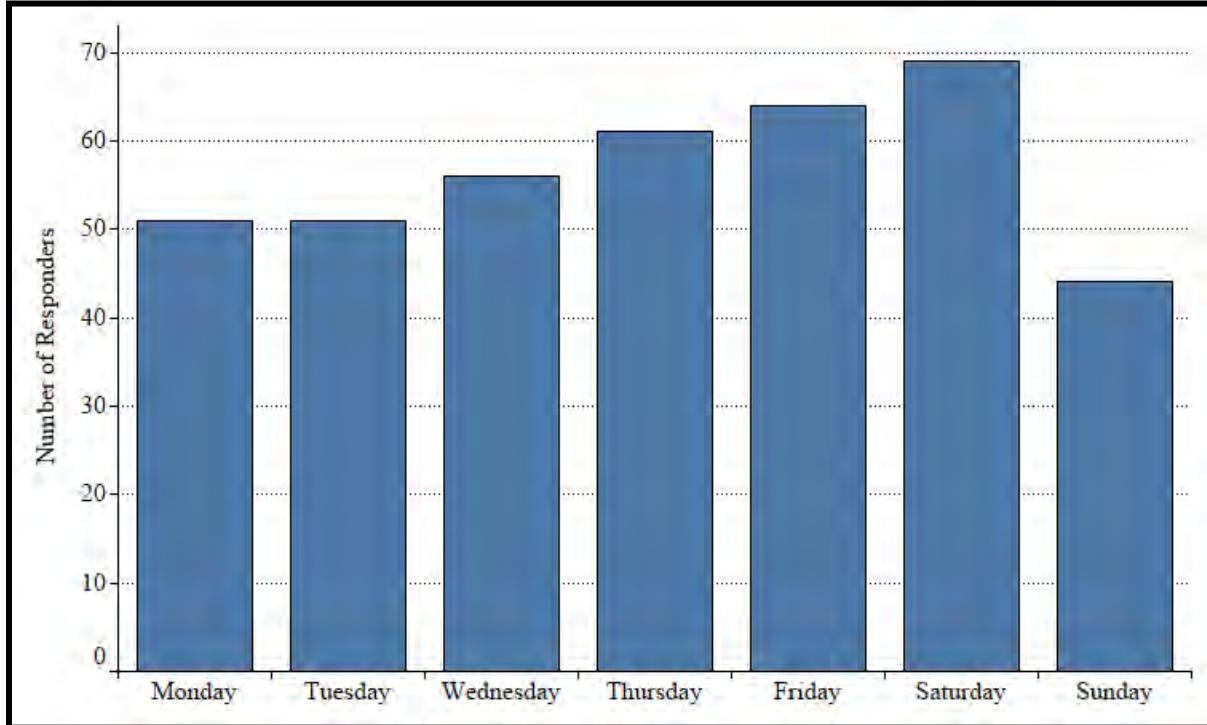
Source: Appendix I of PacifiCorp 2021a

FIGURE 3-32 ANNUAL NUMBER OF DAYS SPENT VISITING THE PROJECT, PER VISITOR SURVEY RESPONDENTS



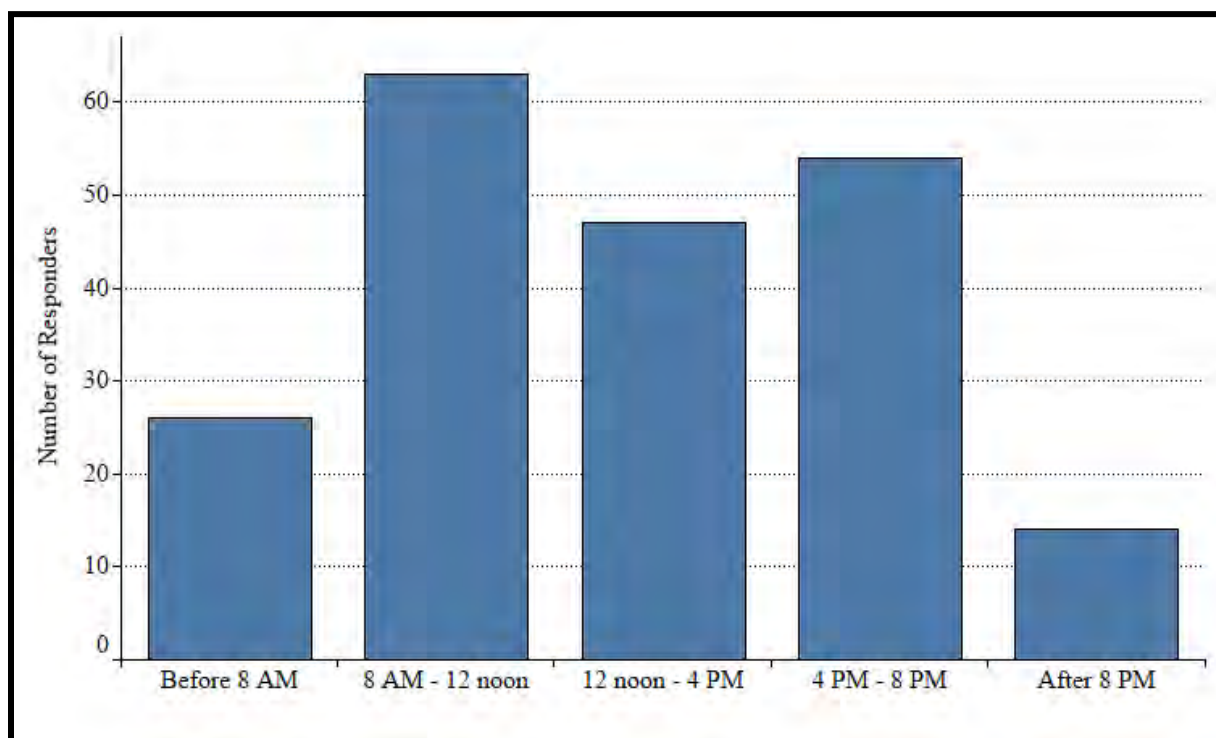
Source: Appendix I of PacifiCorp 2021a

FIGURE 3-33 PROJECT VISITATION BY MONTH, PER VISITOR SURVEY RESPONDENTS



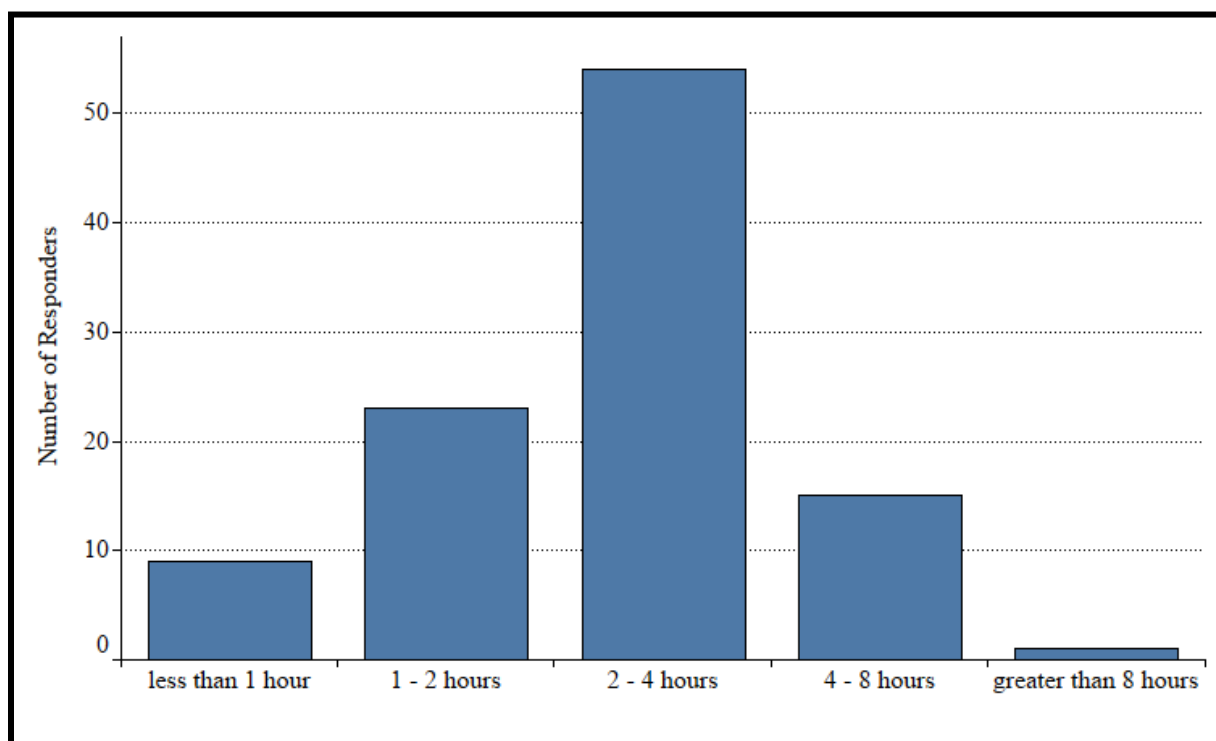
Source: Appendix I of PacifiCorp 2021a

FIGURE 3-34 DAY OF THE WEEK VISITS TO THE PROJECT, PER VISITOR SURVEY RESPONDENTS



Source: Appendix I of PacifiCorp 2021a

FIGURE 3-35 TIME OF DAY FOR PROJECT VISITS, PER VISITOR SURVEY RESPONDENTS



Source: Appendix I of PacifiCorp 2021a

FIGURE 3-36 DURATION OF PROJECT VISITS, PER VISITOR SURVEY RESPONDENTS

TABLE 3-34 RECREATION ACTIVITIES, PER ONLINE SURVEY RESPONDENTS

RECREATION ACTIVITY	NUMBER OF RESPONDENTS	PERCENT
Birding/wildlife viewing	66	65%
Non-motorized boating	58	57%
Hiking/walking	48	47%
Photography	38	37%
Fishing	33	32%
Waterfowl hunting	22	22%
Motorized boating	18	18%
Picnicking	17	17%
Upland bird hunting	16	16%
Water skiing	14	14%
Dog training	14	14%
Outdoor education or research	13	13%
Swimming	9	9%
Other	8	8%
Big game hunting	2	2%
Trapping	1	1%

Source: Appendix I of PacifiCorp 2021a

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, located immediately downstream of the Project Dam. 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 downstream of 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 PSPs for all developed recreation sites for the Project.

RECREATION NEEDS IDENTIFIED IN MANAGEMENT PLANS

The *Bear River Comprehensive Management Plan and Record of Decision* (Utah DNR 2017b) directs agencies and landowners on how to manage use of the Bear River. Recreation in the Bear

River planning area (the river itself) consists of motorized and non-motorized boating, fishing, waterfowl hunting, and wildlife watching (Utah DNR 2017b). The plan identifies the need for more boater access points along the Bear River to allow for full water trail use, especially for non-motorized users who generally prefer shorter distances between boater access points (Utah DNR 2017b). Suggested boater access point locations determined during the plan's public outreach include:

- East of Cornish on State Route 61
- East of Amalga on State Route 218
- East of Fielding, near Hampton's Ford Stage Stop by The Old Barn Community Theatre
- Downstream of the Cutler Dam power plant
- West of Honeyville on State Route 240

Utah's Statewide Comprehensive Outdoor Recreation Plan 2019-2023 (SCORP; Utah DNR 2019) identified outdoor recreation opportunities and needs based on surveys of recreational professionals and residents. The SCORP (Utah DNR 2019) reported that popular activities in the state of Utah were skiing, mountain biking, camping, riding dune buggies, and other motorized vehicles, hiking, biking, soccer, baseball, boating, fishing, and water sports. Survey results indicated that the top three outdoor recreational activities in Utah are hiking, camping, and fishing; the top recreation needs included trails/pathways (all forms), parks/open space, more public access, and camping areas/campgrounds/campsites (Utah DNR 2019).

The 2014 SCORP (Utah DNR 2013) identifies and prioritizes outdoor recreation opportunities and constraints most critical in Utah, with specific information available for planning districts. 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, 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 boater 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).

The *Draft Bear Lake Comprehensive Management Plan* (Utah DNR 2021) directs agencies and landowners on how to manage use of Bear Lake. Bear Lake is upstream of Cutler Reservoir and contributes water to the Bear River and eventually to Cutler Reservoir as detailed in Section 3.1, General Description of Bear River Basin. Recreational activities in and adjacent to the draft plan's planning area consist of boating, waterskiing, swimming, picnicking, sunbathing, scuba diving, fishing, camping, hunting, hiking, biking, wildlife watching, historic interpretation, photography, and sightseeing (Utah DNR 2021). The draft plan has set forth four goals relating to recreation and access at Bear Lake: 1) Balance recreation needs, development, and protection of the natural environment and Public Trust values; 2) Collaborate with partners to address recreation issues and conflicts in the planning area; 3) Understand recreation infrastructure needs and support appropriate recreation infrastructure development; and 4) Integrate recreation and restoration opportunities as appropriate (Utah DNR 2021).

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 (Wild & Scenic Rivers Council n.d.). 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 (Wild & Scenic Rivers Council n.d.). Similarly, no rivers or river segments in the Project Vicinity are listed in the National Rivers Inventory (NPS 2018c). Rivers or river segments are added to the National Rivers Inventory if they possess one or more outstandingly remarkable values.

NATIONAL SCENIC, HISTORIC, RECREATION, AND WATER TRAILS

The National Trails System Act (NTSA) was passed in 1968. The NTSA established four classes of national trails: national scenic trails, national historic trails, national recreation trails, and side/connecting trails (NPS 2020).

National Scenic Trails

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

National Historic Trails

Three 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 5,000 miles across portions of 10 states to California during the Gold Rush. Several route choices on the California Trail existed for pioneers traversing from Wyoming into northern Utah on their westward journey. A cut-off on the California Trail called 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 originally traversed by Mormon Pioneers from Illinois to Salt Lake City, Utah. The trail crosses 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 crosses the Wasatch Mountains descending through Emigration Canyon into the Salt Lake City area approximately 70 miles south of the Project Boundary before heading west into the West Desert.

National Recreation Trails

The National Recreation Trail database (American Trails 2018) identifies three national recreation trails in northern Utah: the 0.5-mile Wetland Wonders Trail on the outskirts of Brigham City in Box Elder County, Utah (part of the Bear River Bird Refuge managed by the USFWS); 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 within the Project Area or the Project Boundary.

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). 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.

3.3.9.2 ENVIRONMENTAL ANALYSIS

This section discusses potential effects to recreation resources from the Project. PM&E measures are summarized in Section 2.0, Proposed Action and Action Alternatives, and measures relevant to recreation are presented below in Section 3.3.9.3. As required in FERC SD2 (FERC 2019b), this section assesses the effects of proposed changes to Project operation and maintenance on recreational use in the Project Area, including the adequacy of existing recreation facilities to provide access to the reservoir if reservoir level fluctuations increase.

WATERFOWL HUNTING

If the proposed 10-day cycles in the extended range occur during the middle or latter part of the hunting season, waterfowl hunters that rely on specific areas or bays may notice changing access routes and hunting opportunities resulting from changing water levels over the multi-day WSE fluctuation cycles. The Shoreline USR (Appendix B off PacifiCorp 2021b) and Section 3.3.5, Wildlife and Habitat, of this Exhibit E note the potential effects of proposed extended operations on specific water depth habitat classes, although the modelled results also indicated that other

suitable²⁶ habitat would almost always be found either adjacent or nearby. As a result, both winter waterfowl and the waterfowl hunters that rely on specific areas or bays may be displaced for short periods in the 10-day cycle under proposed extended operations during the middle or latter part of the waterfowl hunting season,²⁷ requiring both waterfowl and hunters to temporarily shift to other locations in the reservoir. However, because boaters and waterfowl hunters will still be able to navigate and hunt on the reservoir, these effects are considered minor and limited in both area and time, and therefore would not result in an overall impact to recreation use.

RECREATION FACILITIES AND RECREATIONISTS

Current Project operations offer a broad range of recreation opportunities to the public year-round, 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. In addition to the developed recreation sites, most of the land within the Project Boundary (with the exception of the area that is closed to the public in the near vicinity of the Cutler Dam and Cutler Powerhouse) 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 performs maintenance as warranted. Current operations do not impede recreation opportunities within the Project Boundary or regionally; in fact, they enhance it. Project recreation facilities add regional recreation capacity.

Recreationists that responded to the visitor survey were concerned about large fluctuations in WSE. In the survey, 67 percent of respondents said the Cutler Reservoir water level affects their ability to participate in motorized and non-motorized boating (Appendix I of PacifiCorp 2021a).

²⁶ Note that two of the four most commonly observed species were waterfowl (Canada goose, gull, gadwall duck, and American coot) during the Phase 2 Shoreline Habitat Study, which was designed to detect what species may actually be present during the winter months in habitats that could potentially be affected by the proposed extended operating range.

²⁷ Per Utah Proclamation, the waterfowl hunting season typically extends from late September through early January, although the early and busiest part of the season occurs in October, which would not be affected as October is within the irrigation season.

Specifically, respondents indicated that abnormally low reservoir levels during periods of dam maintenance limit boating opportunities on the reservoir; however, this sort of maintenance is typically infrequent, occurring as seldom as once per decade, with several notable exceptions. When reservoir levels are above normal during spring run-off or other unusually high water events, larger boats are not able to pass under some bridges. Partially in response to this concern, PacifiCorp has proposed keeping the current upper operational range limit the same as it currently is (4,407.5 feet) and has proposed to limit the future operation fluctuations to a lower operational range limit of 4,405.0 feet WSE, which maintains boating access to Cutler Reservoir.

The Recreation ISR evaluated seven recreation sites during the 2019 fall drawdown with aerial photos, marking wetted perimeters, and completing a field data form to assess site functionality at the proposed extended operating range. Overall, the seven recreation sites monitored in the fall 2019 drawdown would continue to function within their intended design purpose of providing access to Cutler Reservoir (Table 3-35). However, trailered boat access at Cutler Canyon Marina was reduced to smaller boats at reservoir elevations less than the 4,405.0 feet WSE minimum proposed in the extended operating range.

Both the Recreation ISR (Appendix I of PacifiCorp 2021a) and the USR (PacifiCorp 2021b) includes comparative photographs showing the differences between normal and extended operating range water levels at the Cutler Canyon Marina. WSEs at the recreation sites on Cutler Reservoir do not respond uniformly across the reservoir with changes in elevation at Cutler Dam (Table 3-35; Figure 3-37). WSEs at recreation sites located in the southern end of Cutler Reservoir (upstream) of the Benson railroad bridge decrease far less compared to sites in the northern end of the reservoir (downstream). As determined in the Recreation ISR, the proposed lower pool elevations would not limit access to the reservoir for water-based recreation including waterfowl hunting, fishing, bird-watching, non-motorized boating, motorized boating, and waterskiing. Recreation resources such as Project marinas, water trail access points, water trails, and portions of the reservoir would not be impacted. Trailered boat access at Cutler Canyon Marina was reduced to smaller motorboats when reservoir elevations were approximately 0.4 foot below the proposed extended operating range lower limit of 4,405.0 feet; typically, this would not be an issue as that level is well below the lower WSE limit of the proposed extended range.

The Cutler Project provides unique water-based recreation opportunities in an otherwise arid landscape. Despite the COVID-19 pandemic, Cutler Reservoir recreation facilities received increased numbers of recreationists for the 2021 spring through fall season (May through November), compared to the most recent visitor survey conducted in 2014 conducted over the same seasonal range. The 2014 survey documented 84,412 visitors, while the 2021 survey documented 121,836 visitors, which reflects an approximate 44 percent increase from the 2014 survey, indicating the increasing importance of outdoor recreation opportunities to residents of the area. While the population of Utah has grown by 9 percent (269,000) over the last 6 years (U.S. Census Bureau 2020), the noted increase in visitation (almost five times higher than the population increase over the same time period) may also be due to more time spent outside with COVID-19 restrictions limiting indoor activities and organized sports, similar to most other recreation sites regionally and nationally.

TABLE 3-35 RECREATION SITE WATER SURFACE ELEVATIONS RELATIVE TO PROPOSED PROJECT OPERATIONS

CUTLER RECREATION SITE	LOCATION	RESERVOIR OPERATING RANGE (FEET)		RECREATION SITE FUNCTIONING	
		NORMAL	EXTENDED	NORMAL	EXTENDED
		4,407.5–4,406.5 ^c	4,406.5–4,405.0 ^c	4,407.5–4,406.5 ^c	4,406.5–4,405.0 ^c
Cutler Marsh Marina	Reservoir Sites ^d	4,407.5–4,406.9	4,406.9–4,406.2	Yes	Yes
Benson Marina		4,407.5–4,406.8	4,406.8–4,406.0	Yes	Yes
Clay Slough		4,407.5–4,406.7	4,406.7–4,405.7	Yes	Yes
Cutler Canyon Marina		4,407.5–4,406.5	4,406.5–4,405.1	Yes	Partial
Little Bear River Access ^a	Tributary Sites ^d	4,407.5–4,406.9	4,406.9–4,406.2	Yes	Yes
Logan River Recreation Site ^a		4,407.5–4,406.9	4,406.9–4,406.2	Yes	Yes
Upper Bear River Access ^b		4,408.3–4,407.5	4,407.5	Yes	Yes

Source: Appendix I of PacifiCorp 2021a

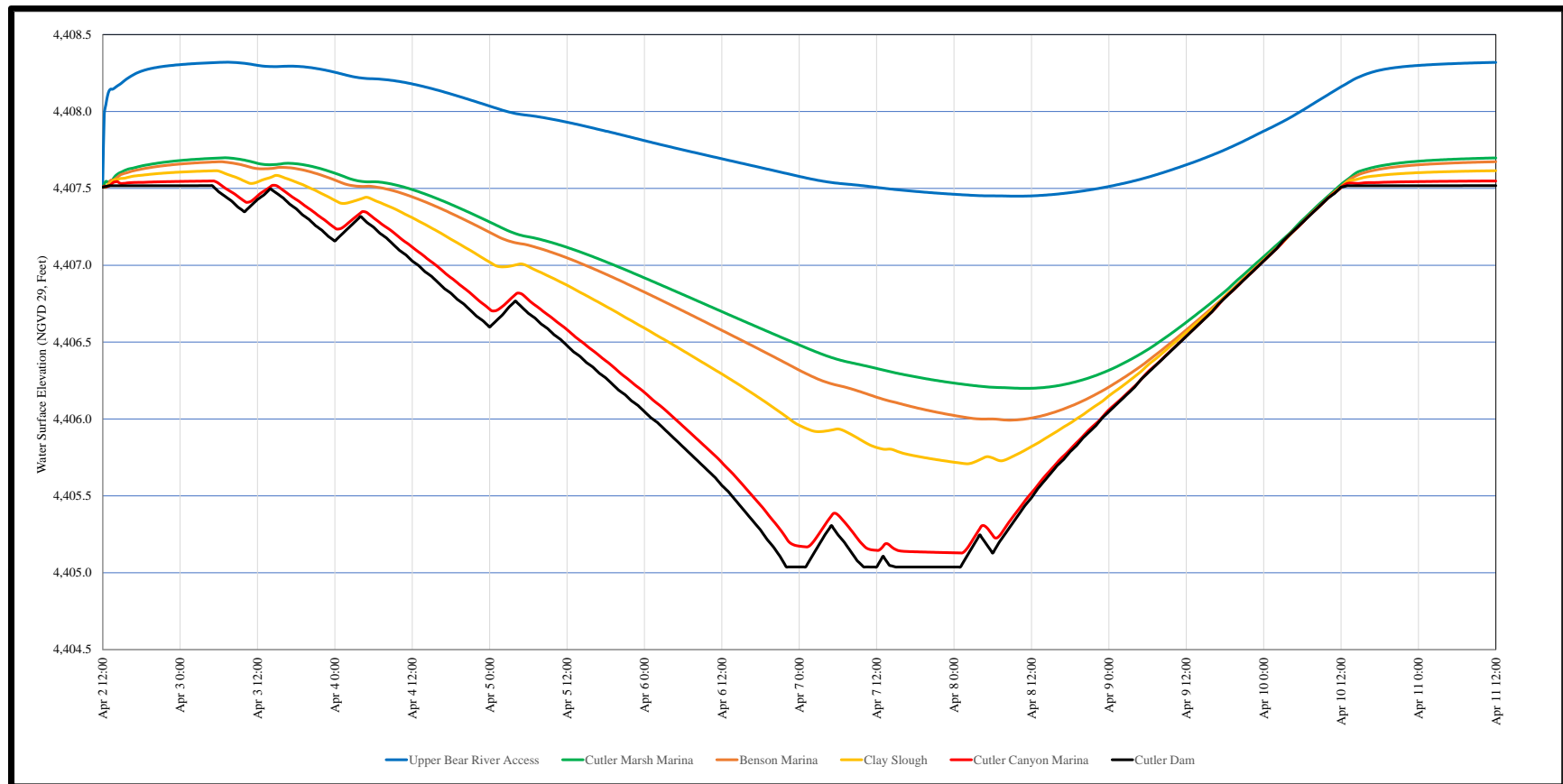
WSE = Water Surface Elevation

^a Little Bear River Access and Logan River Recreation Site are inside the Project Boundary but outside the model boundary. Therefore, the operating range for Little Bear River Access and Logan River Recreation sites were taken from Cutler Marsh Marina, the closest model location; Little Bear and Logan River site operating range WSEs may be higher due to their location on tributaries upstream of Cutler Reservoir.

^b Upper Bear River Access operating range WSE is higher due to its location on the Bear River upstream of Cutler Reservoir

^c As measured at Cutler Dam

^d WSE in feet at each site



Source: Appendix I of PacifiCorp 2021a

^a All model results based on assumed duration of the event: 9 days or 216 hours.

^b All model results based on assumed tributary inflow of 1,046.5 cubic feet per second (cfs) and groundwater inflow of 285.5 cfs.

^c Little Bear River Access and Logan River Recreation Site are inside the Project Boundary but outside the model boundary. Operating range taken from Cutler Marsh Marina, the closest model location; all three are located south of Utah State Route 30. Little Bear and Logan River site operating range WSEs may be higher due to their location on tributaries upstream of Cutler Reservoir.

FIGURE 3-37 WATER SURFACE ELEVATION AT RECREATION SITES UNDER THE PROPOSED EXTENDED RANGE OF PROJECT OPERATIONS

3.3.9.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

PacifiCorp aims to minimize the potential recreation impacts of the Project and maintain the existing recreation opportunities. The Project will continue to allow and promote recreation activities in the Project Area. Section 2.2.3 lists the PM&E measures proposed to be implemented for the Project under a new license. Existing measures that will continue under the new license as well as proposed new measures are described in greater detail below as related to the protection of current recreation resources.

EXISTING MEASURES

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. Measures required in the current license (FERC 1994) that are proposed to be carried forward under a new license (with potential updates) are presented below, including existing license articles and management plans.

Additionally, the proposed extended reservoir operating period would potentially cycle in 10-day periods outside the irrigation season and when there are not high inflows to the Project (typically from November to March), when substantially less recreation and boating (especially in the latter parts of the waterfowl season) occurs at the reservoir.

Current License Articles

- Article 401: Sets operating range and compliance limits in order to balance the needs of wildlife, recreation, irrigation, and power generation.
- Article 402: Develop Cutler Resource Management Plan. The following measures were required to be included in the 1995 Cutler RMP:
 - Recreation Plan (pages 5-28 to 5-36 of Cutler RMP), and page 43 of license application: develop recreation at eight 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, seasonal placement of toilets (portable sites only as permanent facilities are available year-

round) and docks, and regular maintenance. This portion of the RMP has been completed, and expanded on, by PacifiCorp.

- Monitor recreation sites annually. File five-year reports with FERC.
- Part 8 Signage: Post signage indicating the recreational opportunities at the Project, the Project number and statement that the Project is licensed by the FERC, the Project owner's name and contact information to obtain additional information regarding Project recreation, and a notice that recreation facilities are open to the public without discrimination.

Cutler Resource Management Plan

Under the current license, PacifiCorp completes annual (or more frequent, as necessary—recreation sites are monitored weekly, at a minimum, for maintenance needs) monitoring and maintenance, and files a Cutler RMP Monitoring Report in five-year increments (see PacifiCorp 2018 for the most recent example). 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 2018). Monitoring is limited during the winter period, once recreation visits decline substantively (typically by mid-late November). PacifiCorp will continue recreation monitoring in the current license period, although the form of the monitoring may be revised and/or updated. The next Cutler RMP five-year monitoring report is scheduled for submittal 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. The current Cutler RMP is likely to be revised and/or updated, but this or a similar monitoring program is expected to continue to function as the guidance for future Project resource management.

The Cutler RMP is proposed to be updated from its current form under a new license. That is, PacifiCorp proposes to draft a number of management plans that would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP. Aspects to be included in the new Cutler RMP relevant to this resource are summarized in the New Proposed Measures subsection below.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. New proposed measures and management plans relevant to recreation are presented here; the measure number from Table 2-4 is provided for reference.

Standalone Measures

- Complete recreation site improvements, including maintenance and ADA upgrades throughout Project Boundary (REC-4).
- Extend and/or repair boat ramps at both Cutler Canyon and Benson marinas to improve trailered boat access at both sites (REC-5).
- Evaluate and improve accessibility where feasible (e.g., improvements identified by the National Park Service [NPS 2019]) at several recreation sites (REC-6).
- Make carry-in boat launch access improvements at Little Bear River and Logan River access sites (evaluate adding handrails to improve boat entry, assess other needs) (REC-7).
- Provide digital trail and property boundary maps on PacifiCorp's website for recreation use; revise and update hard copy and digital versions of wetland maze map (REC-8).
- Review signage at recreation access sites and update/add new as needed (REC-9).
- Engage with Utah State Parks to identify potential measures for improving public and boater safety; add any identified to Recreation Program in Cutler RMP (REC-10).
- As part of Cutler RMP update, recreation sites with temporary restroom facilities will be assessed for potential upgrades to permanent vault toilet facilities (REC-11).

Management Plans

Cutler Resource Management Plan

A new Cutler RMP would be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. The new Cutler RMP would include the following measures relevant to recreation:

- Update recreation management program within the Cutler RMP (REC-1).

- Develop and implement new shoreline management program within the Cutler RMP to address conflicting recreation/other uses (REC-2). The plan would address items such as permanent structures (e.g., hunting blinds and private docks) and other shoreline land uses.
- Continue to operate and maintain current recreation site facilities, and monitor facility conditions (REC-3).

Project Operational Plan

Under the new Project Operational Plan the following measures would be incorporated related to reservoir operation, and therefore indirectly related to recreation:

- Continue reservoir elevation and river flow monitoring (WR-1).
- Continue to communicate with USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project (WR-2).

3.3.9.4 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable or substantive adverse impacts to recreation resources are anticipated under the proposed Project operations. Specifically, all recreation sites would be functional even during the extended operating range. Although waterfowl hunting may be displaced for short periods in the 10-day cycle under proposed extended operations in the winter season, requiring hunters to temporarily shift to other locations in the reservoir, because boaters and waterfowl hunters will still be able to navigate and hunt on the reservoir, these effects are considered minor and limited in both area and time, and therefore would not result in an overall impact to recreation use.

3.3.10 CULTURAL AND TRIBAL RESOURCES

This section discusses cultural and tribal resources, as they are presently known, that could be affected by operation of the Project under the new license. The regulations applicable to the consideration of cultural and tribal resources in relicensing are discussed first, followed by a discussion of the cultural resources of the area, including a review of the prehistoric and historic period uses of the area that could leave behind archaeological and historic sites, or sites of tribal concern. This is followed by a discussion of the cultural resources that have been identified and

documented in the Project Area, the potential and expected effects to those resources from relicensing the Project, and the stipulations and measures that would be implemented to avoid, minimize, or mitigate those effects.

3.3.10.1 REGULATORY SETTING

Section 106 of the NHPA requires FERC to 1) take into account the effect of licensing a hydropower project on any historic properties and 2) allow the Advisory Council a reasonable opportunity to comment on the Proposed Action. "Historic properties" are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP. Per FERC guidelines, the applicant must develop and implement an HPMP to avoid, reduce, or mitigate the effects to historic properties over the course of a license. As part of the HPMP development, PacifiCorp consulted with FERC, the SHPO, and Native American tribes. The HPMP is being submitted with this FLA (see Appendix HPMP), allowing any other license stakeholder to comment on it during the public comment period. Frequently, the HPMP would be implemented by execution of an Agreement that would be signed by FERC, the Advisory Council, the SHPO, and any other consulting parties (FERC 2002b).

Other federal laws, such as the American Indian Religious Freedom Act or the Native American Graves Protection and Repatriation Act, may also apply when sacred areas or burial sites of Native American tribes have been identified. These and other cultural resources that possess religious or cultural significance to a Native American tribe, if eligible, can be considered as historic properties and treated through the Section 106 process. Such historic properties are called Traditional Cultural Properties (TCPs). As part of efforts to identify resources of tribal concern that could be affected by the continued operations of the Cutler Project under a new license, FERC and PacifiCorp consulted with four Native American tribes who have asserted cultural patrimony over the area: the Shoshone-Bannock Tribe, the Northwestern Band of Shoshone Nation, the Skull Valley Band of Goshute Indians, and the Ute Tribe of the Uintah and Ouray Reservation.

3.3.10.2 AFFECTED ENVIRONMENT

The discussion below focuses on the known and potential cultural and tribal resources within the Area of Potential Effects (APE) for the Project. This APE was defined during consultation between FERC and the Utah SHPO as being equal to the Project Boundary. Initial discussions about the APE included a review of lands just upstream of the Project Boundary that could potentially be affected by proposed Project operations, such as changes in the river flow regime that could induce upstream erosion; however, hydrologic studies showed that no upstream influences are expected from Project operations (as the boundary already extends several miles upstream from the confluence of each of the main tributaries to Cutler Reservoir). Therefore, the APE was limited to the Project Boundary for the purpose of the cultural resource assessment (see Figure 1-1).

IDENTIFICATION OF CULTURAL RESOURCES

Cultural resource surveys were conducted in 2019 (during the full drawdown of the Project) and 2020 to identify, document, and evaluate archaeological sites, historical structures, and resources of tribal concern within those portions of the APE that could be directly affected by proposed Project operations under the new license. This Study Area was the same as the Project Boundary/APE. The cultural resource studies included desktop and archival research, a combination of intensive-level and reconnaissance-level archaeological field surveys (conducted during the 2019 full drawdown for any cultural resources, including sites, artifacts, etc., that may typically be within the reservoir area of influence), architectural resource field surveys, and targeted documentation of known historic period sites, including Project facilities. These studies were conducted in 2019 and 2020 and summarized in both a Section 106 technical report planned for submittal by PacifiCorp to FERC (PacifiCorp 2020a) and the Cultural Resources ISR (Appendix J of PacifiCorp 2021a).

Within the larger Study Area/APE, intensive-level archaeological surveys were conducted on approximately 364 acres and a reconnaissance-level archaeological survey on 1,872 acres. An additional 1,986 acres within the APE was not surveyed because it was either still inundated at the time of the field studies or the mud was too deep to permit access for surveying (PacifiCorp 2020a). The remaining areas of the Study Area/APE were investigated through desktop reviews

of archival records, including reports of previous cultural resource surveys, historical maps, historical air photos, and published and unpublished historical manuscripts. The results of the archival review and field studies are discussed in more detail below and in the archaeological survey summary report (PacifiCorp 2020a), specific portions of which are protected from public dissemination by existing federal law.

CULTURE HISTORY OF THE PROJECT AREA

Use of the broader Cutler area by humans extends back to prehistory. While the prehistory of Utah in general begins with the Paleoarchaic (sometimes referred to as the Paleoindian) period around 11,000 years before present (BP), resources from this period have not been found in the vicinity of the Cutler Project. Rather, the earliest known archaeological sites in the general area date to the Archaic period, which begins around 8000 BP and extends to approximately 2100 BP. More extensive use of the area occurred during the Formative and Late Prehistoric periods (approximately 2100 BP to 500 BP), during which resources found in marsh habitats along creeks, rivers, lakes, and ponds were used extensively by occupants of the area. Subsequent to these periods, ethnographic groups (immediate ancestors of modern-day Native Americans with patrimonial claims to the area) are known to have occupied portions of Cache and Box Elder counties, though specific sites attributable to these groups have not been located previously near Cutler.

Despite the long period of known use of the Project Vicinity by prehistoric peoples, no prehistoric archaeological sites have been found within the cultural resources APE for the Cutler Project relicensing. This lack of prehistoric period sites may well be due to the extensive nature of ground surface disturbance (as most of the area was farmed and/or grazed right to the riverbanks) during the historic and modern periods, or potentially due to the inundation resulting initially from the Wheelon Dam in the late 1880s and later from the larger Cutler Dam in the late 1920s, or to both, and not to an actual lack of use of the area by prehistoric peoples.

The historic period in the Project Area is also deep and rich and has left more substantial physical remains on the landscape than uses of the prehistoric period. Historic period uses around Cutler begin in the 1820s with the explorations of Euro-American fur trappers and traders and extended into the early 1840s with government-sponsored expeditions to map the interior

West and identify routes for emigration and railroad development that would connect the California coast to the eastern states. Among those explorers known to have traveled close to, if not through, the Cutler area was John C. Fremont, who explored the northern part of the then-future Utah Territory between 1843 and 1845.

Historic period settlement in the Cutler area by Euro-Americans began around 1853, when a group of 50 families led by Lorenzo Snow established a settlement near what is now the community of Brigham City (PacifiCorp 2020a). These settlers were all members of the Church of Jesus Christ of Latter-day Saints who were directed by church president Brigham Young to settle the area as part of expanding the church territory from the initial 1847 settlement in Salt Lake City. Three years later, in 1856, the first group of pioneers established a permanent settlement in the Cache Valley. Within a few more years, small settlements were established across the valley and along the northern Wasatch Front north of Brigham City. These settlements came into direct conflict with Native Americans who were living in and using the areas for resource gathering at the time. As such, most of the initial communities were built as small forts surrounded by agricultural lands; settlers lived within the fort compound but worked the fields and grazed their livestock outside of it.

Tensions between settlers and Native Americans escalated, particularly with the additional intrusion into traditional Native American lands by emigrants along the Oregon Trail in southern Idaho, and ultimately induced the U.S. Army to attempt to quell the raids and attacks by primarily Shoshone and Bannock native groups who were desperate to protect their way of life. This led to an attack by the soldiers on a Shoshone winter encampment in January 1863, known as the Massacre at Boa Ogoi or Bear River Massacre, during which hundreds of Shoshone (mostly women, children, and old men) were killed. The Bear River Massacre was one of the—if not the single—largest losses of Native American lives at the hands of the U.S. Army of any of the reported incidents of the “Indian Wars” era (deaths reported for many of these attacks varied widely; in this case, local European settlers reported a higher number of Shoshone deaths than those reported by military personnel). The site of the massacre is located north of the Cutler Project along the banks of the Bear River, just north of the present-day town of Preston, Idaho, in an area where natural hot springs formed an ideal winter encampment location for the Shoshone. The Northern Band of the Shoshone have reacquired most of the land at the massacre site and are

currently undertaking a large-scale ecological restoration of the site, along with construction of the Boa Ogoi Cultural Interpretive Center, also at the same location.

The Bear River Massacre marked a turning point in the history of the area. Raids and attacks on pioneer settlements subsequently diminished, which allowed those settlements to expand beyond the historical forts to more scattered collections of rural farmsteads. Along with this came a need for water to supply both the culinary and irrigation needs of the communities. As such, an era of canal building kicked off across Box Elder and Cache counties, with the Bear River being a primary source of irrigation water. As part of governmental studies to assess water flows as they related to availability for irrigation, the USGS as part of the expeditions by and under the direction of John Wesley Powell established a gage station on the Bear River near the future site of the Cutler Plant. The gage, known as the Collinston gage, was reportedly established in July 1889 at the outset of the practice of stream gaging and was among the first stream gages in the country (UDWRi 2021a).

Construction of irrigation systems in the area extended over a long period of time and ended around 1920. Several of the major canals constructed during this period are located in the Cutler cultural resources Study Area, including the Hammond Canal (also known as the East Canal), the West Canal, the Benson Canal, the Wellsville-Mendon Lower Canal, the Cow Pasture Canal, the Newton Branch West Canal, the West Cache Canal, and the Benson–Bear Lake Canal. Wheelon Dam, which originally served as a primary diversion to allow use for irrigation purposes of the oldest and largest water rights on the Bear River (in the Hammond and West Canals), was also built during this period and completed in the 1880s.

As the population continued to grow in the Cutler area, and as technology progressed, focus soon turned to the development of electrical generation to serve industrial sites and communities across northern Utah and in southern Idaho. The Utah–Idaho Sugar Company modified the Wheelon Dam on the Bear River in the Cutler Study Area around 1903 as part of construction of a hydroelectric facility (Wheelon Hydroelectric Plant) to facilitate its industrial operations in the area. Utah Power & Light (a predecessor company to PacifiCorp) acquired the plant and dam in 1912 in a comprehensive effort to create a connected hydroelectric generation program along the Bear River in southern Idaho and northern Utah (PacifiCorp 2020a). Utah Power & Light

expanded the capacity of electrical generation along the Utah section of the river by constructing Cutler Dam and Cutler Hydroelectric Plant between 1925 and 1927. The resulting reservoir (Cutler Reservoir) inundated the older Wheelon Dam. Wheelon Hydroelectric Plant was demolished once the new Cutler plant became operational.

Agricultural and industrial development progressed rapidly in the decades that followed completion of the Cutler hydroelectric facilities. The route of the first trans-continental railroad passes close to but west of the Project. Railroads were built across the area to serve newly established or expanded industrial facilities. Among these was the Benson Branch of the Oregon Short Line Railroad, which runs through the Cutler cultural resources Study Area and still provides the only access through Cutler Canyon as no roads cross through the canyon (the road that facilitated the construction and maintenance of Wheelon Dam still exists, although it terminates at the historic site). The new railroad networks were a boon to the local economy by connecting the area to outside markets for agricultural and industrial products produced in the area. This market access spurred a major shift from subsistence-level agriculture to agribusiness, especially in the Cache Valley area. That market sector continues to serve as the underpinning of the area's economy.

KNOWN CULTURAL AND TRIBAL RESOURCES IN THE STUDY AREA

Studies conducted for the relicensing project—and reported in both the Cultural Resources ISR (Appendix J of PacifiCorp 2021a) and the Section 106 technical report (PacifiCorp 2020a)—identified 21 archaeological sites, seven historical buildings, one historic district (the Cutler Hydroelectric Power Plant Historic District), and one historical structural complex (the Wheelon Hydroelectric Complex) (Table 3-36). Wheelon Hydroelectric Complex was documented as both an archaeological site and a structural complex. Of these, nine archaeological sites, one historical building, the Cutler Hydroelectric Power Plant Historic District, and the Wheelon Hydroelectric Complex have been determined eligible for listing on the NRHP or are already listed, as in the case of the historic district, by FERC in consultation with PacifiCorp and the Utah SHPO; the historic district was officially listed in the NRHP on March 8, 1989. These resources, therefore, qualify as historic properties under the Section 106 process and are subject to management planning (i.e., via the HPMP submitted with this FLA) over the course of any new operational

license for the Cutler Project for undertakings carried out by PacifiCorp and subject to FERC approval through the license. It is important to note that several of the historic properties, which are summarized in Table 3-36, are owned and operated by parties other than PacifiCorp and are merely located, at least partially, within the FERC Project Boundary. Said parties may carry out actions of their own related to these properties. Such actions, if unrelated to PacifiCorp's operations under the license, are not subject to the HPMP, and PacifiCorp and FERC are not responsible for Section 106 consultation regarding them.

TABLE 3-36 SUMMARY OF HISTORIC PROPERTIES IN THE APE

RESOURCE #	RESOURCE DESCRIPTION
42BO1182	West Canal
42BO1507	Hammond East Branch Canal
42CA143	Benson Canal
42CA174	Wellsville–Mendon Lower Canal
42CA225	Wheelon Dam
42CA227	Wheelon Power Poles
42CA228	Wheelon Hydroelectric Facilities
42CA229	Mendon Road
42CA230	State Route 30/State Route 69
42CA235	Pocatello Mainline of Oregon Short Line (now Union Pacific Railroad) Railroad
NRIS #89000280	Cutler Hydroelectric Power Plant Historic District
11-005-0009	circa 1930 agricultural building at 4301 West 600 Street, Young Ward, Utah

As noted previously, no prehistoric archaeological sites have been found within the cultural resources APE for the Cutler Project relicensing despite the long period over which prehistoric peoples are known to have used the area.

This lack of prehistoric period sites may well be due to the extensive nature of ground surface disturbance (as most of the area was farmed and/or grazed right to the riverbanks) during the historic and modern periods, or potentially due to the inundation resulting initially from the Wheelon Dam in the late 1880s and later from the larger Cutler Dam in the late 1920s, or to both, and not to an actual lack of use of the area by prehistoric peoples.

FERC and PacifiCorp consulted with four Native American tribes who have asserted cultural patrimony over the Cutler cultural resources Study Area: the Shoshone–Bannock Tribe, the Northwestern Band of Shoshone Nation, the Skull Valley Band of Goshute Indians, and the Ute Tribe of the Uintah and Ouray Reservation. These tribes were invited to participate in the Section 106 process and provide information to assist FERC and PacifiCorp in identifying and evaluating cultural resources of concern to the tribes. To date, the tribes have not responded to the invitation to participate and have not identified any resources of tribal concern in the Study Area / APE. PacifiCorp will continue to reach out to the tribes throughout the relicensing process, and would include measures for continuing consultation with tribes as appropriate under the new license.

3.3.10.3 ENVIRONMENTAL ANALYSIS

Effects on historic properties and resources of tribal concern, both known at present and any discovered in the future, are to be taken into consideration as part of operations under the Project license. This includes NRHP-eligible sites from both the prehistoric and historic periods, although no prehistoric sites have been identified in the APE to date. Where possible, adverse effects to historic properties from PacifiCorp's operational and management actions are to be avoided. If avoidance is not possible, then minimization and mitigation of adverse effects must occur. Adverse effects to historic properties are defined as follows per 36 CFR § 800.5(a)(1):

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

Adverse effects under the new Project license could result from such activities as ground disturbance associated with vegetation clearing, demolition of structures, construction of new structures, replacement of equipment within existing structures, grading, trenching, dredging, piping of open canals or ditches, or similar actions. They could also occur from activities such as use of access roads and staging areas; fluctuations in water level that induce erosion; or the sale, lease, or transfer of lands for agricultural or development purposes, livestock grazing, and other activities. Looting and vandalism from outside parties could also adversely affect cultural resources during Project operations. All of these potential sources of adverse effects exist under the current license as well and do not represent a change that would occur because of or only under the new license.

No new construction is explicitly proposed under the new license, and the proposed operations are not expected to have any effect on cultural resources. That said, capital improvements, replacement of aging equipment, and similar actions may become necessary over time. Measures to avoid adverse effects to historic properties when such necessities are identified are discussed below.

3.3.10.4 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

EXISTING MEASURES

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. Adverse effects to historic properties and tribal resources located within the APE for the Cutler Project are currently managed under the Cutler CRMP implemented for Cutler in 1995 (PacifiCorp 1995b). The CRMP derives from several articles in the existing Project license, including Articles 403 and 404.

Article 403 calls for the development of the CRMP in consultation with the Utah SHPO. It directs the CRMP to include management measures, “...to avoid and mitigate impacts to the historical integrity of the Cutler Project dam and powerhouse from maintenance and repair work conducted during project (sic) operation.”

Article 404 of the existing 1994 license addresses unexpected discoveries of cultural resources during Project operations. It specifically states that, “If archaeological or historic sites are discovered during project (sic) operation, the licensee shall...” take several steps, including consulting with the Utah SHPO about the discovery; and preparing a CRMP and schedule to evaluate the significance of the discovery, identify measures to avoid or mitigate effects to those discovered resources that are determined eligible for the NRHP, and protect the discovery from further damage until such time as FERC, the SHPO, and other appropriate parties have been consulted, their comments have been taken into consideration, and all involved parties have agreed to the disposition of the resource.

Pursuant to the direction of Article 403, the CRMP focused largely on the historical buildings and structures directly associated with the Project facilities, including those resources of the Cutler Hydroelectric Power Plant Historic District (e.g., the powerhouse, dam, conduit, and surge tank). Measures to avoid adverse effects to archaeological resources are not explicitly discussed in the existing CRMP. The CRMP currently includes two primary management approaches to avoid or minimize adverse effects: implement preservation standards and implement evaluation procedures. The preservation standards included in the CRMP derive largely from the Secretary

of the Interior’s Standards for Rehabilitation of historical structures as codified in 36 CFR Part 67. These standards emphasize the following:

- Retain original use
- Retain distinguishing original qualities
- Maintain the appropriate era
- Retain historic changes
- Retain character-defining features
- Repair, not replace
- Minimize cleaning damage
- Protect archaeological features
- Maintain form, integrity, and materials
- Retard deterioration
- Design alterations to be compatible
- Design removable alterations

Under the evaluation procedures set forth in the Cutler CRMP, all Project activities are to be assessed for potential effects to historic properties before being undertaken. The assessment includes evaluating the historical significance of the affected facility(ies), assessing the effects of the planned activity on those facilities, consulting with the Utah SHPO, and offering the Advisory Council an opportunity to comment on the undertaking and its anticipated effects.

Current internal project funding procedures and annual training given to all operations, engineering, and compliance staff emphasize the need to assess the potential of all routine operations work and maintenance and capital projects to affect cultural resources, including the nearly century-old Project infrastructure. Further, the annual training is conducted on protocols for new cultural discoveries potentially made during ground disturbing maintenance or capital construction projects.

The Cutler RMP is proposed to be updated from its current form under the new license. That is, PacifiCorp proposes an update to the Cutler RMP that would incorporate and improve upon the

management, monitoring, and best practices contained in the current RMP. This new Cutler RMP is proposed to be developed after the Project receives a FERC license Order.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. New proposed measures and management plans relevant to cultural resources are presented here, and the measure number from Table 2-4 is provided for reference:

Standalone Measures

As a standalone measure PacifiCorp proposes to add a tribal and cultural history section to PacifiCorp Cutler Project website (CUL-2).

Management Plans

The measures in the existing Cutler CRMP are proposed to generally be carried forward under a new license with some modification to update them to current regulatory standards and account for newly identified historic properties, in the form of an HPMP. These updated procedures were included in the HPMP developed for the new license (CUL-1; see Appendix HPMP). The HPMP includes specific procedures for identifying potential adverse effects to known historic properties from specific proposed undertakings (e.g., capital improvements, new construction, ground disturbance, replacing equipment) as well as routine maintenance (e.g., painting and replacing windows or other structural features). The HPMP also includes procedures for avoiding and minimizing those potential adverse effects to historic properties and for consulting with the Utah SHPO to mitigate any adverse effects that could not be avoided.

Similar to PacifiCorp's current Renewable Resources protocols and training, the HPMP formalizes the procedures to address inadvertent discoveries of cultural resources that have not been identified to date, such as resources that might be buried at present, and human remains. These procedures include stopping the activity that resulted in the discovery, having a qualified cultural resource specialist assess the discovery, consulting with the Utah SHPO and other appropriate parties, including Native American tribes, and identifying steps to avoid or mitigate adverse effects to the discovered resource. In the event human remains are discovered,

procedures would include notification of the law enforcement agency with jurisdiction over the area of the discovery.

3.3.10.5 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable adverse effects to historic properties and resources of tribal concern under proposed operations have been identified; therefore, none would be expected to occur.

3.3.11 LAND USE

This section addresses land use within the Project Vicinity, including land ownership, land use/land cover, and agricultural infrastructure (irrigation withdrawal, fencing, and agricultural leases). Shoreline buffer and streambank/ reservoir bank management (shoreline and streambank erosion, shoreline buffers, and bank stabilization) is summarized here but discussed in more detail in Section 3.3.1, Geology, Soils, and Sediment. Recreation resources are discussed in Section 3.3.9.

The geographic scope for the land use assessment is primarily the shoreline areas along the reservoir, tributaries, and Bear River (upstream of the reservoir) located within the Project Boundary. In addition, areas downstream of the Project on the Bear River to the town of Corrine, Utah, as presented in Figure 4-1 in the *Land Use Initial Study Report* (referred to herein as the Land Use ISR, which is included as Appendix D of PacifiCorp 2021a) are included in this section where appropriate. Table 3-37 presents the issue identified in FERC SD2 (FERC 2019b) related to land use resources.

TABLE 3-37 LAND USE RESOURCE ISSUES IDENTIFIED IN FERC SCOPING DOCUMENT 2

ISSUE	WHERE ASSESSED	CUMULATIVE EFFECTS ANALYSIS
Effects of proposed changes to Project operation and maintenance on agricultural land uses, water withdrawals, and wastewater treatment facility.	<ul style="list-style-type: none"> Exhibit E Section 3.3.9, Land Use <i>Land Use Initial Study Report</i> (Appendix D of PacifiCorp 2021a) <i>Land Use Updated Study Report</i> (Appendix C of PacifiCorp 2021b) 	No

3.3.11.1 AFFECTED ENVIRONMENT

The Project is primarily situated in western Cache Valley, approximately 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. Despite its proximity to Logan, Cutler Reservoir and the lands within and adjacent to the Project Boundary are predominantly rural and dominated by agriculture.

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. Utah State University 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 upstream of the reservoir and a meat packing plant that discharges into a tributary of Spring Creek (a tributary of the Little Bear River near the confluence with the reservoir). Logan City's sewage treatment facility is located near the eastern shore of the reservoir, approximately 1.5 miles from the Benson Marina recreation site.

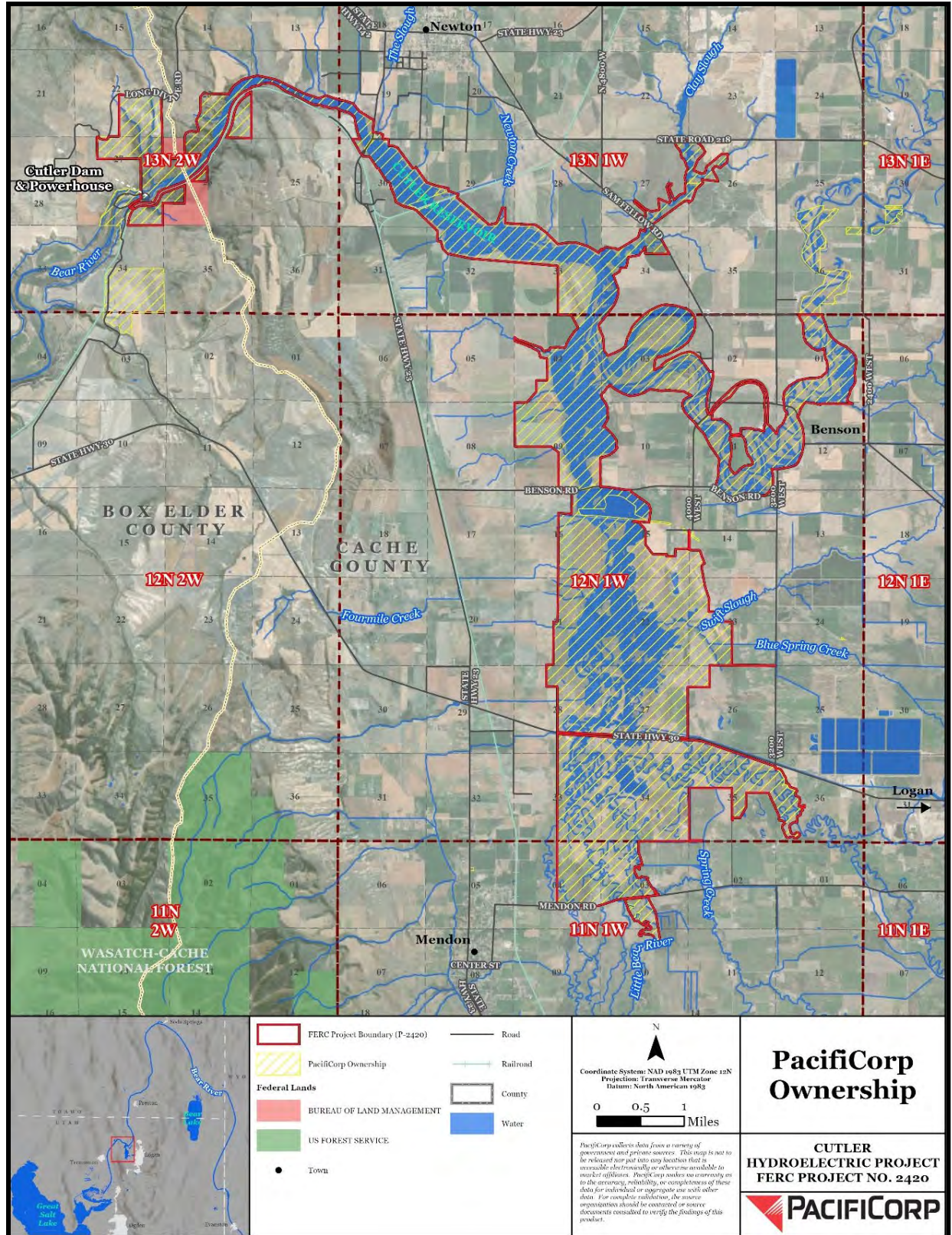
The sections below present the status of land ownership, land use/cover, and agricultural infrastructure (water withdrawal and fencing); an overview of shoreline management within the Project Vicinity; and relevant land management plans. Information was sourced from the March 2019 Project PAD (PacifiCorp 2019), with updates from the February 2021 Land Use ISR and the August 2021 Land Use USR.

LAND OWNERSHIP

Lands within the Project Boundary are entirely composed of private ownership, most of which are owned by PacifiCorp²⁸ (Figure 3-38). Lands adjoining the Project Boundary are also owned by private entities and are primarily used for either agricultural or residential uses, with the

²⁸ Although portions of the Bear River were deemed navigable at statehood in 1896, there have been questions as to whether the State of Utah may claim fee title ownership by virtue of the Equal Footing Doctrine to the bed and bank of the Bear River in some specific reaches of the river near Cutler Dam and Cutler Powerhouse. It is PacifiCorp's stance that 1) the unique title was obtained for some portions of the Bear River that pass through the Project, and 2) this claim may not apply to all Bear River submerged lands within the FERC Project Boundary.

exception of three parcels administered by the BLM located near Cutler Dam in Cutler Canyon, 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 current license. PacifiCorp’s proposed FERC Project Boundary, as detailed in Exhibit G of this FLA, contains 9,277 acres.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

FIGURE 3-38 PACIFICORP OWNERSHIP WITHIN THE PROJECT BOUNDARY AND PROJECT AREA

LAND USE AND LAND COVER

Land cover within the Project Boundary and Project Area²⁹ was estimated by analyzing the 2011 National Land Cover Database (NLCD), which provides land use information by generalizing land cover within the area (MRLC 2011). The NLCD is summarized in Table 3-38 and depicted in Figure 3-39.

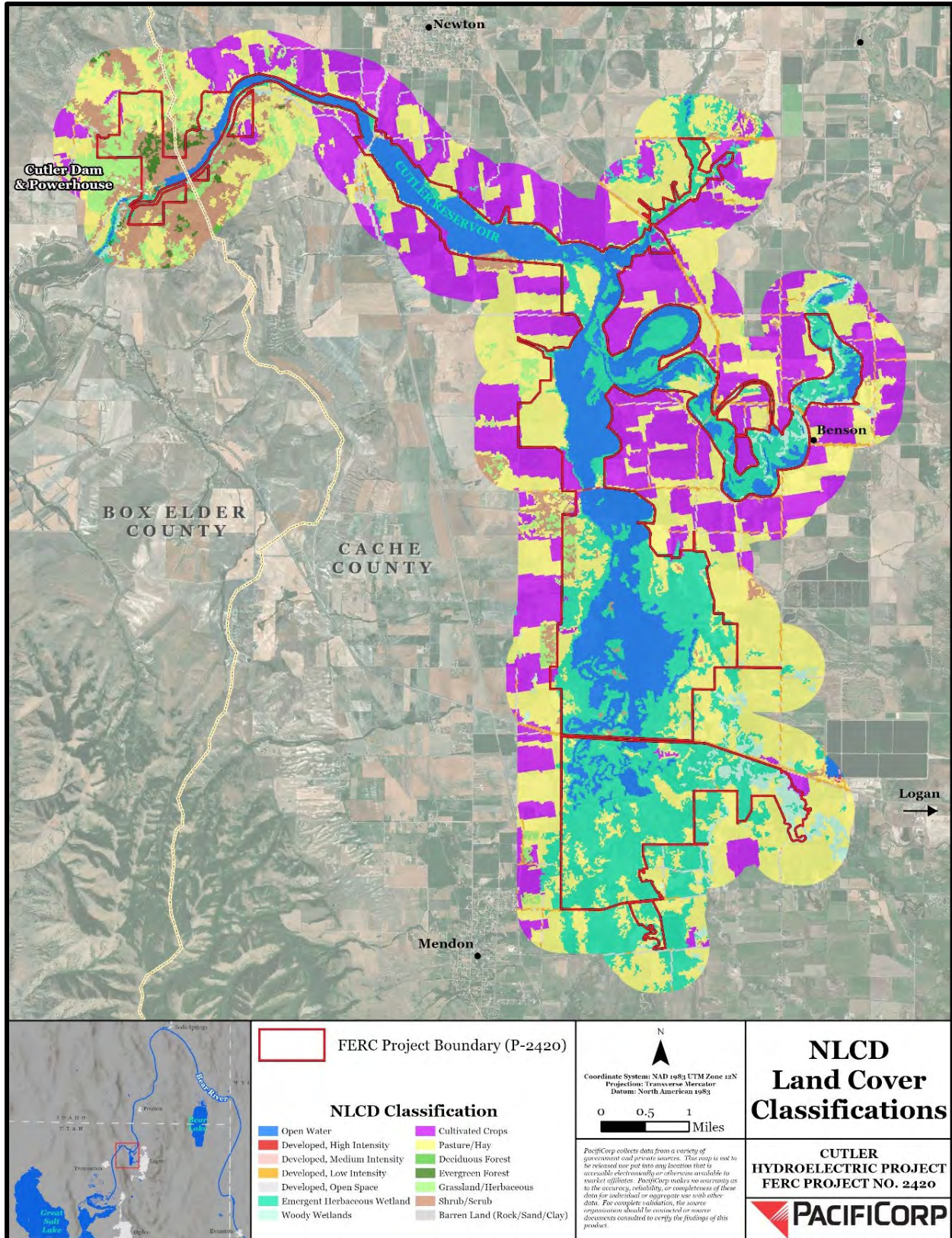
Within the Project Boundary, predominant land cover is the reservoir (32 percent) and associated wetlands (42 percent) (primarily emergent herbaceous wetlands); upland classifications are dominated by pasture/hay (16 percent) and shrub/scrub (4 percent) (MRLC 2011). Within the Project Area, predominant land cover is the reservoir (11 percent), pasture/hay (33 percent), and cultivated crops (24 percent) (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.

²⁹ The Project Area is defined in this FLA as the Project Boundary, plus the area extending 0.5 mile from the Project Boundary.

TABLE 3-38 LAND COVER WITHIN THE PROJECT BOUNDARY AND PROJECT AREA

GRID CODE	PROJECT BOUNDARY		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 Crop
90	294	3%	582	2%	Woody Wetland
95	3,562	39%	4,825	18%	Emergent Herbaceous Wetland

Source: MRLC 2011



Source: MRLC 2011

FIGURE 3-39 NLCD LAND COVER CLASSIFICATIONS WITHIN THE PROJECT AREA

AGRICULTURAL LAND USE IN PROJECT VICINITY

Typical of the Intermountain West, approximately 36 percent of Cache County is considered farmland according to the U.S. Department of Agriculture 2012 Census of Agriculture (USDA 2014). Pastureland for cattle and pigs comprises 51 percent of Cache County's farmland, and cropland accounts for 41 percent, with principal crops including forage land used for hay, grass silage, and greenchop; wheat and barley for grain; and safflower (USDA 2012a).

Box Elder County is also dominated by agriculture, with approximately 27 percent considered agricultural land (USDA 2014). Pastureland for cattle and sheep comprises 69 percent of Box Elder County's agricultural land, and cropland accounts for 28 percent (hay, safflower, and wheat and corn for grain) (USDA 2012b).

The Utah Division of Water Resources at the Department of Natural Resources annually publishes agricultural land use data for the state of Utah (Utah Division of Water Resources 2017). Excluding lands designated as herbaceous and woody wetlands, which are often used as grazing areas, the data estimate that 18 percent of the Project Boundary is used for agricultural purposes. Of the area delineated as agricultural use, dominant uses are other hay/non-alfalfa (30 percent), alfalfa (20 percent), winter wheat (19 percent), fallow/idle cropland (14 percent), and grass/pasture (7 percent).

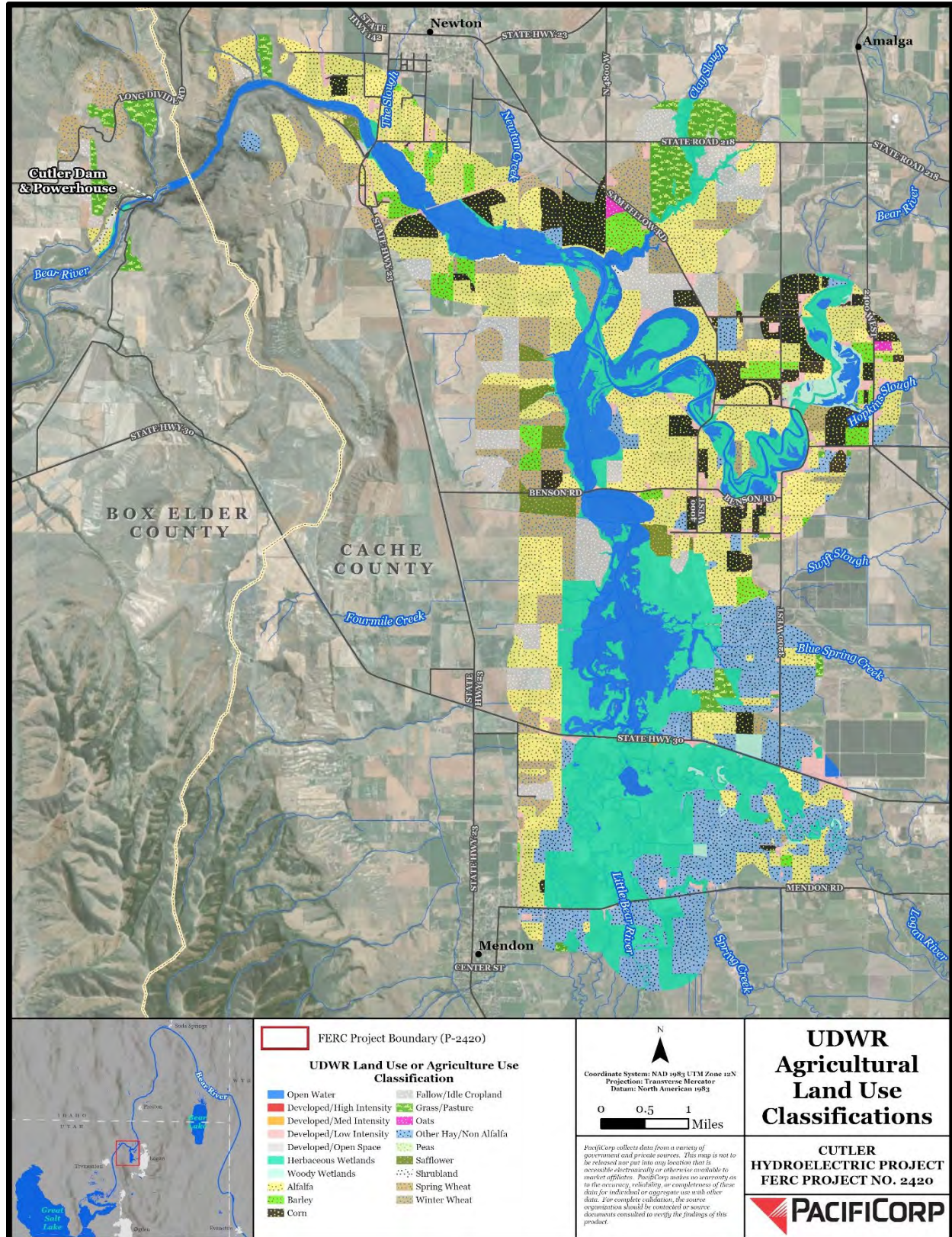
In the Project Area, approximately 63 percent of lands are used for agricultural purposes. Of the area delineated as agricultural use, alfalfa (39 percent), other hay/non-alfalfa (18 percent), winter wheat (14 percent), corn (9 percent), and fallow/idle cropland (9 percent) are the dominant uses (Table 3-39 and Figure 3-40).

TABLE 3-39 AGRICULTURAL USE WITHIN PROJECT BOUNDARY AND PROJECT AREA

AGRICULTURAL LAND USE	AGRICULTURAL USE WITHIN PROJECT BOUNDARY		AGRICULTURAL USE WITHIN 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: UDWR 2017

Note: Recent changes in land cover may not be captured in the base data used to compile this table.



Source: UDWR 2017

FIGURE 3-40 AGRICULTURAL LAND USE CLASSIFICATIONS WITHIN THE PROJECT AREA

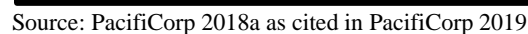
AGRICULTURAL LEASE PROGRAM AND AGRICULTURAL INFRASTRUCTURE

Agricultural leases for grazing and farming are an integral part of land use and management within the Project Boundary and are managed under the Cutler Resource Management Plan (RMP) Agricultural Lease Program. The agricultural infrastructure (water withdrawal infrastructure and fences) along the reservoir shoreline and on the Bear River upstream of the reservoir are also key components to maintaining agricultural land uses in and adjacent to the Project Boundary. Therefore, one of the study objectives of the Land Use ISR was to characterize water withdrawal infrastructure and fences and assess how proposed Project operations may affect this infrastructure.

Agricultural Lease Program

Implementation of the Agricultural Lease Program was largely completed at the end of the first monitoring period in 2002 for the current license. Agricultural Lease Program enhancements are monitored annually, with monitoring activities reported to FERC every 5 years. The most recent monitoring results are presented in the Cutler RMP five-year Monitoring Report from 2013 to 2017 (PacifiCorp 2018); the next monitoring report for the years 2018 to 2022 is due in 2023.

The Cutler RMP Agricultural Lease Program currently consists of approximately 1,733 acres of Project lands available for use as grazing pastures and approximately 445 acres of Project lands available for farming (Figure 3-41; PacifiCorp 2018). Another 663 acres of Project lands that are currently managed as wildlife food/cover plots are potentially available for grazing (PacifiCorp 2018). Implementation of the Agricultural Lease Program resulted in improvements to large areas of Project lands through changes to both grazing and farming leases leading to enhancements in wildlife habitat; shoreline buffer/setback establishment; and reductions in nutrients, sediment, and soil erosion to the reservoir.



MARCH 2022

Irrigation Water Withdrawal Infrastructure

The most senior rights to water from Cutler Reservoir belong to the BRCC, with water delivered to BRCC canals through two diversion structures located at Cutler Dam (Figure 3-38).

Other less-senior irrigation withdrawals within the Project Boundary occur upstream of the dam either from Cutler Reservoir or the Bear River. These withdrawals are mostly pumps associated with pipes to irrigation systems rather than canals, although there is also a new pump station (constructed in 2021) that now charges a portion of the West Cache Canal system from a constructed inlet located on the reservoir near the Highway 24 / Newton bridge. The Land Use ISR documented the location, condition (active versus inactive), and water rights for each of these irrigation withdrawal features based on existing records photo interpretation, the Utah Division of Water Rights (UDWRi) database, and field surveys. The field survey was conducted during the 2019 drawdown period. Because it was determined that the proposed operations would not affect the BRCC withdrawals, they were not included in the water withdrawal infrastructure portion of the Land Use ISR.

The Land Use ISR identified 44 irrigation withdrawal structures within the Project Boundary, 22 that pump from the reservoir proper, and another 22 that pump from the Bear River upstream of the reservoir, (Table 3-40 and Figure 3-42) based on location information derived from the Lower Bear River Distribution System and UDWRi database and surveyed during the field assessment. Of these, 21 structures were identified that historically or currently pumped water from the reservoir or minor inlets to the reservoir (e.g., Clay Slough). In addition to the 21 structures that pump from the reservoir, a new pump station was planned during the study period in 2020; construction was completed in May of 2021, and initial reclamation activities at the site will be completed in late fall 2021. The remaining 22 structures are located on the Bear River upstream of the reservoir. The Land Use ISR presents the full inventory of all irrigation structures including photos, structure owner, operational status, and a description of the structure.

TABLE 3-40 IRRIGATION WITHDRAWAL STRUCTURES WITHIN THE PROJECT BOUNDARY

ID	STATION NAME ^A	OPERATIONAL	ID	STATION NAME	OPERATIONAL
1	46 Dale Benson	Yes	24	Gordon W. Ricks	Yes
2	Duane W. Griffin	Yes	25	34 Harold Falslev (Kevin Falslev)	Yes
3	31 USU	Yes	26	Harold N. Falslev	Yes
4	32 USU	Yes	27	Falslev	No – relocated
5	Ex3 Garth Benson	Yes	28	Nolan R. Ballard	Yes
6	54 USU	Yes	29	Nolan R. Ballard	Yes
7	37 Bullen Farms	Yes	30	Harold N. Falslev	Yes
8	35 J. Golden Rigby	Yes	31	W. Lee Reese, Robert E. Griffiths	Yes
9	Todd N & Norene R Trs Ballard	Yes	32	T01 Lee Reese	Yes
10	55a Todd Ballard	Yes	34	T03 Tom Reese	Yes
12	50 Bob Munk	Yes	35	39a Wayne Watterson	Yes
13	51 Russ Seamons	Yes	36	09 John Allen	Yes
14	William L. Lindley	Yes	37	08a Reese-Ballard	Yes
15	Paul F Cardon, Norma Seamons	Yes	38	Ex1 Preston, Saunders, Johnson	Yes
16	42 Joe Cowley	Yes	39	11c Jim Watterson	Yes
17	Paul F. Cardon	Yes	40	43 Bullen Farms	Yes
18	15b Larry Falslev	Yes	41	11a Lee Johnson (Kimber Johnson)	Yes
19	16 Mike Falslev (Previous: Rulon Falslev)	Yes	42	36 Norval Johnson (Nick Galloway)	Yes
20	22a Laron Falslev	Yes	43	53 Cecil Archibald	Yes
21	30 J.L. Watterson	Yes	44	PacifiCorp	No
22	Norval H. Johnson	Yes	803	M. L. Ballard, Larry J And Mary Falslev Family Trust	Yes
23	11 Benson-Bear Lake Irr. Co.	Yes	804	West Cache Irrigation Company	Under Construction

Source: Land Use ISR (Appendix D of PacifiCorp 2021a)

^a Station names are as stated in Utah Division of Water Rights database (UDWRi 2021b).

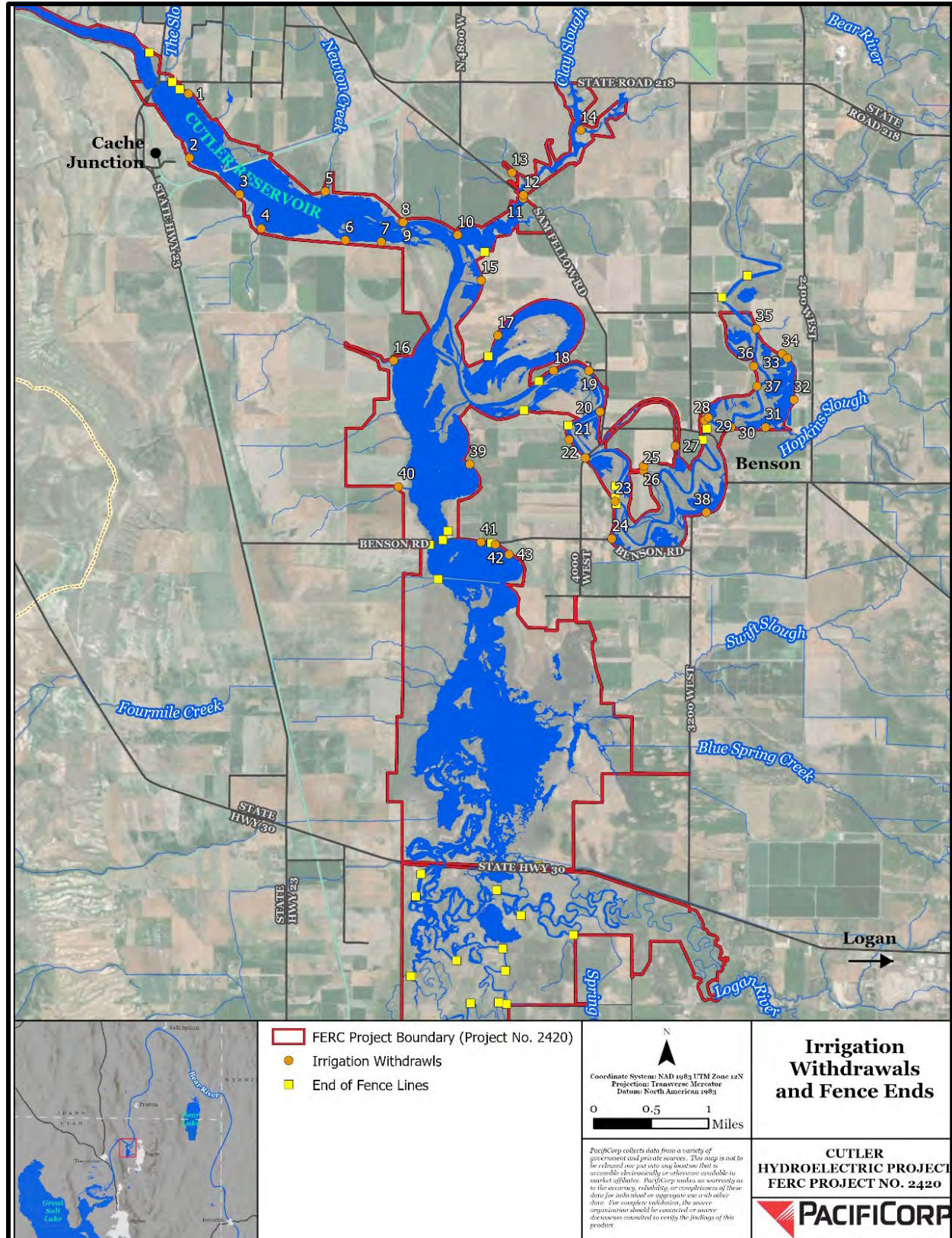


FIGURE 3-42 IRRIGATION WITHDRAWALS AND FENCE ENDS DOCUMENTED DURING THE 2020 LAND USE INITIAL STUDY REPORT

Fences

Fencing is a necessary component of livestock management around the reservoir, in many cases extending to the water's edge or beyond to contain livestock. While most livestock grazing leases within the Project Boundary have been altered to include a setback from the reservoir, a handful of areas remain where this is not the case.

Fences are used within the Project Boundary as part of the Cutler RMP Agricultural Lease Program (PacifiCorp 2018) under three main program components: grazing leases, farming leases, and wildlife food/cover leases. Fences may also be located on the Project Boundary / PacifiCorp ownership boundary and function to protect shorelines and buffers from grazing on adjoining private lands. Functioning cattle management fences are integral to the success of the overall lease program because 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 buffers (see the following sections), an additional 21 miles of interior fencing was constructed to control cattle and conflicting uses that may impact the reservoir shoreline and pastures.

Only fences that terminate near or below the OHWL and rely on WSE to prevent livestock trespass were reviewed in the Land Use ISR. Thirty-five fence endpoints that met this criterion were identified within the Project Boundary during the Land Use ISR and are shown in Figure 3-41.

Shoreline and Streambank Erosion

The current status of erosion along the reservoir shoreline and on the banks of the Bear River downstream of the dam are detailed in Section 3.3.1, Geological, Soil, and Sediment. Erosion conditions are summarized here as they relate to agricultural land use within the Project Boundary. Shoreline soils around most of Cutler Reservoir and the Bear River upstream of the reservoir are highly erosive. Erosion from Cutler Reservoir shorelines and Bear River channel banks has occurred in the past due to several factors including the geologic history of Cache Valley soils, normal river bed and floodplain processes, land use practices that remove protective vegetation and expose soil surfaces, reservoir operations (both at Cutler Reservoir and upstream)

since the creation of the Bear River / Bear Lake irrigation water storage and conveyance system, wave action created by recreation uses such as motorboats and jet skis, steep banks, and freeze-thaw cycles that lead to cracking and slumping. Historically, much of the Cutler Reservoir shoreline was farmed and grazed to the water's edge, which contributed to soil erosion and associated negative effects on water quality, as well as increasing the ongoing rate of bank loss in some areas.

During periods when no power is being generated and all inflow is passed through Cutler Reservoir to the BRCC canals located at Cutler Dam, the riverbanks on the Bear River downstream of Cutler Dam are still exposed to erosion processes, despite the lack of water passed downstream of the Project. The *Land Use Updated Study Report* (Appendix C of PacifiCorp 2021b) reported that numerous factors contribute to bank erosion on the Bear River downstream of Cutler Dam, including the composition of local soils, normal riverbed and floodplain processes, adjacent land-use practices, wave action created by motorized recreation on the river, vertical and overhanging banks, and freeze-thaw cycles (PacifiCorp 1995a; UDWQ 2002a, 2018).

RELEVANT LAND MANAGEMENT PLANS

This section discusses the land management plans that are relevant to land use and shoreline erosion management.

Cutler Resource Management Plan

The Cutler RMP³⁰ (PacifiCorp 1995a) 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 two programs relevant to land use (the Agricultural Lease Program and the Vegetation Enhancement Program)

³⁰ Under the new license, the RMP is proposed to evolve into an updated and more comprehensive resource management program composed of several individual but integrated management plans (as discussed below in Section 3.3.9.3, Proposed Measures).

to alter farming and grazing patterns, reduce conflicting uses, and restore and enhance vegetation, wildlife habitats, and stability along the reservoir shoreline.

The Cutler RMP Agricultural Lease Program (Figure 3-40) was primarily developed to manage grazing and farming leases within the Project Boundary and improve the quality of vegetation, wildlife habitat, water quality, and scenic quality. The Agricultural Lease Program includes the following sub-components:

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

The Cutler RMP Vegetation Enhancement Program emphasizes the improvement of water quality, wildlife habitat, recreation opportunities, and scenic quality on the reservoir by reducing the adverse impacts of land use practices through the establishment of shoreline buffer vegetation between the reservoir and adjacent farming activity, implementing shrub planting and bank stabilization efforts, and constructing erosion control basins to minimize sheet flow erosion from agricultural lands. The Cutler RMP Vegetation Enhancement Program includes the following sub-components:

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

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). In 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 3-41 provides the specific goals of the Cache General Plan applicable to land use in the Project Vicinity.

TABLE 3-41 CACHE COUNTY GENERAL PLAN MANAGEMENT GOALS

GOAL	DESCRIPTION
Agriculture GOAL 1	Maintain agricultural and open space within Cache County, which provide food, security, watersheds, and 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 farmland in appropriate farming operations, which will be in harmony with the agricultural use of the land
Residential Housing Development GOAL 1	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, and 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

GOAL	DESCRIPTION
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 (1998). The plan provides guidance on land use and development priorities, citing that future land use decisions will consider the following (Box Elder County 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

WASTEWATER TREATMENT FACILITIES

Logan City WWTP discharge enters Cutler Reservoir through Swift Slough. The amount and quality of discharge is regulated by the UDWQ. The city is constructing a new facility to meet water quality standards in their permit. Discharge from the new facility will generally follow the same path as existing flows, with some exceptions.

3.3.11.2 ENVIRONMENTAL ANALYSIS

This section of Exhibit E discusses potential impacts to land use from the Project and, as required in the FERC SD2 (FERC 2019b), assesses the potential effects of proposed changes to Project operation and maintenance on agricultural land uses, water withdrawals, and wastewater treatment facilities. Proposed PM&E measures are summarized in Section 2.2.3 and measures relevant to land use are presented in Section 3.3.11.3.

LAND OWNERSHIP, MANAGEMENT, AND LAND COVER

Proposed Project operations would not cause any changes to land ownership or land management within the Project Boundary. There would also not be any changes to land cover as proposed operations are not expected to alter vegetation types adjacent to the reservoir given the short duration and timing of proposed extended operations limited to the winter period. In addition, the Cutler Agricultural Lease Program is proposed to be updated and continued under a new license, maintaining the practice of issuing grazing and farming leases where they best meet Project management objectives within the Project Boundary.

IRRIGATION WATER WITHDRAWAL INFRASTRUCTURE

Proposed operations would not affect the BRCC withdrawals located at Cutler Dam because the proposed extended range would only be utilized outside the irrigation season, and the elevation range proposed would not fluctuate enough to affect the canal withdrawals.

To assess impacts on smaller irrigation water withdrawal infrastructure, fences, and shoreline erosion, the Land Use ISR used the modeling results from the Hydraulic Modeling ISR (Appendix G of PacifiCorp 2021a) to determine which features or areas of reservoir banks may be exposed and potentially affected during proposed normal operations versus during the proposed extended operation periods. The modeled inundation boundaries also indicated how far upstream on the Bear River changes in WSE would occur following any potential decrease in surface elevation at Cutler Dam. The model accounted for travel time based on flow and discharge rates so that the duration of any potential effects could be estimated for any location.

As described above and in the Land Use ISR, 44 smaller irrigation structures are present along the reservoir's edge and on the Bear River upstream of the reservoir. Individual pump diversions/infrastructure on the reservoir are similarly protected due to the timing of the proposed extended operations, although depending on their location and elevation, at least one pump location currently potentially has issues that occur during the irrigation season under the existing (which is the same as the proposed normal) operating range. The irrigation water withdrawal infrastructure portion of the Land Use ISR results indicate the following, for proposed normal and extended operations:

- Proposed normal operations (elevation 4,407.5 to 4,406.5 feet)
 - Based on hydraulic modeling results, one irrigation pump intake on the Bear River upstream of the reservoir could be exposed during the proposed normal operating range (which also could occur currently during the irrigation season and constitutes no change from the existing reservoir elevations). All other pump intakes remain submerged.
- Proposed extended operations (elevation 4,406.5 to 4,405.0 feet)
 - On the Bear River upstream of the reservoir, all intake pipes would remain submerged during proposed extended operation periods, with the exception of one pipe; however, this pipe could also be exposed currently, as well as during proposed normal operating range, as described above.
 - In Cutler Reservoir, four intake pipes would be exposed during the proposed extended operation periods; however, as noted, the extended operations, by definition, would only occur outside the irrigation season.

The extended operations will take place in winter outside of the irrigation season when the pumps and intake pipes are not operating.

FENCING

As described above and in the Land Use ISR, 35 fence endpoints were identified along the reservoir's edge that terminate at or below the OHWL. Where fencing to the water's edge exists, fencing may need to be extended to account for the full range of proposed operating pool elevations. For the 35 fence endpoints, the hydraulic modeling results (Appendix G of PacifiCorp 2021a) indicate the following potential effects resulting from proposed Project operations (as reported in the Land Use ISR):

- Two fence endpoints would remain submerged through the normal (no change from current) and extended operating range.
- Thirty-two fence endpoints are either currently exposed or could be exposed during normal operating range; however, since the proposed normal operating range is the same

as the existing operating range, this effect would not constitute a change from current conditions.

- One fence endpoint may be exposed or left less functional during the proposed extended operating range. The end of this fence would need to be extended an additional 10 feet into the river channel to prevent potential livestock trespass. If the fence was not extended, actual trespass in this area would depend on the presence of livestock during the time when the reservoir is being managed in the extended operating range. This time period would occur outside the irrigation season and during periods when reservoir inflows were conducive to power generation.

At the current normal operating range of the Project, most fence endpoints at the reservoir's edge are already exposed (32 of 35). Only one additional fence endpoint may be exposed or left less functional during the extended operating range. This fence and any other fences that do not extend to the water's edge during the proposed normal or extended operating range should be able to be extended by the lessee or PacifiCorp.

SHORELINE AND STREAMBANK EROSION

The Land Use ISR assessed the potential for the proposed extended operation periods to cause increased erosion associated with soil draining and drying along the reservoir shoreline and along the Bear River upstream of Cutler Reservoir. Shoreline erosion due to increased reservoir fluctuation could lead to further loss of shoreline lands through erosion, as well as a potential reduction in small areas of grazing land and wildlife habitat. A reservoir bank study was conducted during the 2019 full drawdown of the reservoir, which specifically observed areas expected to potentially erode or slump during the greater than 20-foot (as measured at Cutler Dam) drawdown that occurred as part of the initial study phase. As detailed in the Land Use ISR, no movement of reservoir banks was reported during that study, which was made as part of a much lower drawdown than the proposed operating range for the Project. Therefore, given the short 10-day timeframe of the proposed extended operation periods, no additional shoreline or streambank erosion is expected under the proposed operations than would be expected under the current reservoir operations.

The Land Use USR also looked at streambank erosion on the Bear River downstream of Cutler Dam as it relates to reservoir discharge.

Power generation and thus discharge at Cutler Reservoir is limited by available active storage, the magnitude and timing of inflows to refill the reservoir, irrigation withdrawals from the reservoir, and variability in power demand over different timeframes. Historical Project operations indicate that approximately 2,000 cfs is the maximum power flow at which reservoir operating range can be maintained given an average winter inflow of 1,000 cfs (PacifiCorp 2021b).

Hydrographs prepared by PacifiCorp comparing the normal and proposed extended operating ranges illustrate the effect of the additional foot of drawdown on power flows/discharges to the Bear River and on reservoir elevations during a 10-day generation cycle (Figure 3-43; Connely Baldwin, personal communication, May 24, 2021; PacifiCorp 2021b).

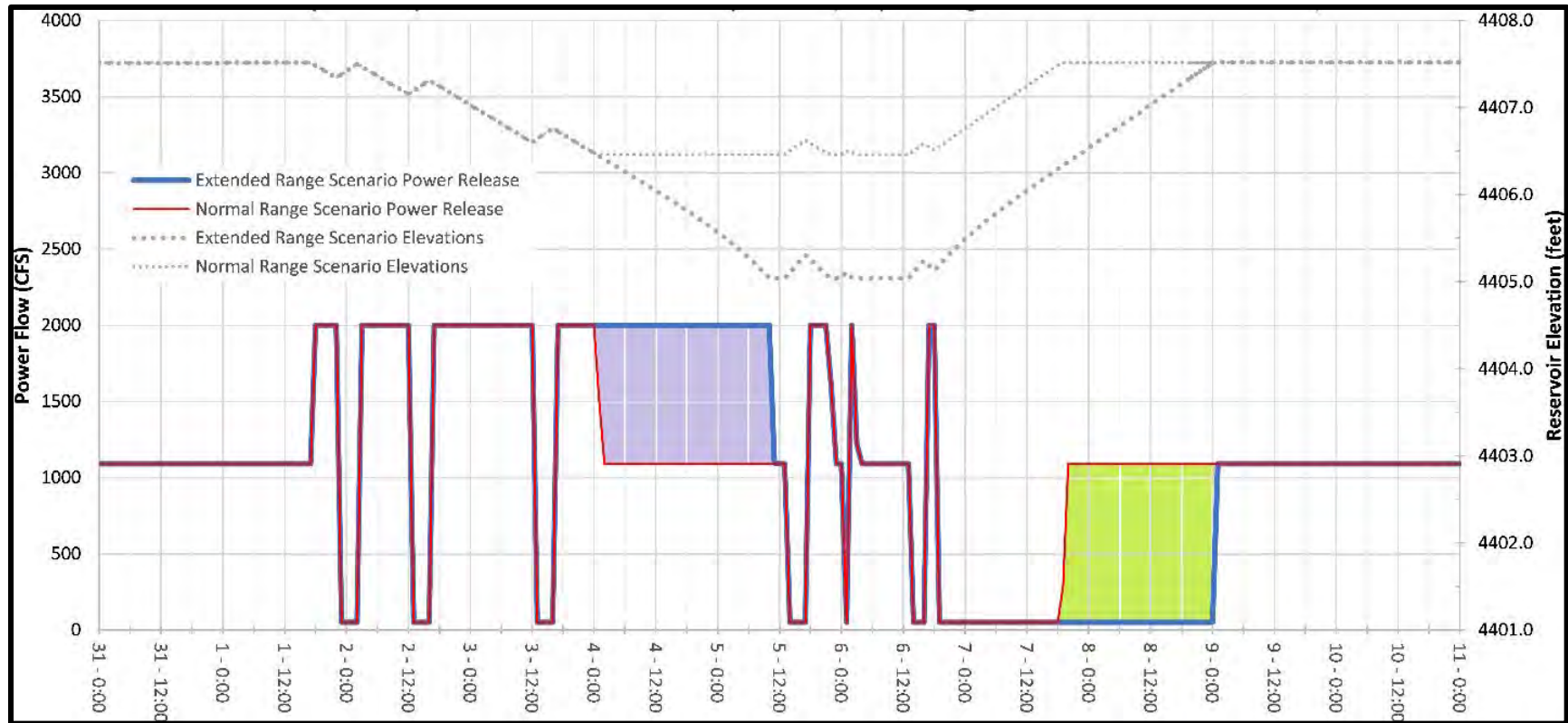


FIGURE 3-43 POWER RELEASE DIFFERENCES BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

As reflected in these hydrographs, total release of flows to the river would be the same under normal and proposed extended operations because the inflow to the Project does not change regardless of operations, and the Project has limited water storage capability. The only difference in flows between the two operation modes would be timing. Under the extended range, about 2,500 af of water (roughly 14 percent of the total released during a 10-day cycle) would be discharged to extend the period of higher generation during the middle of the cycle (see purple block in Figure 3-43). Under normal operations, the period of higher generation at the middle of the cycle would be shorter before operations reverted to run-of-river generation, and the 2,500 af retained in the reservoir would allow it to refill more quickly, so run-of-river generation could begin again sooner (see green block in Figure 3-43). Use of the retained 2,500 af would be delayed within the cycle by about 3.5 days.

As shown by these hydrographs, there would be no change between normal and proposed extended-range operations in maximum flow rate, minimum flow rate, or ramp rates—simply a delay in achieving the same volume (PacifiCorp 2021b). Therefore, there would be no anticipated erosion effects on the Bear River banks due to the proposed extended operating range.

Erosion features and control structures are also discussed in greater detail in relation to soil erosion and sediment deposition in Section 3.3.1, Geology, Soils, and Sediment.

COMPATIBILITY WITH LAND MANAGEMENT PLANS

The Project is compatible with the goals of the Cache and Box Elder County General Plans. The Project is also not expected to conflict with any public agency land use plans, policies, or regulations. Comprehensive Management Plans and their relationship to the Project are discussed in detail in Section 5.0, Consistency with Comprehensive Plans.

WASTEWATER TREATMENT FACILITIES

Receiving water elevation in Cutler Reservoir can potentially influence the rate that discharge moves away from the Logan City WWTP. Although changes in water level that reduce this flow rate could potentially influence WWTP operation efficiencies and create additional concerns in

moving discharge into the reservoir, as Cutler's upper reservoir elevation will not change, this concern will not result in any changes to current WWTP conditions.

3.3.11.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

PacifiCorp aims to minimize the potential land use impacts of the Project and maintain the surrounding quality of the landscape. The Project will be consistent with adjacent land use and intended use of the site. Section 2.2.3 of this Exhibit E lists the PM&E measures proposed to be implemented for the Project under a new license. Existing measures that are proposed to be updated and/or continue under a new license, as well as proposed new measures, are described in greater detail below as related to the protection of current land uses.

EXISTING MEASURES

Measures required in the current license (FERC 1994) relevant to land use that are proposed to be carried forward and/or updated under a new license are presented below, including license articles and management plans. A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures.

- Standard License Article No. 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.
- Article No. 401: Sets operating range and compliance limits in order to balance the needs of wildlife, recreation, irrigation, and power generation.
- Article No. 402: Cutler Resource Management Plan (RMP). Update the RMP (the following measures were required to be included in the original Cutler 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 miles of cattle exclusion fencing.
- Modify leased Project lands, including 300 acres of tilled ground for migratory waterfowl, and install 6 miles of fence.

The Cutler RMP would not continue in its current form under the new license. Rather, PacifiCorp plans to draft a new Cutler RMP that would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP. This new RMP would be developed after the Project receives a FERC license Order.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. New proposed measures and management plans relevant to land use are presented here; the measure number from Table 2-4 is provided for reference.

Standalone Measures

- Evaluate fence endpoints for effectiveness; for fences determined to not be effective at normal or extended range, extend with exposed endpoints to an appropriate point at or below the water surface so they are not exposed during the normal and/or extended operating range (LU-3).
- Work with BLM to evaluate the potential of constructing a single fence on the south side of PacifiCorp and BLM parcels south of the reservoir near Cutler Dam (LU-5).
- Identify approximately three additional miles of bank stabilization projects within the Project Boundary (GEO-2).

New Management Plans

Resource Management Plan

A new Cutler RMP would be developed that incorporates many of the measures in the current Cutler RMP. This new Cutler RMP would be developed after the Project receives a FERC license Order. PacifiCorp proposes developing and/or updating the Cutler RMP for the following resources relevant to land use: grazing management, shoreline management, sediment and erosion control, and weed management. These programs would be part of the overall Cutler RMP and would guide Project operations to minimize impacts to land use and associated features, such as agricultural infrastructure and shoreline erosion.

The new Cutler RMP would include the following measures relevant to land use:

- Agricultural management: Review, monitor, update, and improve grazing management and agricultural lease programs (LU-1); continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve/improve their function as necessary (LU-2).
- Land use and management: Include additional parcels (as reflected in Exhibit G) in FERC boundary downstream of powerhouse in the Cutler RMP programs (land use, fencing, vegetation management) and HPMP (LU-4); Coordinate with BLM to construct a single buffer/boundary fence around PacifiCorp and BLM parcels south of the reservoir near Cutler Dam (LU-5); as part of agricultural use program in the Cutler RMP, evaluate irrigation pump intakes within the Project Boundary and extend where needed (LU-6).
- Shoreline buffer management: Update erosion control and sediment management program (for existing and new erosion control check dams, bank stabilization sites, and vegetated shoreline buffers) within the Cutler RMP; maintain/monitor vegetated shoreline buffers, and erosion control check dams, to minimize sedimentation to Cutler Reservoir (GEO-1); continue to monitor existing (and add any potential new) bank stabilizations measures (GEO-3).

Construction Erosion and Sediment Control Plan

A new CESCOP will be developed that incorporates many of the PM&E measures in the current Cutler RMP. The CESCOP will include standard and Project-specific BMPs and requirements to address construction and ground disturbance-related erosion and sediment activities, with the

goal of avoiding and minimizing impacts of any new construction during the license term (GEO-5). This new CESCIP is to be developed after the Project receives a FERC license Order.

3.3.11.4 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable or adverse impacts to land uses associated with agricultural infrastructure or the agricultural leases are anticipated under the proposed Project operations. Based on the hydraulic modeling results, the proposed operation changes would not result in any effects to irrigation infrastructure. Specifically, water withdrawal features that the hydraulic model showed could potentially be exposed under proposed extended operations would not be in operation during the extended operation period. The one fence endpoint that the model indicated could potentially be exposed as a result of proposed extended operations could be lengthened to the water's edge to avoid any impacts. Similarly, no unavoidable or adverse impacts to other land uses are anticipated under the proposed Project operations.

3.3.12 AESTHETICS

This section addresses the visual characteristics of the lands and waters within the Project Vicinity including the Cutler Dam, associated infrastructure, Cutler Reservoir, viewpoints, and recreation areas. The geographic scope for the aesthetics assessment is the area within the FERC Project Boundary as well as two additional viewpoints in the Project Vicinity (Bear River at State Road 218; and Highway 30 at intersection with 2100 N). No substantive new construction is proposed for the Project, and operation noise would remain largely the same; therefore, no noise/auditory effects have been analyzed in this section. Table 3-42 presents the issue identified in FERC SD2 (FERC 2019) related to aesthetic resources.

TABLE 3-42 AESTHETIC RESOURCE ISSUE IDENTIFIED IN FERC SCOPING DOCUMENT 2

ISSUE	WHERE ASSESSED	CUMULATIVE EFFECTS ANALYSIS
Effects of proposed changes to Project operation and maintenance on aesthetic resources.	<ul style="list-style-type: none"> • <i>Land Use Initial Study Report</i> (Appendix D of PacifiCorp 2021a) • Exhibit E Section 3.3.10, Aesthetics 	No

3.3.12.1 AFFECTED ENVIRONMENT

This section discusses the baseline existing conditions of the visual characteristics in the Project Vicinity and within the Project Area. Conditions were assessed in the *Land Use Initial Study Report* (Appendix D of PacifiCorp 2021a; herein referred to as Land Use ISR) using the Scenery Management System (SMS) (USFS 1995).

PROJECT VICINITY OVERVIEW

The Project Vicinity for scenic resources 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 nationally recognized scenic byways (Logan Canyon Scenic Byway in Utah and Pioneer Historic Byway in Idaho) and two 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, Utah, 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 ends at Bear Lake. The route passes through and past numerous 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 Franklin, Idaho—Idaho’s first city—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 original 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). 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 shoreline ecosystem of the Great Salt Lake past the Farmington Bay Waterfowl Management Area and Legacy Nature Preserve with opportunities for hiking, biking, and bird-watching along the route (Visit Utah 2018).

PROJECT AREA 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 southern portion of Cache Valley. The Project Area can be characterized as a rural, agricultural valley surrounded by high mountains. Aesthetically, the Project Area can be roughly divided into three zones composed of five management units, 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 upstream of Cutler Canyon and where the reservoir 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 (the Bear River, North Marsh, and South Marsh Management Units). A description of these areas, as well as photos (Photo 3-9 through Photo 3-30), are presented below. PacifiCorp designates five management units on Cutler Reservoir that overlap with the three aesthetic zones described above; the five management units are displayed in Figure 1-1.

The Cutler RMP (PacifiCorp 1995a) 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 the shoreline, there were lines of rusted car bodies and agricultural debris purposely placed end-to-end to serve as bank stabilization

(PacifiCorp 1991). However, implementation efforts associated with the Cutler RMP have greatly improved the scenic quality of the shoreline by removing hundreds of the old car bodies from the banks and establishing a vegetated shoreline buffer, including shrub plantings and bank stabilization projects, and fencing to exclude agricultural use and other encroachments 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.

The most prominent infrastructure features visible in the Project Area include the dam, flowline, penstocks, surge tank, powerhouse, substation, various canals, minor roads, railroads, bridges, and transmission/distribution lines. Several Project features are listed as National Historic Properties (e.g., the dam, powerhouse, conduit, and surge tank) as discussed in Section 3.3.10, Cultural and Tribal Resources, and the Project's HPMP. 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 rugged 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 3-9, Photo 3-15, and Photo 3-16). Public access or view of facilities in this portion of Cutler Canyon would be solely for access to the dam and nearby canal features. There is no vehicle access through the canyon (although there is a dead-end road on the south side of the reservoir, extending west approximately 1 mile from the east end of Cutler Canyon, that terminates at the site of the historic Wheelon Dam and was used to access the older dam and canal headgates there); however, a Utah Northern Railroad line does run roughly east-west along the north-facing slopes of Cutler Canyon (Photo 3-10). The railroad is located outside but adjacent to the Project Boundary.

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 3-11). The overall length along the centerline of the crest is 545 feet including two 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 3-12). 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 112-foot-long, 14-foot-diameter riveted-steel penstocks that extend into a brick 60-foot by 123-foot powerhouse (Photo 3-13).

Upstream from Cutler Canyon in the main body of the Reservoir Management Unit, the landscape transitions to the flat expanses of agricultural land typical of Cache Valley with few landforms or vegetation features punctuating the horizontal, open space (Photo 3-17 through Photo 3-19). Views from the reservoir are dominated by flat expanses in the foreground of 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 3-20). The exceptional height and steepness of these mountains is an important visual resource of the region. The Wellsville Range is one of the narrowest and steepest ranges in the Rockies (USFS n.d.).

Because of the lack of middle-ground visual elements, the reservoir's water surface and shoreline edge are important components of the Project Area aesthetics. As noted previously, shoreline scenic conditions were greatly improved by the removal of old car bodies from the banks and the establishment of a vegetated buffer around most of the reservoir, with fencing to control agricultural uses and encroachments (Photo 3-20 through Photo 3-22). Several roads, bridges, and railroads intersect the Project Boundary (Photo 3-23 and Photo 3-24). Cattle grazing, farming activities, and occasional farm structures remain both inside and outside of the Project Boundary and contribute to the area's rural character; lease improvements instituted in the beginning of the current license period have created a better balance between these compatible uses and the other natural resource management objectives of the Project (Photo 3-25 to Photo 3-27).

The Bear River, North Marsh, and South Marsh Management Units encompass the south end of the Project Boundary. PacifiCorp allocates grazing leases as part of their Agricultural Lease Program in all management units, although the majority are located in the South and North Marsh Management Units, including areas along the Little Bear and Logan Rivers and Spring Creek (Section 3.3.11.1, Land Use, for a more detailed description of grazing management). The

grazing leases are monitored annually and reported to FERC every 5 years, with the most recent monitoring results reported in the *Resource Management Plan Five-year Monitoring Report 2013-2017* (PacifiCorp 2018). Because of the scattering of riparian vegetation and cottonwood trees, the South Marsh 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 3-28). Upstream of the Project Boundary on the Bear River, the reservoir's influence ceases and the landscape transitions to a more natural, riverine setting (Photo 3-29 and Photo 3-30).



PHOTO 3-9 CUTLER POWERHOUSE WITH THE BYPASSED REACH IN THE FOREGROUND, LOOKING WEST FROM CUTLER CANYON NEAR CUTLER DAM



PHOTO 3-10 ROCK RAILROAD WALL ON NORTH-FACING SIDE OF CUTLER CANYON



PHOTO 3-11 DOWNSTREAM FACE OF CUTLER DAM, LOOKING NORTHEAST INTO CUTLER CANYON



PHOTO 3-12 FLOWLINE AND SURGE TANK, LOOKING UPSTREAM FROM THE POWERHOUSE AT THE BYPASSED REACH



PHOTO 3-13 CUTLER POWERHOUSE AND SUBSTATION (NOT A PROJECT FEATURE), LOOKING UPSTREAM, CUTLER DAM AND CANYON IN THE BACKGROUND



PHOTO 3-14 CUTLER RESERVOIR IN CUTLER CANYON MANAGEMENT UNIT, LOOKING DOWNSTREAM NEAR HISTORIC WHEELON DAM LOCATION



PHOTO 3-15 CUTLER RESERVOIR AND SURROUNDING LANDSCAPE, LOOKING UPSTREAM NEAR WHEELON DAM LOCATION, IN CUTLER CANYON MANAGEMENT UNIT



PHOTO 3-16 VIEW FROM LONG DIVIDE ROAD, LOOKING SOUTHEAST AT CUTLER RESERVOIR AND CACHE VALLEY WITH ALL FIVE MANAGEMENT UNITS VISIBLE



PHOTO 3-17 CUTLER RESERVOIR NEAR NEWTON, UTAH IN THE CUTLER CANYON MANAGEMENT UNIT



PHOTO 3-18 CUTLER RESERVOIR JUST SOUTH OF CUTLER CANYON MARINA IN THE RESERVOIR MANAGEMENT UNIT, LOOKING SOUTHEAST AT WASATCH MOUNTAINS



PHOTO 3-19 CUTLER CANYON MARINA RECREATION SITE WITH FLAT LANDSCAPE IN FOREGROUND AND STEEP TOPOGRAPHIC RELIEF OF MOUNTAINS IN BACKGROUND, LOOKING EAST AT WASATCH MOUNTAINS



PHOTO 3-20 TYPICAL SHORELINE VEGETATION IN RESERVOIR MANAGEMENT UNIT NEAR BENSON RAILROAD BRIDGE TRAILHEAD, LOOKING SOUTH



PHOTO 3-21 TYPICAL SHORELINE BUFFER VEGETATION IN NORTH MARSH MANAGEMENT UNIT ALONG BENSON RAILROAD NATURE TRAIL, LOOKING SOUTHEAST



PHOTO 3-22 SHORELINE BUFFER VEGETATION IN RESERVOIR MANAGEMENT UNIT ALONG BENSON RAILROAD NATURE TRAIL, LOOKING EAST



PHOTO 3-23 BENSON RAILROAD BRIDGE TRAILHEAD, LOOKING SOUTHEAST



**PHOTO 3-24 HIGHWAY 23 BRIDGE OVER CUTLER RESERVOIR NEAR NEWTON, UTAH,
LOOKING NORTHEAST; LITTLE MOUNTAIN IS IN THE BACKGROUND**



**PHOTO 3-25 RECREATION ACCESS ALONG SHORELINE BUFFER FENCING EXCLUDING
CATTLE FROM ADJACENT GRAZING LANDS**



PHOTO 3-26 CATTLE FENCING AND CORRAL STRUCTURES IN THE SOUTH MARSH MANAGEMENT UNIT



PHOTO 3-27 CANAL IN SOUTH MARSH MANAGEMENT UNIT



PHOTO 3-28 WETLAND AREAS IN THE SOUTH MARSH MANAGEMENT UNIT, LOOKING SOUTHWEST TOWARDS WELLSVILLE MOUNTAINS



PHOTO 3-29 BEAR RIVER AT LOWER BEAR RIVER OVERLOOK LOOKING NORTHWEST IN THE BEAR RIVER MANAGEMENT UNIT TOWARDS CUTLER CANYON MANAGEMENT UNIT



PHOTO 3-30 BEAR RIVER, NEAR UPSTREAM PROJECT BOUNDARY, IN THE BEAR RIVER MANAGEMENT UNIT

VISUAL ASSESSMENT USING THE SCENERY MANAGEMENT SYSTEM

An aesthetics investigation took place from late 2019 to 2020 as part of the Land Use ISR to characterize the scenic quality in the Project Area, and establish a framework for subsequent evaluation of the effects of the proposed extended operations on aesthetic resources. The Landscape Value objective derived from the Cutler RMP is as follows (PacifiCorp 1995a):

Enhance Scenic Quality – To reduce the visual impact of erosion and debris and to enhance the area’s rural, undeveloped landscape. More abundant and mature plant growth of riparian vegetation will add color, texture, and definition to the landscape, improving its overall attractiveness.

The Landscape Value objective was developed to incorporate the Cutler RMP, existing scenic conditions, and public expectations for Cutler Reservoir’s visual aesthetics.

Photographs were taken prior to and during the 2019 drawdown to provide a visual reference across a range of reservoir elevations. Visual conditions under proposed operations were then assessed relative to the Landscape Value objective using a range of variables including form,

line, color, and texture as they occur in this setting. Interpretation also included the effects of seasonality. The method included photographs collected during the 2019 drawdown at key observation points where viewers experience the Project Area landscape, hydraulic modeling of the proposed normal and extended operations WSEs, and use of the USFS SMS (USFS 1995). The aesthetics study results are presented in detail in the Land Use ISR.

Visual resources were assessed using the SMS developed by the USFS (USFS 1995) to provide a systematic process for assessing baseline visual conditions and changes using photographic references. Twenty-six photopoints were used as reference for the SMS assessment. Photopoints were placed in locations where viewers could see Cutler Reservoir, with an emphasis on locations where viewers are most sensitive to visual aesthetics in the Project Area (recreation sites, bridges, State Road 218 and Highway 30). Baseline photos were taken under normal operating conditions (WSE 4,407.3 at Cutler Dam) on October 24, 2019 and a second round of photos was taken during the full 2019 drawdown (WSE 4,392.4 at Cutler Dam) on November 1, 2019. Example photos and photopoint locations are presented in the Land Use ISR (see Figure 6-2 in the Land Use ISR for locations; Appendix D of PacifiCorp 2021a).

Using the baseline photos, a Landscape Value rating was then generated for the Project Area using the SMS, which is based on the following variables:

- Landscape Character describes the visual and cultural image of a landscape, combining the physical, biological, and cultural attributes.
- Scenic Attractiveness Classes are developed to determine the relative scenic value of lands within a particular Landscape Character.
- Distance Zone reflects the distance of landscape features from the viewer (foreground, middle ground, and background).
- Concern Level: sites, travelways, special places, and other areas are assigned a concern level value of 1, 2, or 3 to reflect the relatively high, medium, or low importance of aesthetics.
- Scenic Class is a measure of the relative scenic importance, or value, of discrete landscape areas. It is a numeric rating based on scenic attractiveness, distance zone, and concern level (1-7 with 1 being highest public value).

- Scenic Integrity is a measure of the degree of visible disruption of the landscape character.

Integrating the Scenic Class³¹ with the Scenic Integrity³² category yields the Landscape Value, expressed as the numeric Scenic Class followed by the Scenic Integrity rating (e.g., 2—Very High or 5—Low). The summary value generated by SMS indicates the visual aesthetics in the area relative to the desired potential, and evaluating potential changes in visual aesthetic conditions associated with different management prescriptions.

The SMS variables are described in greater detail in the Land Use ISR (Appendix D of PacifiCorp 2021a).

Under current baseline conditions, the Landscape Values are as follows:

- Scenic Class 1/Moderate Scenic Integrity for recreationists
- Scenic Class 2/Moderate Scenic Integrity for travelers on Project Area roads and highways
- Scenic Class 5/High Scenic Integrity for travelers on Highway 30 entering the valley from the west

3.3.12.2 ENVIRONMENTAL ANALYSIS

This section describes potential effects on aesthetic resources from the Project. As required in FERC SD2 (FERC 2019), this section assesses the effects of proposed changes to Project operation and maintenance on aesthetic resources. No substantive new construction is proposed for the Project, and operation noise would remain largely the same; therefore, no noise/auditory affects have been analyzed in this section.

³¹ Scenic Class is a measure of the relative scenic importance, or value, of discrete landscape areas. It is a numeric rating based on scenic attractiveness, distance zone, and concern level, in which classes 1 and 2 have high public value, classes 3 through 5 have moderate value, and classes 6 and 7 have low value.

³² Scenic Integrity represents a measure of the degree of visible disruption of the landscape character. A landscape with very minimal visual disruption is considered to have high scenic integrity; discordant relationships among scenic attributes diminish Scenic Integrity. Scenic Integrity is expressed as very high, high, moderate, low, very low, and unacceptably low.

The Land Use ISR (Appendix D of PacifiCorp 2021a) evaluated whether changes in WSE during the proposed normal and extended operations could change visual aesthetic conditions in three ways: 1) bank erosion, associated loss of vegetation, and related increase in water turbidity, 2) exposure of reservoir beds, and 3) invasion of the reservoir bed by invasive plant species. Impacts on these three variables were assessed, and the results were interpreted using the SMS. Photos from the 26 photopoints taken during the 2019 drawdown provided a visual reference. Potential changes in the resulting Landscape Values were then assessed relative to the Landscape Value objective.

BANK EROSION

No slumping or soil movement of reservoir banks was reported at any of the monitoring sites during the 2019 full drawdown in the Land Use ISR (Section 6.4.4 in Appendix D of PacifiCorp 2021a), which was a substantially greater and more rapid fluctuation than the WSE for the proposed extended operations (over 20 feet as measured at Cutler Dam, as opposed to 3 feet). Therefore, given the relatively short 10-day cycle timeframe of the proposed extended operations, no additional shoreline or streambank erosion is expected under the proposed operations than would be expected under the current reservoir operations.

Bank erosion not associated with Cutler operations is still actively occurring within the Project Boundary as well as at locations upstream and downstream of Cutler Dam outside the Project Boundary assessed in the Land Use ISR³³ (Section 6.4.4 in Appendix D of PacifiCorp 2021a). As discussed in the Land Use ISR, erosion at these locations is likely most heavily influenced by high flows at the thalweg, wind- and recreation-generated wave action, and agricultural and land use practices, not water-level fluctuations. Additional reservoir bank erosion (and associated potential loss of vegetation and increase in turbidity) is not expected to occur as a result of the proposed normal and extended operations. During the proposed extended operations, the reservoir elevations would change in slightly larger increments (up to 12 to 18 inches), thus exposing more shoreline area. Based on these results and similar to existing conditions (which are mirrored by the proposed normal operating range), the proposed extended range of operations

³³ Per the 2019 FERC SD2, the Study Area for bank erosion is the entire reservoir shoreline, reservoir tributaries to the existing FERC Project Boundary, and the Bear River from Cutler Dam downstream to Corinne (Figure 2 of the Land Use ISR).

would not result in lateral bank movement beyond levels that currently exist or affect the ongoing performance of bank stabilization projects to maintain bank stability.

From a scenic perspective, any turbidity associated with bank erosion mainly affects the color variable. Water color was not evident from most Land Use ISR (Section 6.4.4 in Appendix D of PacifiCorp 2021a) photopoints due to the low viewing angle that increases reflection of the sky and shoreline. Furthermore, the reservoir is typically quite turbid except during the late fall and winter months. While bank erosion is a factor, persistent turbidity is more likely the result of sediment in inflows, algae growth, recreation, and carp foraging. There would be no visible change in turbidity during the proposed extended range of operations because the much larger 2019 full drawdown resulted in no visible change in turbidity from any reference photopoint.

EXPOSURE OF RESERVOIR BEDS

Given the shallow and low-gradient bathymetry in many areas of Cutler Reservoir, an issue raised was whether the proposed extended operations could have the potential to result in large horizontal changes in shoreline wetted perimeter, and the exposure of previously submerged reservoir beds. Aesthetically, the potential increase in exposed reservoir bed could be detrimental to the scenic quality.

However, under the normal and proposed extended range of operations there is not a dramatic change in wetted perimeter, based on the hydraulic modeling (as shown in Table 3-43). Further, direct empirical observations during the fall 2019 drawdown indicated that large portions, including almost all of the reservoir areas accessible from the noted viewpoints, would have minimal visual changes (see photograph series in Attachment B to this Exhibit E). During the proposed normal operations (which cover the same 1-foot range as existing operations), the modelled change in open water and corresponding changes in the shallow transition zones (see Section 3.3 and Attachment A to this Exhibit for additional detail regarding both the uses and potential limitations of the hydraulic modeling) could be up to 15 percent different than the upper WSE at 4,407.5 feet. During the proposed extended operations, the model predicted that there could be an additional 7 percent difference (between the lowest winter WSE of 4,406.0 and the proposed extended low of 4,405.0). As described in Section 3.3, aerial photos taken at WSEs near the upper limit of the proposed operating range (photos taken at 4,407.3 feet) and just below

the lower limit of the extended operating range (photos taken at 4,404.6 feet) show negligible visual changes and no additional exposed reservoir bed. This photograph series was included in Appendix A of the USR (PacifiCorp 2021b). Additional aerial photos are also provided as Attachment B of this Exhibit E.

Further, the hydraulic model, as used in the Land Use ISR (Appendix D of PacifiCorp 2021a) projected the magnitude and extent of the lack of uniformity in elevations across the reservoir during proposed extended operations. WSE data collected at multiple locations in Cutler Reservoir during the fall 2019 drawdown revealed a stair step profile in the reservoir water surface likely caused by the bathymetry and longitudinal constrictions in the reservoir restricting flow. As a result, a 2.5-foot decrease in reservoir elevation at Cutler Dam translates to a projected maximum 1.2-foot decrease at the south end of the reservoir under the proposed extended operations. Accordingly, visual effects of reservoir bed exposure during the fluctuations would be progressively less pronounced moving upstream from Cutler.

TABLE 3-43 MODELED AMOUNT OF OPEN WATER AND TRANSITION ZONE UNDER THE CURRENT AND PROPOSED EXTENDED OPERATIONS

MANAGEMENT UNIT	PROPOSED NORMAL OPERATIONS			PROPOSED EXTENDED OPERATIONS	
	OPEN WATER AT WSE 4,407.5 (ACRES)	OPEN WATER AT WSE 4,406.0 (ACRES)	POTENTIAL CHANGE IN OPEN WATER ^a (PERCENT)	OPEN WATER AT WSE 4,405.0 (ACRES)	ADDITIONAL POTENTIAL CHANGE IN OPEN WATER ^b (PERCENT)
Cutler Canyon	183	178	3%	171	4%
Reservoir	1,185	1,008	15%	902	11%
Bear River	430	371	14%	363	2%
South Marsh	99	75	24%	70	6%
North Marsh	994	822	17%	777	5%
Totals	2,891	2,454	15%	2,283	7%

Source: These data were sourced from the hydraulic modeling discussed in Appendix G of PacifiCorp 2021a, and are corrected from the DLA version.

WSE = Water Surface Elevation

^a Change in open water under proposed normal is the percent difference of open water compared to the upper WSE of 4,407.5.

^b Change in open water under proposed extended is the percent difference of open water compared to the lowest proposed (winter) WSE of 4,406.0.

However, the generally flat topography surrounding most of the reservoir results in low-angle visual perspectives from most viewpoints. Further, as noted above, and in the introduction to Section 3.3, Resource issues, the drone-created aerial photo series (see Exhibit E, Attachment B)

failed to show any substantial visual changes between the proposed normal and proposed extended operations ranges. As a result, changes in the extent of exposed shoreline would not be visible to viewers except potentially in the steeper Cutler Canyon area. Since extended-range operations would only occur primarily during winter, snow and ice coverage would further reduce the visual impact of potentially increased bank and/or bed exposure. Vegetation colors and the reservoir bed would be more similar in color reducing the contrast between reservoir bed and shoreline. Additionally, recreation decreases in winter; as a result, fewer visitors would be present during the proposed Project operations in the extended range.

INVASION OF RESERVOIR BEDS BY INVASIVE PLANTS

The potential for weed invasion of any resultant exposed shoreline or reservoir-bed areas (if any, given the visual data observations reported above) is not an issue of concern because the proposed extended range of operations would occur in the winter period outside the growing season for invasive plant colonization. In addition, the short cyclic nature of the proposed extended range of operations would preclude exposure of the shoreline and reservoir bed long enough for invasive plants to establish.

SMS LANDSCAPE VALUE RATINGS

As described in the Land Use ISR results, the current Scenic Class and Scenic Integrity ratings and the resulting Landscape Values ratings (see Land Use ISR Section 6.5.4, included as Appendix D of PacifiCorp 2021a) would not be expected to appreciably change under the proposed normal and extended Project operations for any of the photo reference locations evaluated. The Scenic Class, Scenic Integrity, and resulting Landscape Value ratings associated with proposed extended Project operations are summarized below from the Land Use ISR.

- The Scenic Class determinations identified for existing conditions (i.e., Class 1 for recreational use, Class 2 for travel on Project Area roads and highways, and Class 5 for travel on Highway 30 entering the valley from the west) would not change.
- The proposed extended range of operations could result in an increase in the extent and visibility of reservoir banks exposed in the Cutler Canyon Management Unit during the winter period. The potential changes to exposed reservoir banks would not be sufficient

to change the Scenic Integrity rating from Moderate. The Cutler Canyon Management Unit has limited viewpoints due to lack of roads and access. Viewpoints of the Cutler Canyon Management Unit are primarily from the water surface. Water-based recreation activities would likely be reduced during the winter period when the proposed extended range of operations would occur.

- The Scenic Integrity rating for recreationists and motorists viewing the main reservoir body (Reservoir Management Unit), South Marsh Management Unit, North Marsh Management Unit, and Bear River Management Unit areas would not be affected and would remain Moderate under the proposed extended range of operations. Because much of the reservoir shoreline is low gradient, recreationists and motorists on valley bottom highways would not observe distinct line changes in the reservoir bed as they are viewing Cutler Reservoir from water level, or near water level, rather than from the air. Further, even when viewed from the air, the visual differences are negligible.
- The Scenic Integrity rating for travelers on Highway 30 entering the valley from the west would remain unchanged at High. Motorists at these more distant highway viewpoints would not be able to distinguish the small incremental changes (if any) in exposed bank and reservoir bed under the proposed extended range of operations.
- Proposed extended range of operations would not alter Landscape Values in the Project Area, which would remain as follows:
 - Scenic Class 1/Moderate Scenic Integrity for recreationists;
 - Scenic Class 2/Moderate Scenic Integrity for travelers on Project Area roads and highways; and
 - Scenic Class 5/High Scenic Integrity for travelers on Highway 30 entering the valley from the west.

These values would remain consistent with the Landscape Value objective defined above (see Visual Assessment Using the Scenery Management System).

3.3.12.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

Any potential effects on visual resources associated with the proposed extended range of operations would be both temporary and short in duration, and occur during the seasons with

generally lower public access for recreation to the Project Area; therefore, no new mitigation measures for scenic resources are proposed, although previous existing mitigation measures for this resource such as maintaining vegetated shoreline buffers, agricultural lease modifications, and buffer and boundary fences would continue. Section 2.2.3, Proposed Environmental Measures, presents the PM&E measures proposed to be implemented for the Project under a new license. The existing measures that would continue under the new license are described in greater detail below as related to the protection of aesthetics.

EXISTING MEASURES

A summary of existing measures is presented in Section 2.1.4, Existing Environmental Measures. Measures required in the current license (FERC 1994) period pertaining to aesthetic resources are summarized here.

Under the current license, the following measures have been completed:

- Standard License Article No. 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.
- Article No. 402: Resource Management Plan (all of these measures have been completed as part of the continuing implementation of the 1995 Cutler RMP).
 - Establish a 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 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.

The Cutler RMP is proposed to be updated from its current form under the new license. That is, PacifiCorp proposes to update the Cutler RMP and incorporate and improve upon the management, monitoring, and best practices contained in the current RMP.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is included in Section 2.2.3, Proposed Environmental Measures. No new measures pertaining to scenic or aesthetic resources are proposed as no effects are anticipated.

3.3.12.4 UNAVOIDABLE ADVERSE IMPACTS

As discussed in the Land Use ISR (Appendix D of PacifiCorp 2021a), changes in WSE could result in minimal short-term changes to scenic quality due to PacifiCorp's proposed extended range of operations during the winter period. Some exposure of reservoir shorelines could potentially occur in the proposed extended range of operations, particularly in the Cutler Canyon management unit. However, these changes would not be substantial enough to change the Scenic Integrity ratings from the existing conditions' ratings. Recreationists at the reservoir level, and recreationists or motorists at higher elevation highway viewpoints may potentially notice limited, if any, areas of more exposed banks during extended operations, but these changes would not affect the Scenic Integrity ratings. Furthermore, extended operations would only occur during the winter months when a combination of snow and ice will likely blanket the ground, further obscuring any potentially changed views.

3.3.13 SOCIOECONOMICS

This section provides the socioeconomic context of the Project Vicinity and presents potential effects of the Project on socioeconomics. The Project Vicinity for socioeconomics is defined as Cache and Box Elder counties, as the Project Boundary is located primarily in Cache County, with a small portion extending west/downstream into Box Elder County. This section does not address recreation activity or land use in the Project Vicinity. These are discussed in Section 3.3.9 and Section 3.3.11, respectively.

3.3.13.1 AFFECTED ENVIRONMENT

The following is a summary of socioeconomic data for the Project Vicinity, including population patterns, average household income, employment sectors, and education.

POPULATION PATTERNS

The population of Cache County is approximately 112,650, with close to half the residents living in Logan City (51,000 people); the remaining population live in small towns or unincorporated areas throughout rural Cache County (U.S. Census Bureau 2017). The population of Box Elder County is approximately 51,000 residents (U.S. Census Bureau 2017). The two counties have largely similar population demographics; however, the presence of Utah’s land-grant public university, Utah State University (USU), in Logan (Cache County) and the more mountainous setting of Cache County have resulted in socioeconomic differences between the two. The median age in Cache County is 23.9 years, which may be skewed towards a younger population due to the USU student body. Around half of the population of Cache County is employed (60,800), and the poverty rate is 15.3 percent (DataUSA 2018).

Table 3-44 summarizes the population estimates for the city of Logan, Cache and Box Elder counties, and the state of Utah as reported in the 2000 and 2010 census, and as estimated by the U.S. Census Bureau for the year 2016. The population has been steadily increasing across the Project Vicinity between 2000 and 2016.

TABLE 3-44 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
State of Utah	2,233,169	2,763,885	+19.2	2,948,427	+24.2

Sources: U.S. Census Bureau 2000, 2010, 2016

Logan is located less than 6 miles from the Cutler Dam, and is the 15th largest city in Utah. The population of Logan is 75.4 percent White, 15.5 percent Hispanic, and 4.24 percent Asian. The

small town of Newton (817 people) is located just over 1 mile from the Cutler Dam in Cache County; although, due to the lack of road connection between the dam and Newton, Cutler Dam and Cutler Powerhouse are more closely linked to the town of Beaver Dam in Box Elder County.

DIVERSITY

The ethnic composition of the Logan, Utah, population is composed of 37,329 White, 7,654 Hispanic, 2,098 Asian, 885 two or more races, and 522 Black residents. As of 2016, 92.2 percent of Logan residents were U.S. Citizens, which is slightly lower than the national average of 93 percent. Approximately 8,300 U.S. Citizens in Logan speak a non-English language, with Spanish being the most common, followed by Chinese and two other Asian languages (international students attending USU may potentially change the cultural makeup of Logan compared to other similar-sized Utah communities). 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).

HOUSEHOLD DISTRIBUTION, INCOME, AND EMPLOYMENT

Table 3-45 provides the household income, household size, and unemployment rate for Box Elder and Cache counties from 2019. Cache County has a higher number of households than Box Elder County but a lower unemployment rate. In recent years, Utah has consistently featured one of the lowest unemployment rates in the country.

TABLE 3-45 HOUSEHOLD AND FAMILY DISTRIBUTION AND INCOME FOR BOX ELDER AND CACHE COUNTIES FROM 2019

DEMOGRAPHIC DATA	BOX ELDER	CACHE
2019 Households	17,569	38,393
2019 Percentage of Population in Civilian Workforce	64.7%	69.2%
Median Household Income	\$62,233	\$59,038
Unemployment Rate	4.1%	2.6%
Average Household Size	3.05	3.16

Source: U.S. Census Bureau 2019

Table 3-46 provides a summary of occupation types for Box Elder and Cache counties (U.S. Census Bureau 2016).

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). The highest paid occupations in the Logan area include health practitioners, legal, architecture and engineering, management, and health technicians, while the most specialized occupations include life, physical and social science, production, education, farming, fishing, forestry, and material moving. The highest paid industries based on median salaries are legal (\$66,184), health diagnosing and treating practitioners (\$51,111), and business and financial operations occupations (\$36,300) (DataUSA 2019).

TABLE 3-46 DISTRIBUTION OF OCCUPATION TYPES IN BOX ELDER AND CACHE COUNTIES FROM 2010 CENSUS DATA AND 2016 CENSUS ESTIMATE

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

Source: PacifiCorp 2019

PROJECT EMPLOYMENT SOURCES

PacifiCorp, owner and operator of the Project, employs approximately 6,500 people throughout California, Oregon, Washington, Idaho, Utah, and Montana. The Project is operated by three full-time employees and two seasonal summer positions. Another five full-time maintenance employees switch duties between this Project and other PacifiCorp Utah and Idaho hydroelectric projects, including Lifton, Soda, Grace, and Oneida (together known as the Bear River Project) in Idaho; as well as at Pioneer, Weber, Granite, Stairs, and Santa Clara in Utah.

In addition, there are seven PacifiCorp Renewable Resources staff and management (based in Salt Lake City) and contractors that support the Bear River Project and other company hydroelectric projects.

HEALTH AND SAFETY

Logan is the largest urban center in the Project Vicinity; as such, most of the health and safety services are based in Logan. The primary hospital in the area is Logan Regional Hospital, which is a 146-bed facility located approximately 13 miles from Cutler Dam in the town of North Logan, Utah. There is a second hospital in the town of North Logan—the Cache Valley Hospital—located approximately 12.5 miles east of Cutler Dam. This facility has been open since 2000 and has 28 fully staffed beds. Between these two facilities and a number of specialty clinics and practices in the area, a range of major medical services are provided. 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).

Ambulance services are provided by the Cache County Emergency Medical Services, which includes the Logan Fire Department. Ambulances are stationed in Logan, North Logan, Smithfield, and Hyrum.

The Logan City Fire Department provides fire protection and Emergency Medical Services for the cities of Logan, Providence, and River Heights, as well as the unincorporated areas of Cache County, responding from three fire stations around the area. The nearest fire department in relation to the Project is the Newton Fire Department in the town of Newton, located less than 2 miles from Cutler Reservoir.

The municipalities of Logan, North Park, and Smithfield all have their own police departments near U.S. Highway 91. The Cache County Sheriff’s Office is approximately 14.5 miles from Cutler Dam and is the closest to the Project.

EDUCATION

Logan colleges and universities awarded 6,877 degrees in 2015. Most undergraduate 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).

WASTE MANAGEMENT

The nearest waste management facility in the area is the Logan City Landfill and Transfer Station. The facility was established in 1960 and has been serving Cache County since 1973. Currently, the landfill only accepts construction and demolition waste, with all municipal solid waste being disposed at the Transfer Station and hauled to the North Valley Landfill. The Logan City landfill has an estimated closure date of 2022.

3.3.13.2 ENVIRONMENTAL ANALYSIS

Current Project operations create employment for three full-time employees and two seasonal summer positions, while five full-time maintenance employees switch duties between this Project and other PacifiCorp Utah and Idaho hydroelectric projects. Under the proposed operations, this would remain unchanged, with no new employment opportunities being created or eliminated by the Proposed Action.

The Project proposes to continue the current Cutler Resource Management Plan (RMP) Agriculture Lease Program (PacifiCorp 1995a) where it supports Project objectives within the Project Boundary, which economically supports local ranchers by allowing grazing and pasture and crop land production on PacifiCorp lands for a fee. The leasing fees help support land management activities at the Project.

No substantive new construction is explicitly proposed under the new license, and the proposed operations and maintenance are not expected to have any notable effect on socioeconomic resources. That said, capital improvements, replacement of aging equipment, and similar actions are already planned which will be necessary over time, and which may create new employment and procurement opportunities.

The proposed operations would not have an effect on existing public services in the Project Vicinity, such as law enforcement or emergency services, health services, or demand for accommodation.

3.3.13.3 PROTECTION, ENHANCEMENT AND MITIGATION MEASURES

The Cutler RMP is proposed to be updated from its current form under the new license. That is, PacifiCorp proposes to update and/or draft a number of integrated management programs that would incorporate and improve upon the management, monitoring, and best practices contained in the current Cutler RMP.

A summary of existing PM&E measures is presented in Section 2.1.4, Existing Environmental Measures. A summary of new proposed PM&E measures is included in Section 2.2.3, Proposed Environmental Measures. No existing measures are in place pertaining to socioeconomic resources under the current license, and no new measures have been proposed.

3.3.13.4 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable or adverse impacts to socioeconomic resources are anticipated due to the proposed operations.

4.0 DEVELOPMENTAL ANALYSIS

This section describes the electric power benefits of the Project; summarizes the cost, power value, and net benefit for each of the licensing decision alternatives; and provides the estimated cost for each of the environmental measures proposed or recommended for inclusion in a license. Consistent with the FERC approach to economic analysis, the power benefit of the Project is determined by estimating the cost of obtaining the same amount of energy and capacity using the likely alternative generating resources available in the region. In keeping with FERC policy as described in *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995), the economic analysis here is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the Project's power benefits. In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

This section includes: 1) an estimate of the net power benefit of the Project for each of the two licensing alternatives (No-Action and Proposed Action); and 2) an estimate of the cost of individual PM&E measures considered in the EA. To determine the net power benefit for each of the licensing alternatives, project costs are compared to the value of the power output as represented by the cost of a likely alternative source of power in the region. For any alternative, a positive net annual power benefit indicates that the Project power costs less than the current cost of alternative generation resources and a negative net annual benefit indicates that Project power costs more than the current cost of alternative generation resources. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, Project economics is only one of many public interest factors FERC considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 4-1 summarizes the assumptions and economic information used in the analysis.

TABLE 4-1 PARAMETERS FOR ECONOMIC ANALYSIS OF THE CUTLER HYDROELECTRIC PROJECT

PARAMETER	VALUE
Period of analysis (years)	42
Insurance (PacifiCorp is self-insured)	NA
Taxes	\$202,000 in 2020 (local, state, federal)
Federal and state income tax rate	24.5866%
Levy rate for Cache and Box Elder Counties	0.999% (Cache County) 1.039% (Box Elder County) 1.003% (Overall rate; weighted by county)
Assessment rate	100%
Insurance (PacifiCorp is self-insured)	NA
Net investment (2020), \$ ^a	\$14,852,718
Original cost (2020), \$	\$34,397,218
Future major operations capital cost, \$ ^b	\$45,253,000
Relicensing implementation capital cost, \$ ^c	\$9,491,000
Relicensing cost, \$ ^d	\$8,037,000
Routine Operation and Maintenance (O&M), \$/year ^e	\$615,000
New and non-routine O&M, \$/year ^f	\$483,000
Annual fees, \$/year ^g	\$141,731.30

^a Net investment, or net book value, is the depreciated Project investment allocated to power purposes. Reported as of the end of 2020

^b Future major capital costs include major plant rehabilitation to maintain present-day capability scheduled from 2022 through 2063 and are expressed in non-inflated dollars.

^c Implementation capital costs include the direct cost of construction of new capital PM&E measures such as the proposed ongoing buffer and vegetation monitoring and new avian and orchid cooperative monitoring, bank stabilization, and recreation site upgrades; these costs include capital surcharge and allowances for funds used during construction (AFUDC).

^d Relicensing costs include the administrative, legal/study, and other expenses to date or budgeted to complete the license process.

^e Existing plant O&M does not include O&M related to PM&E measures associated with the current license.

^f New and non-routine O&M includes PM&E measure operation and recreation and other PM&E measure maintenance.

^g Annual fees paid under Part I of the FPA are based on the nameplate capacity of the Project fees.

As currently operated, the 30 MW Cutler Hydroelectric Project generates an average of 75,052 MWhs annually based on a 30-year average annual energy output (1991 to 2020) and has an installed capacity of 30 MW.

4.2 COMPARISON OF ALTERNATIVES

Table 4-2 summarizes the annual cost, power benefits, and annual net benefits for the No-Action Alternative and the Proposed Action. Both on-peak and off-peak values of Project power are presented, as the Project (currently and proposed) may sometimes operate in a mode other than run-of-river. Some values presented in Table 4-2 for the No-Action Alternative and Proposed Action are the same because although PacifiCorp is proposing minor operational fluctuations in the reservoir elevations, the changes in the operational regime would be negligible and short-

term and would not likely result in any changes to the annual Project generation amount, although the estimated annual value of project power could increase with the small potential shift in timing of some Project generation. Project costs and benefits are also presented in Exhibit D, Statement of Costs and Financing, and Exhibit H, Project Management and Need for Power.

TABLE 4-2 SUMMARY OF THE ANNUAL DIRECT COSTS, POWER BENEFITS, AND ANNUAL NET BENEFITS FOR THE NO-ACTION AND PROPOSED ACTION

	NO-ACTION	PROPOSED ACTION
Installed capacity (MW)	30	30
Average Annual generation total (MWh) ^{a, b}	88,038	88,038
Average Annual generation on-peak (MWh) ^a	49,593	49,593
Average Annual generation off-peak (MWh) ^a	38,445	38,445
Average Annual power value (\$/MWh) (on-peak/off-peak)	\$25.55/21.78	\$29.09/22.48
Average Annual O&M cost (\$) ^a	\$1,952,039	1,952,039
Subtotal of Nominal Levelized Cost (based of annual O&M costs (\$/MWh)	\$22.41	\$22.41
Average annual power generation value ^b	\$2,088,111	\$2,323,597
Annual net benefit (or cost) (\$)	\$136,072	\$371,558

MW = megawatt; MWh = megawatt-hour

^a Annual averages over the five-year period 2016-2020.

^b Generation totals do not include spinning reserve. See Exhibit D for more detail.

Under both the No-Action Alternative and the Proposed Action, the Project would have an installed capacity of 30 MW and generate an average of 88,038 MWhs of electricity annually. For the No-Action Alternative and the Proposed Action, generation is currently valued at approximately \$23.90/MWh (average of on- and off-peak value for the No-Action Alternative) or \$26.60/MWh (average of on- and off-peak value for the Proposed Action Alternative), respectively. The average annual O&M Project cost is currently valued at approximately \$1,952,039 (2016 to 2020). The Proposed Action would result in the environmental benefits that accompany implementation of the PM&E measures described in Table 2-4 and PacifiCorp would continue to operate the Project as a dependable source of renewable electrical energy for its customers.

Implementation of the Proposed Action would provide favorable customer benefits over Project decommissioning. Project decommissioning was considered but dismissed from detailed analysis, as presented in Section 2.4, Alternatives Considered but Eliminated from Detailed Study.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-3 gives the capital cost and operation and maintenance cost of each of the proposed PM&E measures considered in the analysis. These PM&E costs are also presented in Exhibit D.

TABLE 4-3 DIRECT COSTS OF PM&E MEASURES CONSIDERED IN ASSESSING THE ENVIRONMENTAL EFFECTS OF CONTINUING TO OPERATE THE CUTLER HYDROELECTRIC PROJECT

PM&E MEASURE ID	MEASURE DESCRIPTION	PLAN	ESTIMATED CAPITAL COST	ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST
GEO-1	Update erosion control and sediment management program (for existing and new erosion control check dams, bank stabilization sites, and vegetated shoreline buffers) within the RMP; maintain/monitor vegetated shoreline buffers, and erosion control check dams, to minimize sedimentation to Cutler Reservoir	RMP	\$25,000	\$35,000
GEO-2	Identify and implement approximately three additional miles of bank stabilization projects within Project Boundary	Stand-alone	\$1,800,000	\$Included in GEO-1 O&M cost
GEO-3	Continue to monitor existing (and add any potential new) bank stabilization measures	RMP	\$N/A	\$ Included in GEO-1 O&M cost
GEO-4	Continue to minimize flow fluctuations downstream of the reservoir during periods of ice buildup to reduce ice shearing on banks	Operational Plan	\$N/A	\$N/A- ongoing Project Operations costs are included in Table 4-2
GEO-5	Formalize new Construction Erosion and Sediment Control Plan to address construction and ground disturbance-related erosion and sediment activities, including standard and Project-specific BMPs and requirements.	CESCP	\$12,000	\$N/A

PM&E MEASURE ID	MEASURE DESCRIPTION	PLAN	ESTIMATED CAPITAL COST	ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST
WR-1	Continue reservoir elevation and river flow monitoring, per updated Operational Plan	Operational Plan	\$N/A	\$ N/A - ongoing Project Operations costs are included in Table 4-2
WR-2	Continue to communicate with USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project	Operational Plan	\$N/A	\$1,000
WR-3	Update water quality management and monitoring program within RMP; continue existing water quality monitoring on approved five-year quarterly schedule; continue to coordinate with UDWQ and other stakeholders regarding Middle Bear River TMDL and resultant Cutler water quality issues	RMP	\$12,000	\$100,000 every 5 years for sample collection, processing, data analysis and reporting; annual cost averages to \$20,000
BOT-1	Update vegetation management program within RMP; continue to monitor and maintain shoreline buffer vegetation (see also GEO-1)	RMP	\$25,000	\$15,000
BOT-2	Continue to monitor and manage weeds in the Project Boundary as part of updated vegetation management program; include new areas to target <i>Phragmites</i> and stabilize banks	RMP	\$250,000	\$60,000
WILD-1	As part of RMP, develop and implement long-term avian monitoring program within Project Boundary.	RMP	\$175,000	\$40,000
WILD-2	Maintain wildlife habitat improvements, including erosion control check dams, throughout Project Boundary (see also GEO-1)	RMP	\$25,000	\$8,000 additional to the GEO-1 O&M costs
SS-1	Continue to cooperate with UDWR on special status species management (e.g., implement monarch butterfly way stations, long-term avian monitoring)	RMP	\$10,000	\$2,000

PM&E MEASURE ID	MEASURE DESCRIPTION	PLAN	ESTIMATED CAPITAL COST	ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST
TE-1	Develop Ute ladies’-tresses management program, including monitoring, within the Project Boundary in the RMP	RMP	\$20,000	\$8,000
TE-2	Maintain current Ute ladies’-tresses habitat	RMP	\$N/A	\$Included with BOT-1, BOT-2, and LU-1 O&M costs
REC-1	Update recreation management program within RMP	RMP	\$15,000	\$N/A
REC-2	Develop and implement new shoreline management program within RMP to address conflicting recreation/other uses	RMP	\$25,000	\$25,000
REC-3	Continue to operate and maintain current recreation site facilities, and monitor facility conditions	RMP	\$10,000/year; starting in 2032	\$150,000
REC-4	Complete recreation site improvements, including maintenance and ADA upgrades throughout Project Boundary	Stand-alone	\$350,000	\$Included in REC-3 O&M costs
REC-5	Extend and/or repair Cutler Canyon Marina and Benson Marina boat ramps	Stand-alone	\$250,000	\$Included in REC-3 O&M costs
REC-6	Evaluate and improve accessibility where feasible (e.g., improvements identified by the National Park Service) at several recreation sites	Stand-alone	\$Included in REC-1 and REC-4 capital costs	\$Included in REC-3 O&M costs
REC-7	Make carry-in boat launch access improvements at Little Bear River and Logan River access sites (evaluate adding handrails to improve boat entry, assess other needs)	Stand-alone	\$Included in REC-1 and REC-4 capital costs	\$Included in REC-3 O&M costs
REC-8	Provide digital trail and property boundary maps on PacifiCorp's website for recreation use; revise and update hard copy and digital versions of wetland maze map	Stand-alone	\$15,000	\$Included in REC-3 O&M costs

PM&E MEASURE ID	MEASURE DESCRIPTION	PLAN	ESTIMATED CAPITAL COST	ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST
REC-9	Review signage at recreation access sites and update/add new as needed	Stand-alone	\$100,000	\$Included in REC-3 O&M costs
REC-10	Engage with Utah State Parks to identify potential measures for improving public and boater safety; add any identified to Recreation Program in RMP	Stand-alone	\$10,000	\$10,000
REC-11	As part of RMP update, recreation sites with existing temporary restroom facilities will be assessed for potential upgrades to permanent vault toilet facilities.	Stand-alone	\$300,000	\$10,000 (additional to REC-3 O&M costs)
CUL-1	Developed HPMP (updated existing cultural resources management plan and ongoing inadvertent discoveries protocol)	HPMP	\$5,000	\$7,000
CUL-2	Add tribal/cultural history section to PacifiCorp Cutler Project website	HPMP/ Stand-alone	\$10,000	\$2,000
LU-1	Review, update, monitor, and improve existing grazing management and agricultural lease programs within the RMP	RMP	\$40,000	\$40,000
LU-2	Continue to assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve/improve their function as necessary.	RMP	\$4,500,000	\$30,000
LU-3	Evaluate fence ends within the Project Boundary, and extend where needed based on water levels	Stand-alone	\$25,000	\$Included in LU-2 O&M costs
LU-4	Include additional parcels (as reflected in Exhibit G) in FERC boundary downstream of powerhouse in RMP programs (land use, fencing, vegetation management) and HPMP	RMP	\$30,000	\$20,000

PM&E MEASURE ID	MEASURE DESCRIPTION	PLAN	ESTIMATED CAPITAL COST	ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST
LU-5	Coordinate with BLM to confirm agreement for construction of a single buffer/boundary fence around PacifiCorp and BLM parcels south of the reservoir near Cutler Dam	Stand-alone	\$110,000	\$ Included in LU-2 O&M costs
LU-6	As part of agricultural use program in RMP, evaluate irrigation pump intakes within the Project Boundary and extend where needed	RMP/ Stand-alone	20,000	\$0
TOTAL:			\$8,169,000	\$483,000

Notes: PM&E measures are presented in Table 2-4; capital costs are shown as direct costs only, and do not include capital surcharge and AFUDC expenditures—fully loaded capital costs are shown in Table 4-1, above. BLM = Bureau of Land Management; FLA = Final License Application; HPMP = Historic Properties Management Plan; RMP = Resource Management Plan; UDWR = Utah Division of Wildlife Resources; UDWQ = Utah Division of Water Quality; USFWS = U.S. Fish and Wildlife Service

4.4 AIR QUALITY

No substantial new construction is proposed for the Project, including any construction activities that would create air quality concerns. Air quality was also not raised as an issued during the scoping process. As such, this section is not required as part of the analysis.

5.0 CONSISTENCY WITH COMPREHENSIVE PLANS

This section presents how the Project would comply with comprehensive plans.

5.1 COMPREHENSIVE WATERWAY PLANS

Section 10(a)(2)(A) of the FPA, 16 USC 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 FERC 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 two comprehensive plans pertain to waters in the vicinity of the Project; no inconsistencies between these two plans and the Proposed Action were found.

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

5.2 RELEVANT AGENCY RESOURCE MANAGEMENT PLANS

In addition to the waterways comprehensive plans listed above, some agencies have developed resource management plans (not associated with the Cutler RMP) to help guide their actions regarding specific resources of jurisdiction. The agency resource management plans listed below may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions; similarly, no inconsistencies between these plans and the Proposed Action were found.

- 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.

- U.S Forest Service. 2003. *Wasatch-Cache National Forest land and resource management plan.* Department of Agriculture, Salt Lake City, Utah. March 2003.
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- Utah Division of Wildlife Resources. 2016. Three Species Monitoring Statewide Summary. Roundtail 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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7.0 LIST OF PREPARERS

PacifiCorp’s team list of preparers is outlined in Table 7-1:

TABLE 7-1 EXHIBIT E LIST OF PREPARERS

PREPARERS	TITLE	ORGANIZATION
Eve Davies	Relicensing Project Manager Principal Scientist	PacifiCorp
Todd Olson	Director of Compliance	PacifiCorp
Connely Baldwin	Senior Water Resources Engineer	PacifiCorp
Michael Ichisaka	Senior Environmental Scientist, Exhibit G Specialist	PacifiCorp
Chris Raeburn	Senior Dam Safety Engineer	PacifiCorp
Stewart Edwards	Senior Area Engineer	PacifiCorp
Chuck Lewis	Senior GIS Analyst	PacifiCorp
Kim Zentner	Senior GIS Analyst	PacifiCorp
Nuria Holmes	Senior Regulatory Project Manager	SWCA Environmental Consultants
Frank Shrier	Fisheries Biologist and Water Quality Technical Lead	SWCA Environmental Consultants
Leah Candland	Fisheries Biologist	SWCA Environmental Consultants
Ben Cary	Hydraulic Modeling Lead Hydraulic Modeling Engineer	Kleinschmidt Associates
Sebastian Ferraro	Staff Hydraulic Engineer	Kleinschmidt Associates
Matthew Harper	Project Scientist GIS Technical Lead	Kleinschmidt Associates
Charles Aquilina	Staff Engineer (Water Resources) GIS Specialist	Kleinschmidt Associates
Emily Waters	Licensing Coordinator	Kleinschmidt Associates
Jane Mallory	Technical Editor	Kleinschmidt Associates
John Gangemi	Recreation Resources Lead	River Science Institute
Sheri Ellis	Cultural Resources Specialist	Certus Environmental Solutions
Neal Artz	Aesthetic Technical Lead	Cirrus Ecological Solutions
Eric Duffin	Land Use Technical Lead	Cirrus Ecological Solutions
Matthew Westover	Shoreline Habitat Technical Lead	Cirrus Ecological Solutions
Justin Barker	Sediment Technical Lead	Cirrus Ecological Solutions
Stephanie Trapp	Ecologist	Cirrus Ecological Solutions
Levia Shoutis	Project Manager and Biologist	ERM
Emily Smith	Lead Technical Editor	ERM
Miriam Hugentobler	Project Coordinator	Independent Contractor

8.0 CONSULTATION DOCUMENTATION

Consultation that has occurred prior to the filing of this FLA is included as Appendix A to this FLA. This consultation record contains a list of all federal, state, and interstate resource agency, Native American tribe, or member of the public with which PacifiCorp consulted in preparation of this FLA, as well as a reference to where each of the record items can be found, or the record itself if not previously documented as part of the relicensing process. Consultation that occurred through a formal stakeholder engagement process such as site visits, scoping meetings, and the ISR and USR meetings are also documented in the consultation record. Comments and responses to comments gathered as part of the consultation process are either included directly in the consultation record or included by reference.

The response to comments table containing all comments on the DLA generated by various license stakeholders (agencies, NGOs, private irrigation companies, and elected representatives) and PacifiCorp's response to those comments is included as Attachment A to this Exhibit E.

ATTACHMENT A

DRAFT LICENSE APPLICATION RESPONSE-TO-COMMENTS MATRIX

COMMENT NO.	COMMENTS/ REQUESTER	COMMENT LETTER PAGE	STUDY REPORT OR RESOURCE AREA	STAKEHOLDER COMMENT	PACIFICORP RESPONSE TO COMMENT
1	Bridgerland Audubon Society	1	Fish & Aquatics	<p>As we’ve indicated in previous letters, Bridgerland Audubon’s primary concern is how operational drawdowns of the reservoir have and could impact aquatic vegetation and the benthic invertebrates on which birds and fish depend. Throughout most of the process PacificCorp has maintained that this is not an issue because sediments would not be exposed.</p> <p>For example, in your May 2021 <u>Response to Comments</u> PacificCorp states “almost all of the reservoir bed remains inundated under conditions representative of the proposed extended operations lower limit at water surface elevation (WSE) 4,405.0 feet.” In this Response PacificCorp presented aerial photographs of launch areas that do show limited exposure of sediments during the drawdown. However, these boat launch areas are located in deep areas with steep banks that are not representative of reservoir as a whole.</p> <p>Similarly, in the early part of the <u>Draft License Application</u> (p. 3-124) you stated that “PacificCorp’s proposed operations would result in short-term, cyclical, reservoir fluctuations of 2.5 feet or less, which <u>would not result in shoreline sediment exposure</u> and would potentially have minor, temporary effects on the BMIs [benthic macroinvertebrates] in the form of drift and relocation to other parts of the reservoir.” [emphasis is ours]. However, later in the Application (p. 3-168) the modeling analysis presented by PacificCorp indicates that 21% of the lakebed would be exposed at an elevation of 4,405 ft. and even more would be exposed with the additional 0.5 ft. of drawdown in the requested tolerance range. Notably, all of the emergent vegetation and invertebrates associated with them would be exposed during freezing conditions in winter. Because larger invertebrates such as dragonflies and mayflies are often associated with the macrophytes, and since diet analyses of fish in Cutler indicate that these are important prey items, the exposure of the emergent vegetation is an additional concern.</p>	<p>PacificCorp has included additional aerial photos illustrating the reservoir inundation area under the proposed operational ranges in Exhibit E, Attachment B. In addition, both the photos in Exhibit E, Attachment B, and the aerial photos of the boat launches included in Section 3.3.7 Recreation of Exhibit E, provide expansive views of Cutler Reservoir, further illustrating the lack of steep banks and deep water at the recreation site boat launches, and that virtually all of the reservoir remains inundated at WSE 4405.0. The additional aerial photos were taken from other viewpoints to further illustrate the inundation zone at several WSEs and the lack of exposed reservoir bed.</p> <p>Overall, statements made in the Draft License Application regarding changes to the reservoir as a result of proposed operations, such as those quoted in the comment, have been clarified with the addition of the word ‘substantive’, or similarly modified or expanded. Further, Table 3-23 on page 3-168, noted in the comment as being inconsistent with some of the text describing reservoir conditions during current and proposed operations, contains an area calculation that is based on predictions from the hydraulic model as opposed to empirical observations of reservoir inundation zones at the 4405.0 WSE. Table 3-23 contained a calculation error (now corrected in the FLA) which resulted in an overstatement of the calculated area potentially affected. In addition, several potentially confusing table headers have now been clarified to more accurately describe the observed conditions. Both of these table issues served to magnify the perceived inconsistency described by the comment. Most importantly however, the DLA version of the table and accompanying text did not do enough to clarify both the potential strengths and limitations of the hydraulic model, and the apparent differences between empirical observations of reservoir WSE operational ranges, and the hydraulic model’s predictions. Accordingly, the specific accompanying text and Table 3-23 in the FLA (and, as needed, throughout Section 3 of the FLA) have been expanded with additional detail regarding this differentiation. This clarification regarding the model predictions is also covered in detail below.</p> <p>The hydraulic model was used, in part, to predict water depths throughout Cutler Reservoir across a range of operational WSE as measured at Cutler Dam. Direct observations during the full drawdown in the fall of 2019 (which exceeded over 20 feet, as measured at Cutler Dam, more than 17 feet lower than the lowest proposed operating range) provided empirical data that can be used to verify the accuracy of the modeling results and potentially identify limitations of the model. The data collected from direct observations indicates the hydraulic model tends to overestimate the area of exposed reservoir bed at a Cutler Dam WSE of 4405.0 feet, as noted below. Large areas of exposed reservoir bed were not observed as the Fall 2019 full drawdown progressed through elevation 4405.0.</p> <p>Specifically, the hydraulic model is limited when it comes to replicating observed shallow reservoir depths in what the FLA now refers to as the “transition zones” of Cutler reservoir. The model accuracy in these areas of the reservoir is limited due to the following: (1) the LiDAR data collected for developing the 2D model geometry, (2) the highly complex interaction between the reservoir’s groundwater and bed</p>

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					<p>material at the end of the reservoir boundary, and (3) the inherent accuracy limitations of model output based on LiDAR data at shallow (<6”) depths (both the model and the LiDAR data have accuracy limitations ranging from 0.10-0.25 feet, resulting in a total limitation on model output accuracy of a minimum of 0.35 feet).</p> <p>Additionally, post-processing of the LiDAR survey data revealed that some portions of the reservoir bed had low levels of elevation survey returns due to the water saturation of the exposed bed material at the time of the 2019 full drawdown event. The low LiDAR survey returns (further complicated by ice formation during the unseasonably cold temperatures that occurred during the 2019 full drawdown) limited the level of elevation information in some of these areas which makes reporting model depths and velocities in these areas more difficult than in areas with full LiDAR coverage. During Project operations many of these same areas experience complex hydraulic phenomena, including increased groundwater inflow from the perched groundwater levels surrounding the reservoir, as well as capillary action from the bed material drawing moisture from the reservoir. The result is that many of these areas, now defined as “transition zones”, remain partially or mostly saturated even after the reservoir drops below the bed elevation in certain areas. Lastly, the uncertainty of the hydraulic model results increase as the depths of the reservoir approach zero in the transition areas. This increase in uncertainty is due to the complex physics involved with flow in shallow water conditions some of which is not accounted for in 2D hydraulic modeling.</p> <p>Lastly, the predicted inundation boundaries that were used to generate the percent of exposed reservoir bed do not display depths less than 0.1 feet. In a normal riverine environment very little of the channels’ inundated area is less than 0.1 feet and thus this limitation is not noticeable. However, in shallow, flat systems with noticeable groundwater interaction along the “transition zones” (the shallower areas between the reservoir banks and the reservoir open water), a portion of the reservoir bed may experience water depths at or less than the model accuracy range. The result can be an apparent discrepancy between the observed or known amount of “exposed reservoir bed” (based on aerial photos taken at or below the current and proposed operating ranges) and what the model is reporting. The results of the model simply do not consistently reproduce the observed shallow depths of water that exist in the transition areas of the reservoir for the reasons discussed above.</p> <p>The model is, however, extremely useful in providing the capability for comparisons between the proposed normal (which mirrors the existing operations range during most of the year) and the proposed extended range effects, particularly for the analysis of avian community potential effects of proposed Project operations. This analysis was indicated by the results of the ISR and is clarified in the FLA (compared to the DLA), with the expanded discussion noted above regarding the differentiation between model results and empirical data observations.</p> <p>Because all of the emergent vegetation and associated invertebrate community are already exposed to annual, variable, extended freezing temperatures, PacificCorp believes that there would likely be relatively small, if any, changes from the current</p>

COMMENT NO.	COMMENTS/ REQUESTER	COMMENT LETTER PAGE	STUDY REPORT OR RESOURCE AREA	STAKEHOLDER COMMENT	PACIFICORP RESPONSE TO COMMENT
					<p>existing conditions. That is, both the flora and fauna of the potentially affected communities have been pre-adapted to these conditions; much of the extant invertebrate community already burrow to escape freezing conditions that already are variable in nature. These adaptations would continue, resulting in little or no additional effect to these resources.</p> <p>Subsequent to BAS’ comments being submitted, PacificCorp met virtually with BAS in January of 2022 in order to better understand and address BAS’ concerns. The photos added in Exhibit E, Attachment B are partly in response to this meeting, as they provide additional empirical data regarding potential effects at proposed normal (current) and extended reservoir operations ranges.</p> <p>In summary, the following edits were made in the FLA to address this comment:</p> <ul style="list-style-type: none">• Clarified, corrected, and expanded information throughout Section 3 to indicate that proposed operations would not substantively change existing Project resources; also added details regarding source descriptions to any relevant resource section• Tables 3-23 and 3-43- clarified and corrected table headers, data, and calculations• Section 3.3: Added detailed descriptions of the hydraulic model (including limitations) and observations taken during the 2019 full drawdown• Attachment B to Exhibit E: added a photo log of aerial photographs at approximately (or below) WSE 4,405 feet (measured at Cutler Dam); these photographs are referenced throughout Section 3
2	Bridgerland Audubon Society	1	Fish & Aquatics	<p>In 2019 PacificCorp conducted a significant drawdown of the reservoir with one of the objectives being to: “<i>determine potential effects of future Project operations on resident fish, macroinvertebrate, and mollusk habitat in Cutler Reservoir</i>”. A major impact of winter drawdowns on benthic invertebrates is desiccation and freezing of the exposed sediments (Carmignani and Roy 2017). Unfortunately, the PacificCorp survey did not measure densities of macroinvertebrates in the areas of the reservoir exposed during the drawdown. Indeed, the Initial Study Report (2021, p. E-7) indicates that “<i>Transects were selected based on representativeness of the unit, accessibility during the drawdown, and further were not expected to be dewatered during the drawdown.</i>” Actually, one sample site was dewatered during the experimental drawdown, but it was “<i>not sampled because it was not representative of the conditions expected during the proposed operations, and thus negated the analysis assumptions.</i>” (PacificCorp letter, Nov. 2021). That is, throughout their analyses PacificCorp refused to understand or acknowledge that a significant portion of the reservoir would be dewatered by their current and proposed extended operation proposal and that this dewatering could have a significant impact on the macrophytes and benthic invertebrates in that zone.</p>	<p>As noted in the comment, one of the objectives of the study was to “determine potential effects of future Project operations on resident fish, macroinvertebrate, and mollusk habitat in Cutler Reservoir.” Future project operations will not result in substantial dewatering of the reservoir (see also comment response No. 1, above). In fact, the study anticipated and later confirmed with direct observations (see photographs in Attachment B to Exhibit E) that very little of the reservoir was dewatered at reservoir elevations associated with the proposed normal and extended operations. The single sampling location that was eliminated during data collection as noted by BAS, was dewatered only at the full drawdown in the Fall of 2019 at WSE 4,388.0 feet as measured at Cutler Dam, which is at least 17 feet lower than the proposed extended operations. As a result, it was not appropriate to sample locations dewatered during the full drawdown in the Fall of 2019 that were well beyond the proposed normal and extended Project operations, as that data would not be comparable to the sampling data collected from all other submerged sites.</p> <p>As previously noted in the Study Plan and the ISR, the study used the widely accepted Rapid Bioassessment Method as a means of determining species and density of Benthic Macroinvertebrate Index (BMI) in the permanently wetted zone of the reservoir. Only 1 site on transect 4 was found to be dewatered during the full 2019 drawdown, and the other remaining 3 sites in transect 4 remained submerged—as did the 15 other sampling sites for respective transects (19 total sites). That is, these specific transect site selections were made because current operations do not—</p>

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					<p>and future proposed normal and extended operating ranges would not—expose large areas of reservoir bed, as compared to the much larger magnitude drawdown in 2019. As demonstrated in other responses within this comment matrix, aside from model predictions (which are particularly useful in the comparison across species of potential effects to the winter avian community), actual observations in the form of photographic evidence confirm that largescale dewatering along the shorelines or reservoir bed do not occur.</p> <p>See also response to Comment No. 1.</p>
3	Bridgerland Audubon Society	2	Fish & Aquatics	<p>In previous comments we have asked PacificCorp to incorporate the findings of decades of published research on the impacts of reservoir dewatering on benthic invertebrates. Although the present Draft License Application acknowledges some of these publications and recognizes that winter drawdowns can cause benthic invertebrate and macrophyte die-offs, PacificCorp discounts their applicability to the proposed Cutler Reservoir drawdowns because most of the studies were of greater magnitude and longer duration than what is proposed for Cutler (Draft License Application p. 3-124). Additionally, they once again erroneously state that the studies are not applicable because <i>the “substrate along the shoreline would not be exposed to the physical factors described by other studies cited because the Cutler shoreline would not be dewatered and exposed to the elements.”</i> [Our emphasis]</p> <p>We agree that some of the other studies were different, but if PacificCorp feels they are not applicable, they need to do studies of their own to assess how dewatering and freezing impacts the invertebrates and macrophytes in the shallow areas of the reservoir that would be exposed. This has not been done. It is possible that the proposed winter fluctuating regime would not significantly impact the biota in Cutler’s littoral zone, but it is also possible that multiple dewatering and refreezing events would have more serious impacts on the exposed organisms than the single, longer dewatering events discussed in the literature. In lieu of such studies by PacificCorp, FERC should rely on the published literature that does indicate significant impacts of water drawdown.</p>	<p>BAS’ comment is based on the premise that large areas of the reservoir bed will be exposed under the proposed extended operations. In responses to commentsNos.1 and 2 in this table, PacificCorp explained that observations during the 2019 drawdown demonstrate minimal exposure of reservoir bed associated with the proposed extended operations, and none related to the proposed normal (which mimic the current) operation range. Clarifications made regarding the description of potential effects to the reservoir resulting from proposed operations are detailed in comment response No. 1.</p> <p>The literature referenced by BAS provides valuable information for evaluating potential effects on the BMI community across a range of hypothetical reservoir elevations including the proposed normal and extended operations at Cutler Reservoir. The various studies reviewed and summarized in Carmignani and Roy (2017) discuss impacts to macroinvertebrates and macrophytes. BAS comments focus on impacts from studies where reservoirs are drawn down 2 to 3 meters (considered a large amplitude) and held at that level for a prolonged period over the winter. The impacts from those studies are not transferable to future operations at Cutler Reservoir because the proposed normal and extended operations are substantially smaller in amplitude, and shorter in duration. The Cutler Reservoir shoreline will not experience large-scale exposure as asserted by BAS. In fact, the Carmignani and Roy (2017) publication includes result from studies of aquatic biota where reservoir elevation changes are much smaller, in the range of 0.4 to 0.6 m, similar to Cutler proposed operations. These studies with narrower ranges of elevation change revealed higher submergent species richness. For macroinvertebrates, Carmignani and Roy (2017) found that chironomids possess short life history cycles with multiple generations per year, enabling them to avoid the effects of inhospitable conditions associated with large, prolonged winter drawdowns. The authors go on to state that other taxa such as amphipods, oligochaetes and ceratopogonids can physically tolerate freezing and burrow in sediment to inhabit relatively unaffected substrates. These four taxa dominate the Cutler Reservoir BMI community, suggesting pre-adaptation of this community, potentially as a result of previous reservoir conditions over the last 90-120 years, or perhaps from the marshy conditions that likely existed prior to the construction of even the Wheelon Dam, and that would have also been subject to extended, variable freezing conditions historically.</p>
4	Bridgerland Audubon Society	2	Recreation	Another lesser issue that should be addressed is that the License Application suggests that the proposed increase in reservoir fluctuations would have no	As noted in the Draft License Application, Cutler Reservoir remains accessible at the boat launches under all proposed operating ranges. Recreation opportunities such as

COMMENT NO.	COMMENTS/ REQUESTER	COMMENT LETTER PAGE	STUDY REPORT OR RESOURCE AREA	STAKEHOLDER COMMENT	PACIFICORP RESPONSE TO COMMENT
				effect on recreational use (p. 3-198). It is true that access to launch sites (Table 3-35) would not be impeded. However, if the proposed period of increased fluctuations includes the month of November, the lower reservoir levels would greatly reduce boating access to much of the reservoir for waterfowl hunters and other users. Even with the current 1 ft. fluctuation that is allowed, canoeing and other boating is difficult in many areas because of the extensive shallow sandbars. In November, most boating is by waterfowl hunters. If the proposed period of increased drawdown begins in December, as stated in some places in the Application, the impact would likely be considerably less, as the reservoir is usually frozen by then. Later in the Application (p. 3-249) PacificCorp does acknowledge that “waterfowl hunting, may be displaced for short periods in the 10-day cycle under proposed extended operations in the winter season requiring hunters to temporarily shift to other locations in the reservoir.” That is, both recreational use and damage to the organisms in the littoral zone would likely be impacted by the proposed extended operation limits.	waterfowl hunting continue to exist on Cutler Reservoir under the proposed normal and extended operations. As previously described in the DLA, and referenced by BAS’ comment, navigation routes and preferred hunting locations on the reservoir may shift for short periods in the 10-day cycle under the proposed extended operations in the winter season. Because boaters and waterfowl hunters will still be able to navigate and hunt on the reservoir, these effects are considered minor and limited in both area and time, and therefore would not result in an overall impact to recreation use. This additional clarification has been made to Exhibit E (Section 3.3.7.2 and 3.3.7.4). Further, as noted in response to comments No. 1 and 3 above, PacificCorp believes the proposed extended operations will not result in substantive additional impacts to organisms in the littoral zone.
5	Bridgerland Audubon Society	2	Fish & Aquatics	The Application requests that fish “spawning” be removed as an operational consideration for the reservoir because no endangered or threatened species inhabits Cutler Reservoir (p 1-3,4). However, many important sport fishes do spawn in the reservoir, so reproduction of these species should continue to be a consideration. Although the proposed water levels of the reservoir would not change from previous license agreement during the spawning season, a consideration of reproduction of these species should continue to be acknowledged in the license agreement.	PacificCorp understands the importance of fish spawning in Cutler Reservoir but given that virtually all fish in the reservoir are introduced sport fish, and that any changes to the current operations would occur outside of the spawning season, we have chosen to remove that issue from the previous license-era visual representation of operational constraints. The highest priority constraint is the seasonal contractual obligations for irrigation water delivery, which restrict PacificCorp’s operations. The proposed operations for Cutler Reservoir maintain those obligations with the additional 1 foot of elevation change occurring outside the irrigation season in the late fall and winter when irrigation has ceased (the extended range also cannot be used during high flow periods, which occur starting in the early spring). In the fall and winter period, fish spawning in Cutler Reservoir does not occur as the known introduced species present are either spring or summer spawners. Since there is no stranding potential with the proposed additional 1-foot elevation change, young-of-year fishes would also not be at risk. As stated in responses to BAS comments in the ISR and the USR, the proposed change from normal (which mimic current) operations to extended operations would only occur during the winter season for up to a 55-day period. During this potential maximum 55-day period, WSEs would fluctuate throughout the approved operating range (4,407.5 to 4,405.0 feet) and would not remain at 4,405.0 feet for the duration of the 55 days (the proposed future operations are best described in Section 1.3 of the ISR; see also Figure 1-3 of the ISR).
6	Bridgerland Audubon Society	3	Recreation	On a positive note, we applaud PacificCorp’s prior and proposed efforts to provide recreational opportunities on Cutler Reservoir and in the surrounding lands. As indicated in the Application, these facilities are extensively used by a variety of recreationists, and we are pleased to see that the company will continue to support these uses.	Thank you. During the current license period, PacificCorp has worked with local stakeholders, including BAS, to identify recreation user needs and improve recreation access balanced with preservation, protection of wildlife habitat, and visitor experience. PacificCorp will continue this approach in the next license term, and appreciates BAS’ ongoing commitment as a long-time stakeholder, partner, and collaborator in balancing those interests.

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7	Bridgerland Audubon Society	3	Fish & Aquatics	Bridgerland Audubon is supportive of PacificCorp’s and other utilities efforts to increase power generation with renewable sources rather than reliance on fossil fuels. The proposed extended operation limits at Cutler would allow greater peaking power to be generated and thus would represent a small step towards reducing global warming. Nevertheless, as we have indicated, we do not want to see this small increase in power generation result in significant impacts on the vegetation and macrophytes living in the shallow regions of the reservoir. As addressed above, the relevant studies have not been done to assess these impacts. Consequently, we urge FERC to disallow the proposed extended operation limits until such time that PacificCorp can provide useful data on these likely impacts. If the impacts are minor, the extended operation limits could then be granted. In previous communications with PacificCorp, we have indicated how experimental studies could be done on ponds located in the valley. Alternatively, assessments could be done during a trial period that allowed extended operation limits for the reservoir. The license could then be amended depending on the findings of the studies.	In their comments on the ISR in 2021, BAS requested additional experimental studies including a BACI study and/or repeat of the fall 2019 drawdown (BAS ISR Comment No. 6). FERC determined no additional study was needed in their Study Modification Determination filing on June 11, 2021. Study methods as approved were sufficient for the analysis of potential project effects. Furthermore, on January 25, 2022, FERC determined no study modification determination was warranted for the Updated Study Report (USR) because BAS’s comments had been addressed previously in the ISR Study Modification Determination or were comments on interpretation of study results.
8	Bear River Canal Company	2		Bear River Canal Company fully supports PacificCorp in the application of a new Federal Energy Regulation Commission (FERC) license. As the denial of the renewal of the Cutler license would decimate Box Elder County and the Bear River Canal Company, we, in the strongest language possible, request the renewal of the license by FERC.	PacificCorp appreciates BRCC’s support for the new license for the Cutler Hydroelectric Project.
9	Bear River Canal Company	2	Exhibit A: Project Description	In Exhibit A page 2-5, PacificCorp states the following “The flow capacity of the Eastside and Westside canals is 165 and 735 cfs, respectively.” We wish that this be edited to the following: “The since the construction of Cutler Dam, the greatest historic peak seasonal flows of the Eastside and Westside canals have been 180 and 750 cfs, respectively.”	PacificCorp delivers irrigation water to BRCC, from Cutler Reservoir, according to a contract executed in 1912 (1912 Agreement). At Cutler Dam, water is delivered to canals on the north (named the Westside Canal) and south (named the Hammond or East Canal) sides of the Bear River. PacificCorp is obligated to deliver a flow of up to 900 cfs between May 1 and October 31, and up to 150 cfs the remainder of the year. While the canals may be physically able to accommodate, in aggregate, greater than 900 cfs (depending on conditions within the canals), PacificCorp’s contract obligations to BRCC are limited to 900 cfs and 150 cfs as noted above. Per the 1912 Agreement PacificCorp “delivers a flow of nine hundred second feet of water continuously between and including May 1 st and October 31 st each year,” and “a flow of one hundred and fifty second feet of water continuously between and including November 1 st of each year and April 30 th s of the next succeeding year...” The proposed future operation of the Cutler Project will not interfere with PacificCorp’s ability to meet the 1912 Agreement obligations. Exhibit A was written to describe the operation of the system, in accordance with the 1912 Agreement, and has been further clarified to reflect that.
10	Bear River Canal Company	3	Measurement of water flow delivered to BRCC	In our official comment to FERC concerning the relicensing process, dated 7/7/19, we introduced the concern about the steadiness of flow delivery and the accuracy of the real-time measurement of the canal flows. In all meetings and comments since that time concerning the relicensing of the Cutler facility, we have returned to this concern. PacificCorp has addressed our concerns with the steadiness of flow delivery through some programmatic changes to their gate automation system. However, the accuracy of the real-time measurement is still disputed. Currently, a rated channel is used for both the Hammond Main and West Main Canals to measure the flow. These	PacificCorp has been delivering irrigation water to BRCC, under the 1912 Agreement for over 100 years. PacificCorp has been and continues to be in compliance with the terms of the 1912 Agreement. Based on BRCC concerns regarding the steadiness of flows within the irrigation canals, communicated following the onset of the Cutler relicensing process, PacificCorp voluntarily modified its automated control gate software to better “smooth out” flows at the point of delivery to BRCC. As noted in BRCC’s comments, this addressed BRCC’s concerns regarding flow steadiness.

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				<p>rated sections are checked for accuracy every 30-45 days. This results in 4-5 measurements per year. Two of these measurements are undertaken by USGS and the remainder are conducted by PacificCorp. [...]</p> <p>Thus, we requested that PacificCorp provide accurate real-time measurement via the installation of broad crested weirs at or near the point of ownership change for both canals. There is disagreement upon who should be responsible for the costs of these installations. During the discussions of issues surrounding the new FERC license, BRCC offered to contribute 50% of the installation costs while still believing that the governing contract requires PacificCorp to fully fund such improvements in measurement. This offer was rejected by PacificCorp.</p>	<p>Regarding the accuracy of flow measurements (the volume of irrigation water being delivered to BRCC), PacificCorp has met and continues to meet its 1912 Agreement requirements. In addition, PacificCorp has gone above and beyond the contract requirements to ensure measurement of irrigation water delivered to BRCC meets USGS standards. As further noted in BRCC’s comment, USGS is involved in checking the accuracy of flow measurements, and PacificCorp meets or exceeds USGS standards for flow measurement accuracy. While there are multiple ways to measure flows in the irrigation canals, PacificCorp’s use of periodically rating the canal sections is a proven and acceptable method meeting current USGS and industry standards.</p> <p>As noted in additional detail below, the issue of flow delivery and accuracy of real-time flow measurements was addressed following our meetings with BRCC in 2019. A summary of those meetings and results is described below:</p> <p>BRCC participated in study plan consultation meetings for the Cutler Hydroelectric Project relicensing process hosted by PacificCorp on October 28 and November 14, 2019. The meeting focused on BRCC’s study plan requests submitted to the Federal Energy Regulatory Commission (FERC) in July 2019, and a discussion of PacificCorp’s Proposed Technical Study Plans (PSP) filed with FERC on September 11, 2019. The meeting purposes were to gain a better understanding of BRCC’s study requests, demonstrate where comments were incorporated into the September 11, 2019 version of the PSP, and attempt to reach agreement on remaining study plan comments. PacificCorp prepared a meeting summary along with a table of PacificCorp’s revised responses to BRCC’s study plan requests and filed the correspondence with FERC as part of the Cutler relicensing consultation record.</p> <p>PacificCorp and BRCC made considerable progress addressing BRCC’s comments on the proposed study plans. One of BRCC’s concerns and a primary focus during the October 28, 2019 meeting was related to irrigation water deliveries and the accuracy of real-time measurement of those deliveries. Specifically, BRCC contended in the October 28, 2019 meeting that PacificCorp’s measurements lacked sufficient accuracy. Staff from the United States Geologic Survey (USGS) participated in the discussion on October 28, 2019. The USGS measures flow at PacificCorp’s gages two times a year, in part, to confirm rating curves. USGS staff said that PacificCorp’s discharge measurements at the BRCC canals are +/- 5 percent accurate. USGS indicated that discharge measurements within +/- 5 percent are the industry standard and considered “good.” PacificCorp measurements generally meet or exceed USGS standards; see additional specific details below.</p> <p>At the October 28, 2019 meeting, BRCC informed the group that they contracted a third party (J-U-B Engineers) to measure discharge in the east and west irrigation canals on two dates in September 2019 to verify accuracy of the rating curves for each canal channel. According to BRCC, J-U-B Engineers estimated that on two dates in September 2019 the rating curve was off by approximately 3.5 percent on one date and 9 percent on the other from the discharge measures.</p>

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					<p>Following the October 28, 2019 meeting, PacifiCorp received J-U-B Engineers’ September 2019 discharge data for review. PacifiCorp subsequently identified an error in J-U-B Engineers discharge calculations that omitted the final step necessary, per the USGS protocol, to provide better accuracy. Corrections to J-U-B Engineers’ data, using the additional final step, were reviewed and approved by the USGS. The corrected discharge measurements indicated the canal rating curves ranged from 0.6 percent to 2.7 percent accuracy to the measured discharge value. This level of accuracy falls into the highest standard of measurement and is considered “excellent” by USGS.</p> <p>In summary, PacifiCorp’s real-time flow measurements meet the highest industry standards for accuracy based on the USGS’s independent assessment. Installation of broad-crested weirs in the canals is not needed to improve accuracy. Further, no such installation is required by the Contract, which is why PacifiCorp has noted previously, and again here, that although the company supports BRCC and its shareholders in pursuing any canal or irrigation system upgrades that it feels are warranted, including new measurement weirs, PacifiCorp customers should not be responsible to bear those costs.</p>
11	Bear River Canal Company	4	Land Use	<p>The draft license agreement Exhibit C page 3-272 states “Because it was determined that the proposed operations would not affect the BRCC withdrawals, they were not included in the water withdrawal infrastructure portion of the Land Use ISR.” Exhibit C page 3-272 states “Proposed operations would not affect the BRCC withdrawals located at Cutler Dam because the proposed extended range would only be utilized outside the irrigation season, and the elevation range proposed would not fluctuate enough to affect the canal withdrawals.” BRCC firmly states that no such determination was made or is defensible by PacifiCorp. BRCC would like to make it clear that the operational issues discussed in this comment are real issues that affect canal withdrawals both under the current license and under the proposed license. Edits should be made to the draft license to reflect the past and current status of this issue.</p>	<p>Note BRCC’s references to Exhibit C should be Exhibit E.</p> <p>In the November 14, 2019, meeting with BRCC, PacifiCorp provided a cross-sectional view of Cutler Dam illustrating the location of the reservoir pool elevations during the proposed normal and extended range operations relative to height of canal gate structures. The canal intakes are located approximately 21 feet lower than the normal reservoir pool elevation, and as noted, no changes would occur from the current operations regime during the irrigation season. Therefore, PacifiCorp’s determination that ongoing Project operations will not affect delivery of water to the BRCC canals is accurate. Further, the cross-sectional illustration eliminated the need for modeling potential impacts of future project operations on irrigation water delivery to BRCC canals.</p>

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12	Bear River Canal Company	4 & 5		<p>To this point, PacificCorp has made the argument that the operations of the canals are outside of the FERC prevue. However, we would point to the history/creation of the project, current operating agreements, and the economics of the project as evidence supporting the opposite opinion. [...]</p> <p>There may be some argument that the current rated channel section is up to industry standard currently. We would point that the purpose of the relicensing process is to assess the value of the project for the future. During the term of the proposed license agreement, even proponents of the current measurement practices would have to agree these practices will be out-of-date during the next license period, thus canal measurement infrastructure should be upgraded as part of the issuance of a FERC license.</p>	<p>Water delivery obligations under the 1912 contract are, and will continue to be, completely fulfilled in operating the Cutler Hydroelectric project so long as available water permits. The proposed operations in the next license period do not interfere with those water delivery obligations.</p> <p>PacificCorp disagrees with BRCC’s assertion that current measurement practices will be out of date during the term of the next license given the fact that these field techniques remain mostly unchanged despite substantial advancements in computing technology. The field methods associated with the accurate measurement of flow volume have been well established for over a century. New equipment has been developed to measure water velocity and depth such as acoustic doppler current meters, but the field data collection methods remain largely unchanged. In fact, the instruments used to measure velocity in the past (Price AA current meter) continue to be used in situations where it is appropriate and where they continue to be accurate. PacificCorp utilizes newer equipment such as acoustic doppler current meters, as well as time-tested current meters such as the Price AA where applicable for field data collection.</p> <p>Standard license article 8 requires PacificCorp to delegate supervision of their Project gaging efforts to the United States Geological Survey (USGS). The USGS sets the industry standard for hydrologic data collection methods and analysis. Any changes in the industry standards for Project hydrologic data collection will be directed by the USGS as needed during the next license period. As noted previously, PacificCorp will continue to meet or exceed both the 1912 Agreement requirements, as well as USGS measuring standards. Further, PacificCorp notes that measurement in these irrigation canals is not part of the FERC license process, in that they are not measurements of flow on a stream where the Project is located but are on irrigation canals downstream of the Project generation works, are not part of Project operations, and are governed by the 1912 Agreement.</p> <p>As to “measurement” using a weir, the USGS does not consider a weir a “measurement device” but a hydraulic control on the stage-flow relationship (rating curve) that requires the same frequency of discharge measurements to confirm the accuracy of the rating curve of the weir. Notably, weirs sometimes rely on standard computer-calculated or laboratory-derived empirical ratings, which may not match the actual rating curve of the installed weir due to variations in field conditions from the idealized conditions used to produce the standard rating curve.</p> <p>The need for new devices to measure water delivery within irrigation canals falls under water delivery contracts and is not a part of the FERC relicensing process. Further, PacificCorp has demonstrated to the satisfaction of the USGS that the current water delivery measurement system is accurate, meets industry standards, and continues to comply with the 1912 contract.</p>
13	Bear River Canal Company	6		Bear River Canal Company has demonstrated that an issue exists with the accuracy of the current measurement system implemented by PacificCorp in	See response to Comment No. 10. Also, see letter to BRCC dated November 30, 2019, and filed with FERC addressing the issues of water delivery timing and

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				its conveyance of water through the FERC project. We have established a nexus to the FERC regulated Cutler Project through the project’s history, current operations agreements, and economic impact on the area. Further, we have made an attempt to resolve the issues outside of a request to include upgrades as part of the license agreement. However, we have been unsuccessful in those attempts. Therefore, we request that FERC consider including an update in canal delivery measurement as a required upgrade to the infrastructure as part of the license which will govern the Cutler Project for the next license period. If FERC feels that our request is valid and intends to provide for it in the license, BRCC would request a consultation between FERC, PacificCorp, and BRCC to discuss infrastructure required by the license for the reasons delineated in “Bear River Canal Company Capital Improvements Plans and Goals” section of this document.	accuracy of real-time flow measurements. As a result of the meetings with BRCC on October 28 and November 14, 2019, PacificCorp implemented changes to the automatic headgate control to use the primary streamflow gage as the primary flow input. Previously, a secondary water level sensor was used, resulting in some bias between the flow control set-point flow rate versus the provisional flow rate at the primary gage. This was implemented at the beginning of the 2021 irrigation season, which has reduced both the bias and variability between the requested flow control set-point and the delivered flow beyond the requirements of the 1912 Contract. That is, PacificCorp complies with the obligations under the 1912 Contract. Although not required by the Contract, once the company was made aware of BRCC concerns, PacificCorp also implemented additional system changes to further improve the water delivery system where feasible. As such, additional capital upgrades to BRCC’s canal system are clearly the responsibility of BRCC and not PacificCorp customers.
14	Bear River Canal Company	7	Exhibit C: Construction History	In Exhibit C Page 1.1 states the following: “The construction of the Project begins with the construction of the Hammond Canal (also known as the East Canal) and the West Canal to provide irrigation water to the dry bench lands of the east side of Bear River Valley (SWCA 2020). The larger West Canal serves those east-bench lands north of Cutler Canyon, while the Hammond Canal serves the lands located south of Cutler Canyon on the east bench.” We feel that this was simply a misstatement but should be corrected to the following: “The construction of the Project begins with the construction of the Hammond Canal (also known as the East Canal) and the West Canal to provide irrigation water to the dry bench lands of the east side and west sides respectively of Bear River Valley (SWCA 2020). The larger West Canal serves those west-bench lands west and south of Cutler Canyon, while the Hammond Canal serves the lands located south of Cutler Canyon on the east bench.”	PacificCorp appreciates these clarifications, and has modified Section 1.1 of Exhibit C of the FLA.
15	FERC (Frank Winchell)	1	Draft HPMP	Figure 2-2, Page 2-8: FERC project boundary lines (red lines) look strange. Not sure if this is correct.	Figure 2-2 in the HPMP is zoomed in to provide detail of the Project facilities. The FERC Project Boundary is correctly delineated in Figure 2-2, and can be seen in its entirety in Exhibit G.
16	FERC (Frank Winchell)	1	Draft HPMP	Subsection 5.3: There should be an annual meeting within every anniversary of the issuance date of the license, among the participating parties to discuss the implementation of the HPMP. Add to Subsection 5.3 that the purpose of the annual meeting would be to share information regarding Project activities that have taken place during the preceding year, to discuss cultural resource concerns, to discuss site conditions, protection measures, and/or other activities that have been carried out that affect cultural resources; to provide an overview of anticipated upcoming Project activities; and to discuss any concerns with and proposed changes to the protocols established in the HPMP. Also add to Subsection 5.3 that every 5 th year, the annual report and meeting, will consider any possible cumulative effects to historic properties in the project’s APE as a result of project operations that may have occurred or developed over the 5-year span.	PacificCorp has modified Section 5.3 of the HPMP to address periodic reviews for cumulative effects. For efficiency and to align all substantive reviews (vs. annual reporting) of the HPMP administration and any necessary changes, the cumulative effects review has been incorporated into the 10-year HPMP review meeting (see Comment 17, below).

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17	FERC (Frank Winchell)	1	Draft HPMP	Subsection 5.4: Change from every 20 years following the acceptance of the HPMP by FERC, to every 10 years, PacificCorp will review the HPMP for adequacy and continued applicability to the Project’s operation.	PacificCorp has modified Section 5.4 of the final HPMP.
18	FERC (Frank Winchell)	1	Draft HPMP	Section 4.0: Add another subsection before 4.3 on procedures and protocols for determining National Register of Historic Places eligibilities on any newly discovered cultural resource within the Project’s APE. The procedures and protocols in this subsection should be consistent with the measures provided in subsection 4.7.1 and include standard consultation efforts between PacificCorp and the Utah SHPO, and include involved Indian tribes concerning cultural resources of aboriginal origin.	PacificCorp has added subsection 4.3 to the final HPMP.
19	FERC (Frank Winchell)	1	Draft HPMP	Subsection 5.5: Just state that any kind of dispute regarding this HPMP, implementation of its measures, or treatment of cultural resources with PacificCorp and/or with any of the involved parties will be carried through the dispute resolution process provided in the associated PA.	PacificCorp has modified subsection 5.5 of the final HPMP.
20	Utah State Historic Preservation Office	N/A	Cultural Resources	My main buildings' related item is to change your "Exemptions" section to "Streamlined Activities" (this terminology is more consistent with updated Advisory Council on Historic Preservation guidance) and I would also request you provide an annual (or biennial) report on those streamlined activities to be submitted to the Utah SHPO.	PacificCorp has modified the final HPMP.
21	Utah State Historic Preservation Office	N/A	Cultural Resources	SHPO hasn’t seen SWCA survey report or site forms.	All technical reports and supporting documentation were provided to the SHPO prior to submittal of the Final License Application.
22	Utah State Historic Preservation Office	Table 4-1, Column 1, first text cell	Draft HPMP	What is defined as “previously disturbed”?	PacificCorp has added text to clarify the meaning of “previously disturbed” to Table 4-1, Column 1 of the final HPMP.
23	Utah State Historic Preservation Office	Table 4-1, Column 1, 2 nd text cell	Draft HPMP	Are these resources to be evaluated if over 50 years old?	PacificCorp has added text to Table 4-1 to clarify that only resources less than 50 years old qualify for processing under this “exemption” criterion.
24	FERC	2	Exhibit B	On page 1-12, you state that the proposed extended range “would typically only be utilized during the November-to-March timeframe”; however, in Exhibit E, page 3-139, you state that the proposed operation changes would occur “typically between December and March.” Please ensure that your FLA is consistent in the timing of your proposed operation changes.	PacificCorp clarifies that the proposed extended operations would only be utilized outside of the irrigation season and cannot be used during high flows; these conditions generally occur during the November to March timeframe (and even more narrowly if extremely cold temperatures, such as those causing downstream ice damming conditions, or warmer temperatures contributing to low elevation runoff and subsequent higher flows, are present). The statements are not inconsistent as the conditions which could allow for the proposed extended operations are limited and somewhat variable (i.e., ‘typically’ starting in November or December) but generally only occur during the winter months as they are defined by excluding the irrigation season and higher water flows. The FLA has been clarified to reflect this (additional detail may also be found in Exhibits B (Section 1.3) and E (Section 2.2.2) regarding the Proposed Operations).

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25	FERC	2	Wildlife and Habitat	On page 3-149, you state that the littoral and open water habitat is a type of wetland/waters habitat that is “located adjacent to the reservoir.” However, on page 3-148 [page number corrected by PacificCorp], you state that “[g]iven that much of the reservoir is shallow, a large portion of this open water habitat constitutes the littoral zone.” Please clarify in the FLA where in the project reservoir this habitat is located.	In Section 3.3.5.1 (DLA page 3-149) the text “...located adjacent to the reservoir...” has been clarified to read “...located on the margins of the reservoir where water is shallow...”
26	FERC	2	Fish and Aquatic, Botanical, Wildlife and Habitat	On page 3-124, you state that “the Cutler shoreline would not be dewatered and exposed to elements” and that proposed operations would “not result in shoreline sediment exposure” due to reservoir level fluctuations being short-term, cyclical, and 2.5 feet or less. However, on page 3-139, you indicate that “proposed operations would potentially decrease the lower WSE [water surface elevation] and increase the amount of exposed reservoir bank and shoreline”, and on page 3-149, you state that “littoral and open water habitat has the highest potential to be affected by proposed reservoir operations.” In addition, table 3-23 indicates that the proposed extended operations could result in up to 21 percent exposed reservoir shoreline. Please clarify this apparent inconsistency regarding the potential effects of the proposed reservoir operations in the FLA.	<p>Table 3-23 presents the results of the hydraulic model predictions, and as noted above in Comment Response No. 1, a calculation error was discovered in the table in that the model actually predicted that extended operations could result in less of a reduction in the area of open water at WSE 4,405.0 ft, compared to the current low of WSE 4,406.0 ft. The 21 percent difference noted in the DLA was calculated incorrectly and has been rectified in Table 3-23 and associated text.</p> <p>Also, as previously stated in Comment Response No.1, PacificCorp notes the apparent inconsistency between DLA page 3-124 and other references to “exposed” reservoir bed including on DLA page 3-139, and have clarified the text to include the more accurate term “transition zone” in Section 3.3.5.2 (including on DLA page 3-139 and in Table 3-23), based on the empirical photographic evidence included in Attachment B of Exhibit E, as well as with staff experience with the reservoir at current operating WSE ranges. Further, relevant portions of the Section 3 text now have expanded and clarified descriptions regarding the strengths and limitations of the hydraulic model, and how it is expected to differ with empirical observations of reservoir elevation, particularly in the shallower portions of the reservoir.</p> <p>As described in detail in the response to Comment No. 1 above, the hydraulic model has certain limitations in the transition zones, including the shallower zones along the edge of the reservoir. The model is only able to predict the relative change in the amount and distribution of what is now defined more accurately as the “transition zone” (defined as the shallower areas between the reservoir banks and the reservoir open water). This edit clarifies the use of the term “exposed” as the change in open water does not necessarily translate directly to an increase or decrease in exposed reservoir shoreline. Rather, it could indicate a range of conditions within the transition zone from wet reservoir bed sediments, to flooded shallow water (not exposed but less than 0.4 feet in depth). As described above in the response to Comment No. 1, the latter condition is considered more probable, based on hydraulic processes, observations, and photos captured at various WSEs that occurred during the 2019 drawdown.</p> <p>To help clarify this change, a more detailed explanation of the limitations of the hydraulic model has been added to FLA Section 3.3, including its limitations in the transition zones along the reservoir shoreline. This description of limitations will be referenced in Section 3.3.5.2, and elsewhere in the FLA where model limitations are relevant.</p>
27	FERC	2	Fish and Aquatic	In your analysis on the effects of reservoir drawdowns on benthic macroinvertebrates (BMI) (page 3-124), you indicate that the studies for the peer reviewed articles you relied on as part of your literature research	As noted above in comment response No. 1, overall, statements made in the <u>Draft License Application regarding changes to the reservoir as a result of proposed operations, such as</u> those noted in the comment, have been clarified with the addition

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				<p>focused on the effects of long-term winter drawdowns, primarily with drawdowns greater than 5 meters. As such, you state that because the proposed water surface fluctuations in the Cutler reservoir would be significantly less in magnitude and duration, these studies do not appear to provide an accurate prediction of potential effects of the proposed reservoir drawdowns on BMI at the project. In addition, on page 3-124, you state that “substrate along the shoreline would not be exposed to physical factors described by other studies cited because the Cutler shoreline would not be dewatered and exposed of the elements.” As discussed in item 3 above, table 3-23 indicates that proposed operations could potentially cause up to 21 percent of the reservoir shoreline to be exposed. If the literature review studies are not applicable and the shoreline sediment will indeed be exposed during proposed extended operations, please provide further analysis of the potential effects of the shoreline exposure during proposed extended operations on BMI in the project reservoir. This may include using more applicable peer-reviewed studies for comparison, if available, or an estimation of effects based on the difference in magnitude and timing of the proposed reservoir drawdowns when compared to the drawdowns evaluated in the available studies.</p>	<p>of the word ‘substantive’, or similarly modified or expanded. However, with those caveats, the effect of the proposed operations (fluctuating by 0.3-0.76 m) would not be substantive, and would be limited in time and area, as described further in Section 3.3 of the FLA, in previous comment responses, and as shown on the photos in Exhibit E, Attachment B.</p> <p>The peer-reviewed studies indicated were actually referenced by commenters on both the ISR and the DLA, and were not relied on for the Cutler analysis specifically, although they are addressed in our various comment responses. In their comments on the ISR, BAS referenced a peer reviewed article by Carmignani and Roy (2017) that synthesized the results from a number of other published papers on the effects of winter reservoir drawdown on aquatic communities. In their comments, BAS focused in on the impacts to aquatic communities where reservoir drawdowns result in water surface elevation changes in the range of 3 to 4 meters and held there for relatively long periods of time. That range of water level fluctuations and prolonged drawdown are not representative of the Cutler proposed operating conditions. Interestingly, the paper by Carmignani and Roy (2017) also summarized results from studies where reservoir fluctuations were much smaller and over shorter durations (days). In fact, Carmignani and Roy (2017) point out that reservoir elevation changes in the range of 0.4 to 0.6 m, ranges similar to Cutler proposed operations, revealed <u>higher</u> submergent species richness. For macroinvertebrates, Carmignani and Roy (2017) found that chironomids possess short life history cycles with multiple generations per year, enabling them to avoid the effects of inhospitable conditions associated with large, prolonged winter drawdowns. The authors go on to state that other taxa such as amphipods, oligochaetes and ceratopogonids can physically tolerate freezing and burrow in sediment to inhabit relatively unaffected substrates.</p> <p>Regarding FERC’s reference to percent of inundation listed in Table 3-23 of the DLA please see the response to Comment Nos. 1 and 26 in this table.</p>
28	FERC	2	Exhibit F	The drawing and text on Exhibit Drawing F-1 titled: “Principal project works location drawing” is not legible and needs to be updated in the FLA.	The reservoir image and associated labeling in Exhibit F, Drawing F-1 of the Final License Application has been made more legible.
29	FERC	2	Exhibit G	All required maps and drawings must conform to the specifications of sections 4.39 and 4.41. As such, please provide the project boundary data in a geo-referenced electronic format (e.g., ArcView shape files, GeoMedia, files, MapInfo files) in your FLA.	PacificCorp will provide Project Boundary data that conforms to FERC’s requirements for the final Exhibit G submittal.
30	Senator Sandall	1	Comment not part of DLA process	The purpose of my communication is to articulate my support of the Bear River Canal Company’s petition to update the measurement of their agricultural water right.	As previously noted, (see response to Comment No. 10, above), PacificCorp also supports BRCC and its shareholders interest in pursuing any BRCC canal or irrigation system upgrades that it feels are warranted, including new measurement weirs; however, the company differs in noting that PacificCorp should not be responsible to bear BRCC system upgrade costs.
31	Senator Sandall	2	Comment not part of DLA process	Bear River Canal Company has been using [the State Water Agricultural Optimization Grant program] and has been awarded grants for system improvements which have already been undertaken. They are taking very seriously the stewardship of their water rights through the implementation of	PacificCorp also values improvements in water use efficiency, including investments in infrastructure that support these goals throughout the watershed. PacificCorp disputes that the initial delivery of water to BRCC’s canal system is metered at a less accurate standard; see details provided in comment responses No. 10, 12, and 13.

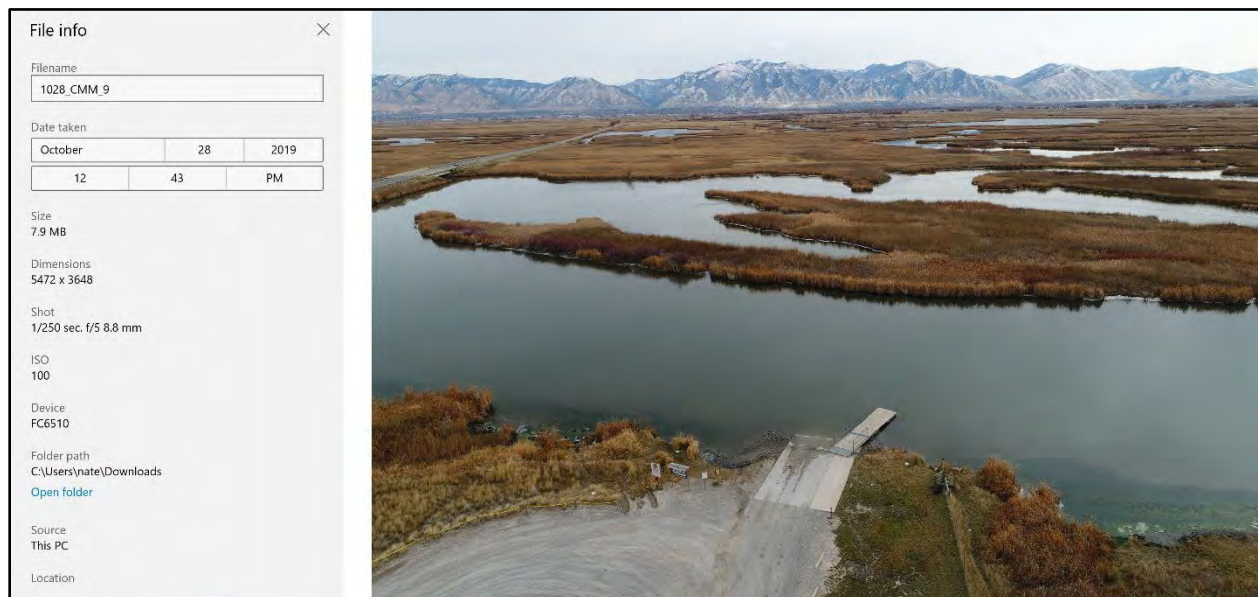
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				leading-edge water measurement /automation equipment and economical canal liners and piping. I see the validity of their concerns with them making large investments in cutting-edge technology in downstream sections of the canal system while PacificCorp’s initial delivery of water is metered [to] a much less accurate standard.	
32	Senator Sandall	2	Comment not part of DLA process	I do not feel it is reasonable to expect the current rated channel measurement of the Bear River Canal Company’s water right [to] remain acceptable to the State of Utah or its citizens for the duration of the next license period.	Regarding measurement of irrigation water deliveries, PacificCorp will continue to meet or exceed USGS standards and 1912 Agreement requirements going forward, in the current and in any future license periods. See above comment response No. 30 regarding PacificCorp support for BRCC upgrading its system.
33	Senator Sandall	2	Comment not part of DLA process	Our area is also developing. As a result, we, as public officials, are more and more concerned about canal safety issues and the effects of water movement in storm events as farm ground is converted to homes. The canal company is going to have to manage its system more precisely and more dynamically in the next license period than it ever has before in order to meet the needs of users’ safety. A key to that is an accurate measurement of input water at Cutler Dam.	PacificCorp also agrees that canal operational safety is important, and annually undertakes considerable operation and maintenance expense in maintaining the safe operation and delivery capability of its canal systems, including the portions of the Hammond and West canals which PacificCorp is required to maintain by the 1912 Agreement. See previous comments (Nos. 10, 12 and 13) that thoroughly address the fact that water in the canals is accurately measured at Cutler Dam, at a level that meets or exceeds all USGS standards, as well as the requirements of the controlling contract, the 1912 Agreement.
34	Senator Sandall	2	Comment not part of DLA process	Bear River Canal Company has submitted cost information that supports that the power company will not bear additional cost over the license period as a result of the implementation of better measurement as it results in less required check measurements. This coupled with the changing needs of the canal company as well as the benefits to society in general by better measurement, I strongly support FERC’s inclusion of improved measurement as part of a term of the next license agreement.	PacificCorp has not seen the noted cost information and disputes the underlying premise of overall cost savings. Further, PacificCorp has repeatedly stated to BRCC that no such cost savings would exist. Finally, and as noted previously (see comment responses No. 10, 12, and 13), existing canal measurements meet or exceed USGS standards and the 1912 Agreement, upgrades or improvements are neither warranted nor required by the Agreement, and are outside of the FERC relicensing process.

ATTACHMENT B

CUTLER RESERVOIR 2019 EXPERIMENTAL DRAWDOWN AERIAL IMAGERY



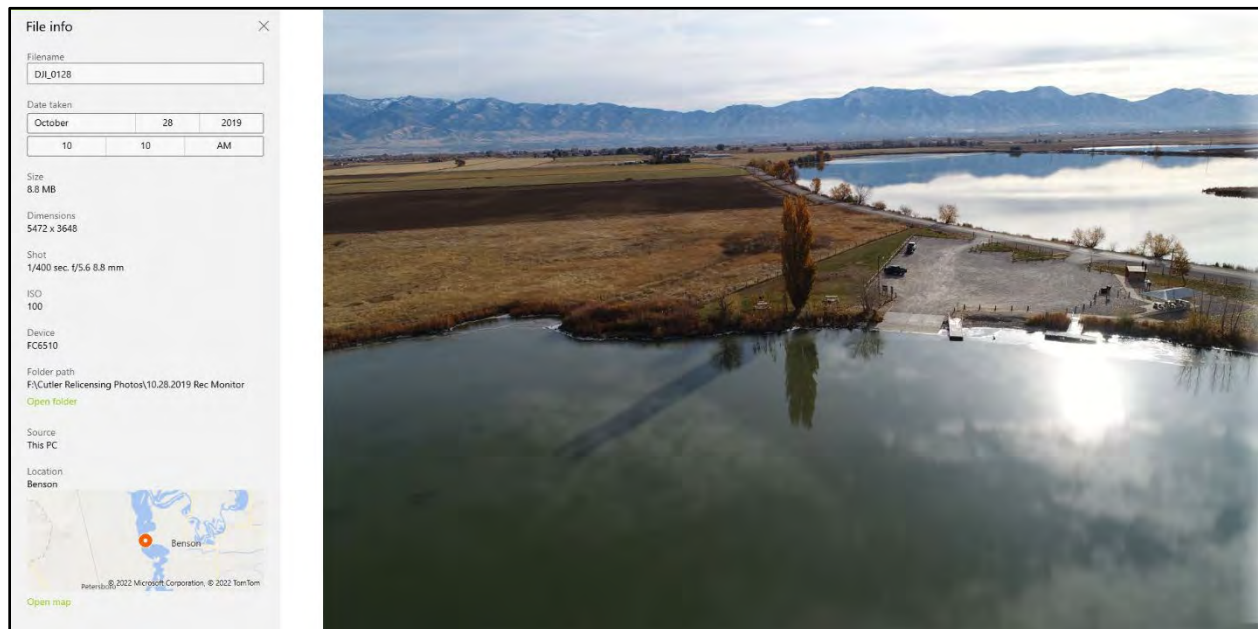
Location: Cutler Marsh Marina
Date: October 28, 2019
Time: 12:43 PM
Reservoir Elevation at Dam: 4404.47 feet (below lowest proposed operating limit of 4405.0)



Location: Cutler Marsh Marina
Date: October 28, 2019
Time: 12:43 PM
Reservoir Elevation at Dam: 4404.47 feet (below lowest proposed operating limit of 4405.0)



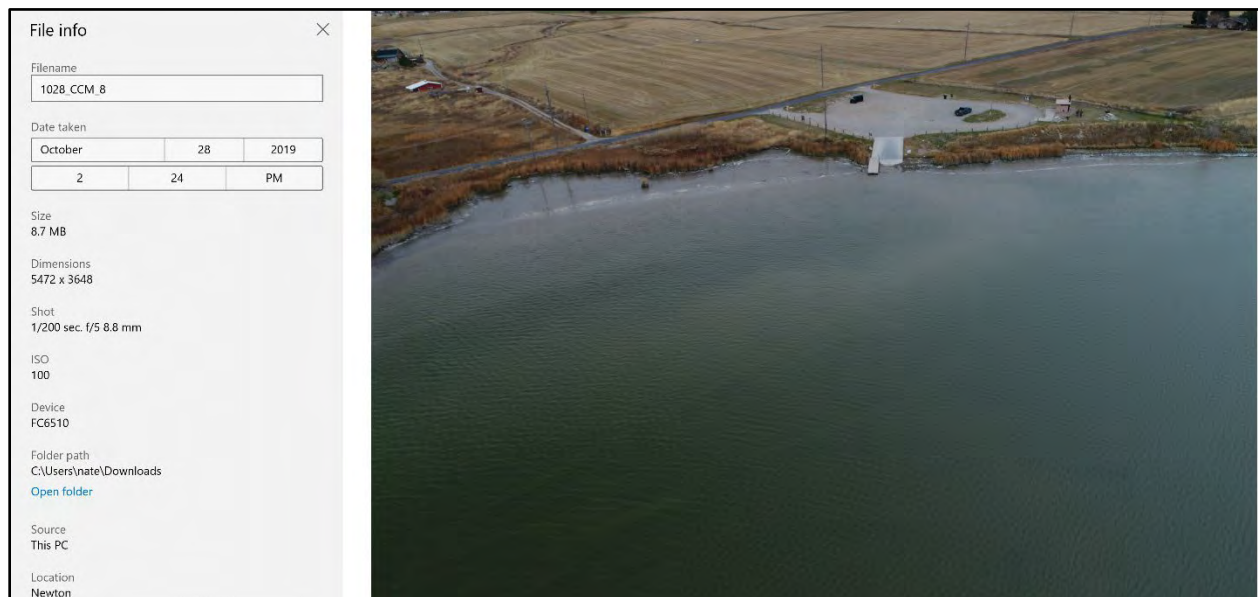
Location: Benson Marina
Date: October 28, 2019
Time: 10:09 AM
Reservoir Elevation at Dam: 4404.85 feet (below lowest proposed operating limit of 4405.0)



Location: Benson Marina
Date: October 28, 2019
Time: 10:10 AM
Reservoir Elevation at Dam: 4404.85 feet (below lowest proposed operating limit of 4405.0)



Location: Clay Slough
Date: October 28, 2019
Time: 1:48 PM
Reservoir Elevation at Dam: 4404.30 feet (below lowest proposed operating limit of 4405.0)



Location: Cutler Canyon Marina
Date: October 28, 2019
Time: 2:24 PM
Reservoir Elevation at Dam: 4403.98 feet (below lowest proposed operating limit of 4405.0)



Location: Cutler Canyon Marina
Date: October 28, 2019
Time: 2:25 PM
Reservoir Elevation at Dam: 4403.98 feet (below lowest proposed operating limit of 4405.0)



Location: Cutler Canyon Marina
Date: October 28, 2019
Time: 2:27 PM
Reservoir Elevation at Dam: 4403.98 feet (below lowest proposed operating limit of 4405.0)



Location: Benson Marina
Date: October 31, 2019
Time: 10:48 AM
Reservoir Elevation at Dam: 4394.78 feet (below lowest proposed operating limit of 4405.0)

The last image indicates that most of the reservoir bed is inundated with water at a level greater than 10 feet lower than the proposed lowest operating range. It is reasonable to assume that at elevation 4405 there would be even less exposed shoreline.

APPENDIX HPMP

HISTORIC PROPERTIES MANAGEMENT PLAN

HISTORIC PROPERTIES MANAGEMENT PLAN

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT No. 2420)**

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)****HISTORIC PROPERTIES MANAGEMENT PLAN****TABLE OF CONTENTS**

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ACRONYMS AND ABBREVIATIONS***A***

ac	acre
af	acre-feet
ACHP	Advisory Council on Historic Preservation
Al	Aluminum
Amp	Ampere
APE	Area of Potential Effects

C

CFR	Code of Federal Regulations
CPRR	Central Pacific Railroad
CRMP	Cultural Resources Management Plan

D

District	Cutler Hydroelectric Power Plant Historic District
DLA	Draft License Application

F

FERC	Federal Energy Regulatory Commission
FLA	Final License Application

G

GWh	gigawatt hours
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H

hp	horsepower
HPMP	Historic Properties Management Plan

I

IFs	isolated features
IOs	isolated occurrences

K

kW	kilowatt
----	----------

L

Latter-day Saints	Church of Jesus Christ of Latter-Day Saints
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M

MOA	Memorandum of Agreement
msl	Mean Sea Level
MVA	Megavolt-ampere
MW	Megawatt

N

NAGPRA	Native American Grave Protection and Repatriation Act
NC	non-contributing
NGVD29	National Geodetic Vertical Datum of 1929
NPI	National Preservation Institute
NPS	National Park Service
NRHP	National Register of Historic Places

O

OSL&UNR	Oregon Short Line & Utah Northern Railroad
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P

P	Phosphorus
PF	Power Factor
Project	Cutler Hydroelectric Project

R

rpm	revolutions per minute
-----	------------------------

S

SHPO	State Historic Preservation Office
SWCA	SWCA Environmental Consultants

U

UCA	Utah Code Annotated
UNRR	Utah Northern Railroad
UPRR	Union Pacific Railroad
UP&L	Utah Power and Light Company
USGS	United States Geological Survey
USU	Utah State University

V

V	volt
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1.0 OVERVIEW AND EXECUTIVE SUMMARY

PacifiCorp is the owner, operator, and Licensee for the Federal Energy Regulatory Commission (FERC) Cutler Hydroelectric Project (FERC Project No. 2420) (Project). Under the terms of the existing FERC license issued in 1994 (Article 403), PacifiCorp is required to enact procedures to ensure the consideration and management of effects of its actions and operations on historic properties. Historic properties are defined as resources determined eligible for listing or listed on the National Register of Historic Places (NRHP). PacifiCorp currently operates the Project under a Cultural Resources Management Plan (CRMP) that was implemented in 1995.

This document constitutes a Historic Properties Management Plan (HPMP) to be implemented by PacifiCorp upon receipt of a new FERC Project license. This HPMP is effectively an update to the 1995 CRMP. This HPMP includes newly identified historic properties, and updates procedures and protocols to reflect current standards, including the designation of a staff position as the HPMP Coordinator; this person will be responsible for administering the HPMP and ensuring compliance with its measures.

This HPMP was developed under the authority of the National Historic Preservation Act and its implementing regulations at 36 Code of Federal Regulations (CFR) 800 (i.e., Section 106) and consistent with Utah Code Annotated (UCA) 9-8-404, the state-level equivalent of 36 CFR 800. The plan is also consistent with the federal Native American Grave Protection and Repatriation Act (NAGPRA) and the Utah NAGPRA (UCA 9-9-401) requirements.

This HPMP was developed in consultation with FERC and the Utah State Historic Preservation Office (SHPO). Consulting parties, including the Northwestern Band of Shoshone Nation, Shoshone-Bannock Tribes, Ute Indian Tribes, and Skull Valley Band of Goshute, as well as several other consulting parties, such as local historical societies, were invited to participate in or comment on versions of the HPMP; their comments will be included in an appendix, along with PacifiCorp responses to any comments, once they are received. Following final approval of the HPMP, PacifiCorp will maintain an “open door” policy to allow consulting parties to provide information about cultural resources (known and newly identified) that may be affected by the Project. This includes measures for additional consultation outreach with these parties during implementation of the plan as related to specific undertakings.

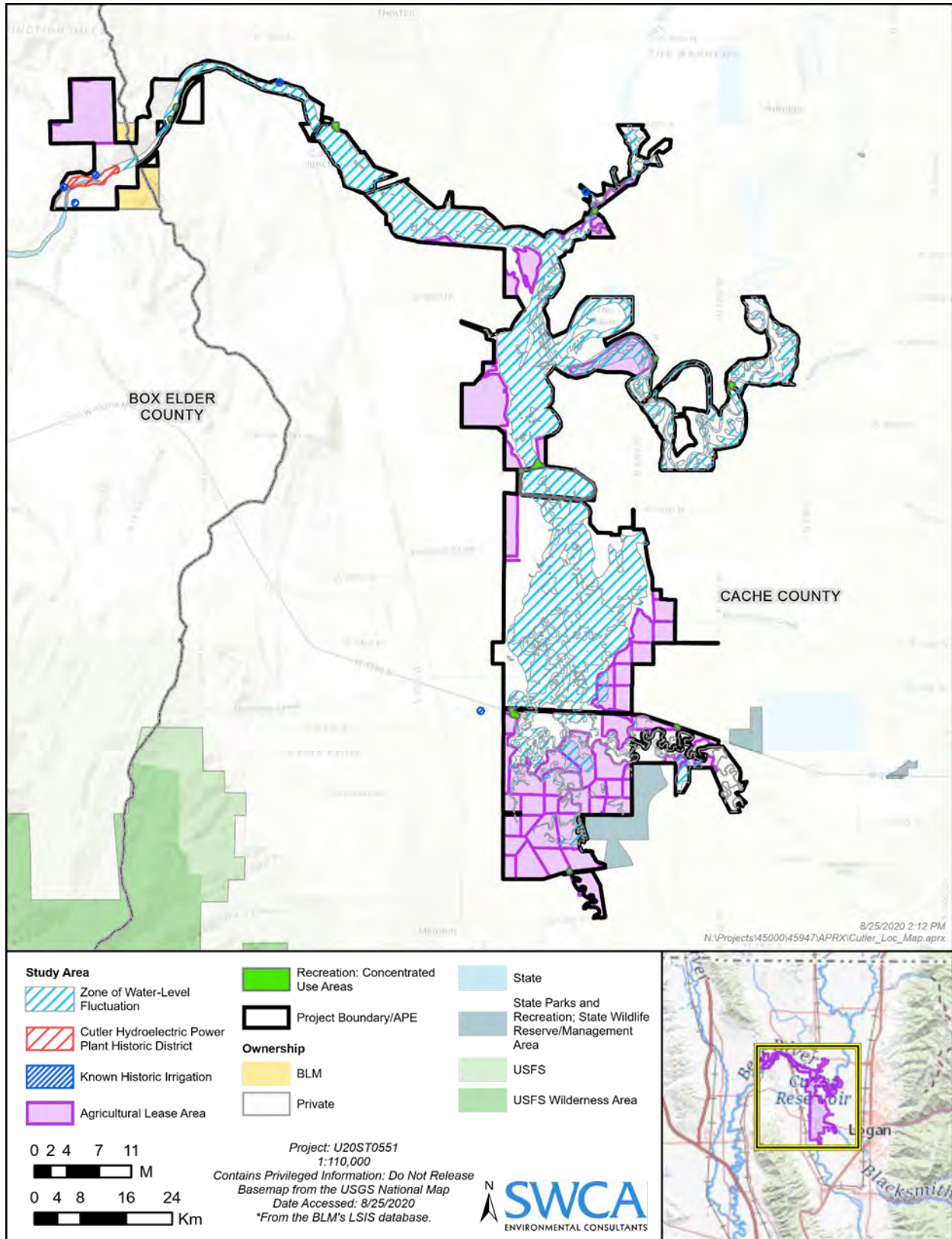
This HPMP includes the following:

- Detailed information about the Project, its facilities, operations, and historical context;
- A discussion of past efforts to identify historic properties and descriptions of the properties that have been identified;
- PacifiCorp's goals, objectives, and priorities in managing historic properties during Project operations and maintenance;
- A review of known and potential Project effects on historic properties;
- Procedures for PacifiCorp to evaluate specific Project effects, both ongoing and future, on historic properties; and measures that will be implemented to avoid, minimize, or mitigate adverse effects as they are identified;
- A schedule and process for implementing HPMP procedures and protocols; and
- Protocols for addressing cultural resources or human remains inadvertently discovered during actions related to the Project.

2.0 BACKGROUND INFORMATION AND CONTEXT OF THE HPMP

The Project is located on the Bear River in western Cache Valley, Utah, between the Wasatch and Wellsville Mountains (Figure 2-1). Although Cutler Dam is located in Box Elder County, most of the Project reservoir lies within Cache County. The Project reservoir is formed at the confluence of Spring Creek and the Bear, Logan, and Little Bear Rivers. Construction of the Project was completed in 1927 to replace an earlier, smaller impoundment area created with the construction of the Wheelon Dam in 1896, and many of the original facilities remain at the time this HPMP was prepared.

Pursuant to 36 CFR 800.4, the area of potential effects (APE) for the Project—the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties—is defined as the FERC Project Boundary (Figure 2-1). PacifiCorp is responsible for the implementation of this HPMP to its actions on all lands within this APE. It should be noted that non-Project privately-owned resources, such as irrigation canals, pass through the Project Boundary and have been identified as historic properties. While PacifiCorp is responsible for considering the effects the company’s undertakings on these properties, they are not responsible for the effects of actions undertaken by such other private property owners, and the HPMP does not apply to those private actions. Additionally, PacifiCorp is not responsible for regulatory compliance associated with such other private actions or with other actions undertaken by other parties that might induce effects to historic properties within the APE. That is not to say that PacifiCorp would not or should not take actions to avoid or minimize those adverse effects within their APE, but only that they are not responsible for regulatory compliance related to those activities or other parties causing those effects.



Source: SWCA 2021

FIGURE 2-1 CUTLER FERC PROJECT BOUNDARY AND AREA OF POTENTIAL AFFECT

2.1 PROJECT FACILITIES AND OPERATION

The FERC Project Boundary, which also represents the APE, encompasses 9,277 acres of open water, associated wetlands, and uplands surrounding Cutler Reservoir. The Project facilities within this area consist of a reservoir, concrete gravity arch dam, gated-overflow spillway, low-level gate (non-operational), intake tower and cylinder gate, two irrigation canal intakes, a steel flowline, a surge tank, two steel penstocks, a powerhouse, two generating units and appurtenant facilities, turbines, circuit breakers, transformers, accumulator tanks, an air compressor, and several emergency generators (Figure 2-2). Most of these facilities were designed in 1924 and completed in 1927, though some equipment associated with them has been replaced since that time. Also within the APE are lands owned by PacifiCorp and leased to other parties for agricultural uses.

Specific facility details are as follows:

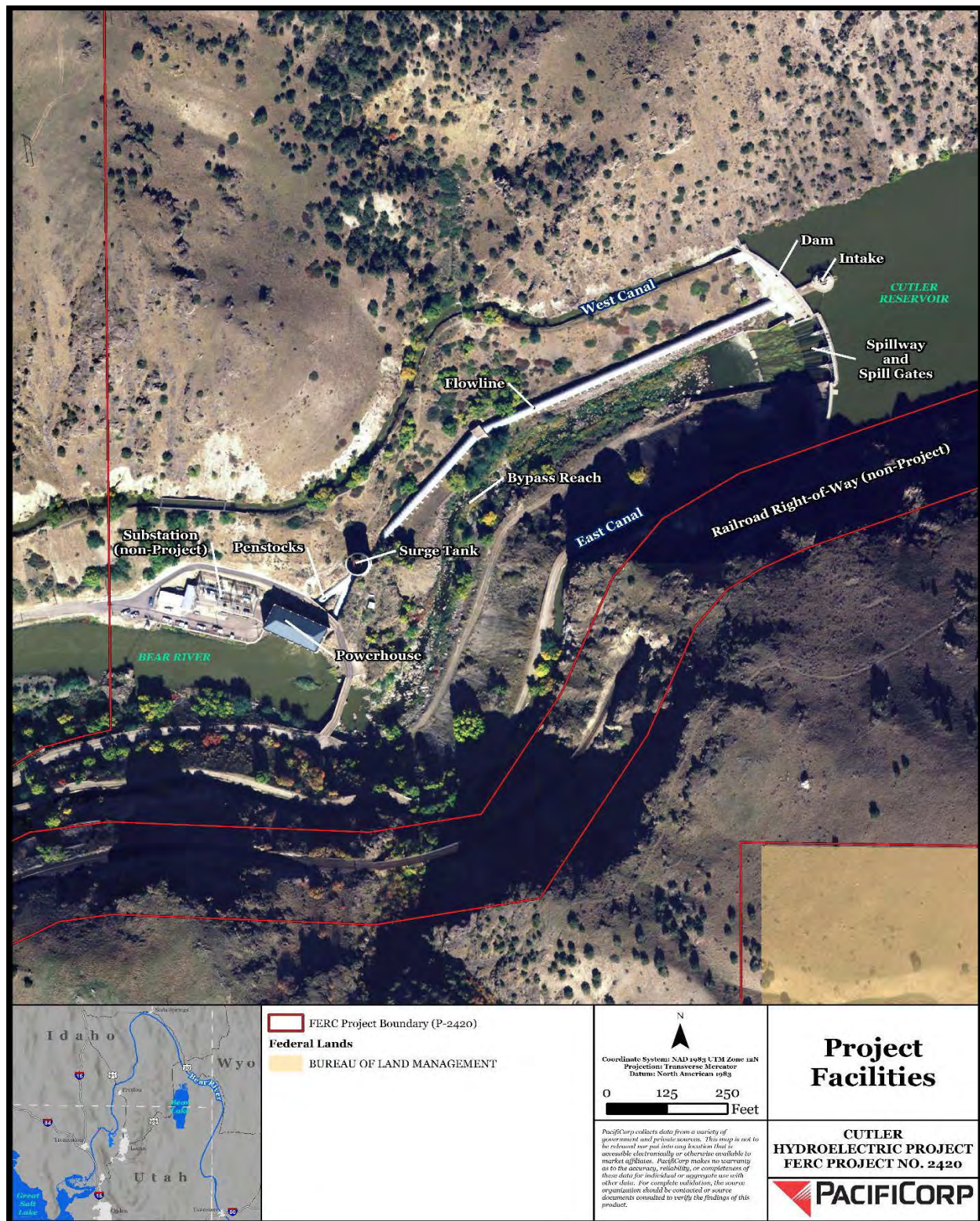
- A reservoir with a surface area of approximately 2,476 acres, with gross and useable storage of approximately 8,563 af at a normal maximum operating elevation of 4,407.5 feet, mean sea level (msl) United States Geological Survey (USGS)^{1,2};
- A concrete gravity arch dam that has an overall length along the centerline of the crest of 465 feet plus an additional 80 feet for canal intake structures near the top of the abutments, for a total of 545 feet in length. It has a hydraulic height of 109 feet high by 7 feet wide at its narrowest location, and a structural height of 126 feet.
- A gated-overflow spillway that contains four 30-foot-wide by 14-foot-high radial (Tainter-type) gates with crest elevation at 4,394.5 feet;
- A 7-foot -diameter low-level opening located near the base of the dam controlled by a slide gate (currently non-operational due to upstream siltation, the gate operators have also been removed);
- 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);
- A 1,157-foot-long by 18-foot-diameter steel flowline;

¹ All elevations in this Final License Application refer to USGS mean sea level datum (National Geodetic Vertical Datum of 1929 or NGVD 29).

² Areas of Cutler Reservoir that do not contribute to the usable storage capacity (e.g., areas of emergent marsh vegetation) have been excluded from the reservoir surface area calculation.

- An 81-foot-high by 45-foot-diameter Johnson Differential surge tank (surge tank comprised of an external shell and internal riser);
- Two 118-foot-long by 14-foot-diameter steel penstocks that bifurcate from the surge tank into the powerhouse;
- A brick 74-foot by 130-foot brick powerhouse;
- Two General Electric 15,000 kilowatt (kW), 6,900-volt (V), 1,570 amperes (amp), 0.8 power factor (PF) generators with a total installed capacity of 30 MW, and appurtenant facilities;
- Two I.P. Morris Vertical Francis turbines:
 - Unit 1 (2008 efficiency upgrade): 15 MW, 23,602 horsepower (hp) (or 17,600 kW), 124-feet of static head, and 150 revolutions per minute (rpm).
 - Unit 2 (2007 efficiency upgrade): 15 MW, 21,180 hp, 124-feet of static 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. 1 138 kilovolt (kV)–46 kV–6.6 kV 50 megavolt ampere (MVA) generator step-up transformer (not part of Project; associated with transmission);
 - No. 2 46 kV–7.2 kV 20 MVA generator step-up transformer (part of Project);
- Two accumulator tanks located in the powerhouse;
- One air compressor located in the powerhouse;
- One bubbler system with compressor located on the wooden bridge deck between the intake and dam;
- A 115-kW emergency generator installed next to the surge tank for backup station power, which also runs to the cylinder gate; and
- A 100-kW back-up power unit for the cylinder gate, installed on the wooden bridge deck between the intake and dam.

PacifiCorp operates the Cutler Project by diverting flows from the Bear River. At present, although the Project is typically operated in a run-of-river mode, some of the 8,563-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 1991 to 2020, the Project produces approximately 75,052 MWh of electric energy annually serving residential and commercial customers. The March 2022 Cutler Final License Application contains details regarding future proposed Project operations that may be utilized in the next license period, once the current license expires in early 2024.



Source: PacifiCorp 2018

FIGURE 2-2 PROJECT FACILITIES

2.2 HISTORIC CONTEXT

In a historical context, the Cutler Project is associated with the themes of hydropower/electricity generation and irrigation agriculture. It is one of five historical hydroelectric developments on the Bear River operated by PacifiCorp; the other four developments are located further north along the river in the state of Idaho.

Known cultural resources within the Project Boundary date from the 1860s to the 1950s. No prehistoric or ethnographic period resources have been identified within the Project Boundary, though it is known from archaeological sites in the broader region that prehistoric peoples actively used the Bear River corridor and surrounding lands for resource gathering and habitation. As a historical resource, the core Project facilities have a period of significance of 1925 to 1927 (i.e., the period of construction) as established in the NRHP listing for the Cutler Hydroelectric Power Plant Historic District (District).

2.2.1 HISTORICAL OVERVIEW OF THE CUTLER PROJECT'S CONSTRUCTION

The construction of the Project actually begins with the construction of the Hammond Canal (also known as the East Canal) and the West Canal to provide irrigation water to the dry bench lands of the east side of Bear River Valley in Box Elder County (Collins and Eskenazi 2020) in the late 1800s, over 20 years before the construction of the Cutler Project. The larger West Canal serves those Box Elder County east-bench lands north of Cutler Canyon, while the Hammond Canal serves the Box Elder County east-bench lands located south of Cutler Canyon. A diversion dam, called Wheelon Dam, was constructed at the Cache Divide, the location in Cutler Canyon just downstream of the point where the Bear River leaves Cache Valley. The Wheelon Dam, which was started in 1889 and completed in 1890, would serve to divert water into the two canals (Collins and Eskenazi 2020). Construction of the canals began the same year as the dam (1889) but they were not completed until 1907. Almost immediately after completion of the canals, controversy erupted over water rights and actual-versus-promised water distributions to farmers whose land was served by the canals (Box Elder News Journal 1915). Such controversy continued for many years.

In 1924, in the wake of having successfully constructed several hydroelectric plants along the Bear River in southern Idaho, the Utah Power & Light Company (UP&L) started planning a new

hydroelectric development on the Bear River to expand the company's power supply and reach additional customers, particularly those on the Wasatch Front. This new development would become the Project. In November 1924, UP&L Company announced they were prepared to begin construction of the Project as soon as the Utah State Engineer granted the permit to use the water from the Bear River (Box Elder News Journal 1924). Among the "selling points" for the Project was that the reservoir created by the new dam could impound flood waters and other excess waters not being put to use at the time (1924). Despite UP&L Company's readiness to commence construction in late-1924, actual construction of the Project did not commence until March 1925, roughly 2 months after UP&L Company received the final certificate of "convenience and necessity" for the Project from the Public Utilities Commission of Utah (Box Elder News Journal 1925a). Construction was well underway by early-April 1925 with most of the work in the first six months focused on preparatory efforts of establishing the construction camp, and the compressed air and hydraulic pump stations necessary to run the excavation equipment, and access roads to work sites (Box Elder News Journal 1925b). Construction continued through 1926 with more than 600 workers employed in the effort at various times.

The Project was completed in 1927, and the original Wheelon Dam was submerged under the new reservoir (NPS 1989). Cutler Dam originally consisted of a concrete gravity arch dam founded on bedrock, a power intake structure, a flowline, a surge tank, two penstocks, and a powerhouse. Original construction of the concrete gravity arch dam included two non-overflow sections located on the right and left sides of the dam, a centrally located spillway section, and irrigation canal intake structures on the north-river right (West) and south-river left (Hammond/East) abutments of the dam.

Historical records indicate the Project operated without major new construction or notable public controversy throughout the remainder of the historic period. Little is stated about the Project in newspapers of the period save for a few articles written between 1941 and 1945, when a study was undertaken to potentially raise the height of the dam by 10 feet as part of a government-backed post-war "stimulus" project to employ returning soldiers and increase the agricultural water storage capacity of Cutler Reservoir. The proposed increase in the dam's height was never undertaken. Another series of articles in 1942 noted an emergency repair effort was underway when "three 130,000-volt electric transmission lines" associated with the

Project snapped due to freezing fog during a late-December cold snap (Salt Lake Telegram 1942).

2.2.2 HISTORICAL OVERVIEW OF THE GENERAL PROJECT AREA

A historical chronology of the Project and the surrounding area was developed as part of a cultural resources assessment carried out in advance of preparing this HPMP. That chronology, which was prepared by SWCA Environmental Consultants (Collins and Eskenazi 2020), addressed both the prehistoric and historic periods of the area and focused on understanding the area's cultural past through a variety of time-associated themes that sometimes overlap in their specific dates. As only historic period resources are known to be present in the Project APE following field surveys, only those temporal and thematic periods associated with that time frame are included in this HPMP as a means of placing the known historic properties in the proper context. Should prehistoric or ethnographic period resources be discovered over the course of Project operations, the aforementioned SWCA report should be consulted for a detailed prehistoric chronology.

The overview below is not intended to be an exhaustive history of the Cutler Project or the region in which it is located. Rather, it is meant to provide a general framework for understanding the Project's role in history and relative importance, or lack thereof, of identified cultural resources both associated with the Project and unassociated with the Project but located within the APE. Several excellent histories of the Cache County and Box Elder County areas are available to the reader seeking more comprehensive information, including those written by Ricks (1956) and Peterson (1997).

2.2.3 EARLY EURO-AMERICAN EXPLORATION PERIOD (1800–1845)

Fur trappers and federal agents traveling through the Intermountain West were among the first Euro-Americans to explore the northern Utah region and only lightly occupied the area that is the Wasatch Front. As early as 1800, various American and British mountain men began entering the area to capitalize on unexploited beaver populations that would earn their companies' dominance in the lucrative beaver pelt trade. For the next two decades, fur trappers played key roles in exploring and mapping the region. The men of the American- and British-sponsored fur

companies created maps and defined territories, which later lead to more formal investigation of the region. The fur trade continued into the next phase of exploration, but the exploratory fervor of the fur industry began to slow by mid-century. Trapping become increasingly monopolized and less lucrative as demand in the fur market waned.

The California Territory, having already been established by the Spanish, began to attract settlers looking for new opportunities for their families. During the early 1840s, settlers often used routes that passed through northern Utah. In 1841, an emigrant party led by John Bidwell and John Bartleson traveled along the northern boundary of the Great Salt Lake while searching for an alternate route to California. The establishment of this route to California through the Great Basin increased the number of travelers moving through northern Utah.

Also in the early 1840s, the U.S. government demonstrated a concerted interest in documenting the resources of the region. Several surveyors were tasked to develop more accurate and comprehensive maps of the western territories than had previously been drafted. Among these surveyors was noted explorer, soldier, and politician John C. Frémont, who in 1843 and 1845, issued reports on the Salt Lake Valley and Wasatch Range. Part of Frémont's responsibility was to identify potential emigrant routes through the region. When his initial attempt to establish an emigrant route across northern Colorado was unsuccessful, Frémont continued on the Oregon Trail and eventually traveled down the Bear River to the Great Salt Lake. While camped on the Great Salt Lake for almost a full week, Frémont's party conducted a reconnaissance of Frémont Island and what is now western Weber County. The published accounts of this exploration included the first accurate maps of the region. These documents informed the westward migration of members of the Church of Jesus Christ of Latter-Day Saints (Latter-day Saints or Mormons), and also provided information to Lansford Hastings, who established the infamous Hastings Cutoff, of Donner Party fame, along the northern Wasatch Front (Leonard 1999; Roberts and Sadler 1997).

2.2.4 EURO-AMERICAN SETTLEMENT PERIOD (1846–1889)

Shortly after the 1847 arrival of Latter-day Saint settlers in the Salt Lake Valley, their leader, Brigham Young, dispatched Church members to various locations throughout the territory to establish settlements. In 1853, Lorenzo Snow, along with 50 families, was called by Young to

settle in a community to the north, which eventually became known as Brigham City. The transition from loosely incorporated settlements toward a system of organized counties in the Utah Territory was largely motivated by the Compromise of 1850. This act granted territorial status to the recently established communities. This new status was welcomed by many, who considered it a step toward statehood. However, the new territorial government experienced difficulties and obstacles to statehood (achieved in 1896) from the beginning.

Cache Valley was first permanently occupied by Euro-Americans between 1856 and 1859, when Peter Maughan and a small group of settlers from the Salt Lake Valley moved into the area of what is now Wellsville, Utah (Ricks 1956; Thatcher 1994). Mormon pioneers established valley communities in Box Elder and Cache Counties, including the city of Logan in 1859, by constructing small forts composed of numerous cabins surrounded by high walls. The forts generally protected the settlers from attacks by local Shoshone Indians. Confrontations were numerous and substantial numbers of livestock, which were grazed and herded in fields outside the forts, were stolen in raids. Euro-American emigrants following the Oregon and California trails were also putting pressure on local Shoshone and Bannock groups, as they regularly shot and killed Indians they encountered. A series of attacks by Shoshone warriors on Oregon-bound wagon trains in 1862, followed by increased travel on the Montana Trail, ratcheted up tensions between the two groups. The Shoshones were eventually forced out of the valley by the rapid influx of settlers, most of whom were armed with weapons superior to those owned by the native peoples, as demonstrated in the 1863 conflict between the U.S. Army and local Shoshone groups that is known as the Bear River Massacre, one of the largest massacres of Native Americans by the U.S. Army (Huchel 1999:78–80).

Once the threat of attacks by the Shoshones was diminished and settlers could move out of the fort in Logan, the pattern of the modern-day Logan City landscape began to be established. The grid system of roadway configuration typical of Latter-day Saint settlements was established in Logan. However, rather than the streets all having northing, easting, southing, and westing coordinate numbers (e.g., 100 North or 200 East) many of the streets, particularly the north–south streets, were assigned names. The exception to this rule was the town of Corinne (north of Brigham City, UT), which was intentionally established without the leadership of the Latter-day Saints on the Bear River near the Montana wagon road when the Union Pacific Railroad (UPRR)

came in 1869. The streets were platted running parallel to the railroad tracks rather than on the typical Latter-day Saint grid, and it attracted the vices that were prohibited in Latter-day Saint settlements, as well as bankers, regional trade, and industry (Huchel 1999:126–130).

As populations within arid Cache and Box Elder Counties continued to increase at a fast pace, lands available for settlement became farther removed from the rivers and streams that provided the water necessary for the agricultural activities that sustained both individual families and entire communities. To accommodate those families and farmers that did not have ready access to water on their lands, irrigation canals and ditches were constructed off of local streams and rivers. Small undertakings at first, these irrigation ditches and canals eventually wound their way over vast distances and throughout area communities, joining together to form an elaborate network of large and small waterways.

2.2.5 CANAL CONSTRUCTION AND HYDROELECTRIC DEVELOPMENT (1864–1920)

The first period of canal construction, which lasted until about 1880, was characterized by small canals built off the tributaries of the Bear River that were cooperatively developed and managed by members of Latter-day Saint settlements as they were being established within Cache Valley (Wrenn 1973:2). By the 1870s, an extensive network of canals designed to control the flow and amount of water extended throughout the Cache and Bear River valleys. Farmers received water rights by digging sections of canals on their lands, rather than by purchasing them. The canal system was geographically widespread and stretched across many pioneer communities; it was managed by local irrigation districts that were largely independent of one another (Sillitoe 1996:85; Wrenn 1973:23). The first canals were rudimentary at best and required constant maintenance. The West Benson Canal, for example, was surveyed in the 1880s by Bishop Alma Harris with only a spirit level (e.g., a bubble level or similar liquid-based leveling device) (Smith 2020). Canals were constructed from basic materials such as rock, straw, logs, and dirt. Horses and oxen pulling wooden frames and slip scrapers would start the excavation, and men following with picks and shovels would complete the task. Another example of a canal from the first period is the Logan-Benson Canal. The community of Benson first dug a ditch that brought irrigation water from Hyde Park, but the area it traveled

through was marshy and the water flow was unreliable. In 1880, Benson farmers made an agreement with the Logan Canal Company. That company had built the Logan Canal in 1864 that diverted water from the Logan River. In 1880, Benson farmers agreed to widen the canal by 2 feet (0.61 m) and extended a line into southern Benson; this extension was known as the Lower Benson Canal. In 1887 the original canal was widened another 2 feet (0.61 m) and a third segment, known as the Upper Benson Ditch, extended irrigation water to northern Benson. The three sections were administered together by the Logan Irrigation District, and farmers all paid for irrigation company stock but were not guaranteed a certain amount of water. In 1898, 30 farmers sued to have the canal company administer the land as a water district. They lost in district court but won in the Utah Supreme Court, setting the precedent for Utah water law (Smith 2020). Parts, if not all, of the irrigation system are still in use today and appear on the 1986 provisional edition of the Logan, Utah, USGS 7.5-minute quadrangle as the Benson Canal and the Logan Northwest Field Canal. Canals such as the Logan and Benson Canals were key to the survival and expansion of Cache Valley communities.

The second period of Cache Valley irrigation, from around 1880 through 1920, is characterized by technological advancements, the use of the main flow of the Bear River, and an emphasis on water storage, as well as more capital investment, the introduction of large corporations, and the development of a legal framework for irrigation regulation (Wrenn 1973:3). By the end of the nineteenth century, with new building materials that were available (e.g., concrete), canal construction and maintenance became commercialized and regulated. Two examples of canal systems built during this period are the Hammond and West Canals that extend from the Cutler Dam and the West Cache Canal.

As noted above, the Hammond Canal and the West Canal were constructed between 1889 and 1907 to provide irrigation water to the dry bench lands of the east side of the Bear River valley in Box Elder County (Ellis 2018; Wrenn 1973:40). The associated diversion dam, called Wheelon Dam, was constructed at the Cache Divide, at a location approximately a mile upstream of where the Bear River leaves the Cache Valley. Wheelon Dam was built between 1889 and 1890, and it measured 17 feet high, 38 feet wide, and 375 feet long (Huchel 1999:219). Diversions were made into two canals, the West on the north side of the Bear River and the Hammond/East on the

south side, each having a 1,000 cubic feet per second (cfs) capacity (Ellis 2018). First water was diverted into the canals in 1892, prior to the completion of the full system in 1907 (Hooton 2000). The purpose of the Hammond Canal was to provide irrigation water to the eastern bench lands of the Bear River valley in Box Elder County, Utah, where a lack of local water sources meant the lands had to be dry farmed (Ellis 2014). The Utah-Idaho Sugar Company bought the West Canal in 1902 and used it to irrigate primarily sugar beet and alfalfa fields (Hooton 2000). A few years after Wheelon Dam was in place, farmers upstream near Cache Junction began to complain that their lands were being inundated by waters in the forebay of the dam. To solve this problem, the original top of the dam was cut off so a “system of flash boards” could be put into place that would allow the dam to be lowered during flood season to keep the maximum water level upstream consistent year-round (Huchel 1999:219).

The Utah-Idaho Sugar Company built the Wheelon power plant in 1903 (downstream of the current Cutler powerhouse) to produce electricity with the excess flow from Wheelon Dam to power its Garland sugar factory—the first attempt to produce hydroelectric power along the Bear River. Utah Power and Light (UP&L) Company bought the power plant in 1912 as the first of several plants along the Bear River in Utah and Idaho, creating a system of interconnected power generating facilities. The subsequent Cutler Dam and associated power plant were built between 1925 and 1927 to replace Wheelon Dam and was the final UP&L Company plant to be constructed. Cutler Reservoir inundated Wheelon Dam behind Cutler Dam, and the Wheelon Hydroelectric Plant was demolished in 1927, once the Cutler power plant was complete (Fiege and Ore 1989:8.2–8.3).

The West Cache Canal is a historic irrigation canal that was constructed between River Dale, Idaho, and the northern portion of Cache Valley (Jordan 2019). The West Cache Irrigation Co. was incorporated in 1898, and construction of the main canal segments associated with the West Cache Canal system began a year later (Peterson 1997:171; Wrenn 1973:57–58). The canal first held water as far as Battle Creek in 1902, and the main canal was completed by 1905 (Wrenn 1973:57–58). The canal system was the largest system built entirely by individuals and the second-largest system of its kind in Utah after its completion; collectively, it brought over 17,000 acres of land under irrigated cultivation—roughly one-fifth of the irrigated lands in Cache Valley

at the time (Peterson 1997:171; Wrenn 1973:57–58). The presence of this canal system opened up the northwestern part of the valley to settlement (Peterson 1997:171).

The third period of irrigation development in Cache Valley, which began around 1920 and continued through the twentieth century, is characterized by increased technological sophistication to allocate water resources over more acreage, the entrenchment of established irrigation systems, control over those systems by corporate entities, and little new construction (Wrenn 1973:4). However, one new canal system associated with the Hyrum Dam was built in the southern portion of Cache Valley with federal funding during the Great Depression.

2.2.6 RAILROADING (1869–1889)

Following the passage of the Pacific Railway Act of 1862, the UPRR was organized on October 29, 1863. While the UPRR line was being constructed in a westward direction, the Central Pacific Railroad (CPRR), originating in Sacramento, California was moving eastward and making considerable progress. Both railroad companies were operating with grants under the Pacific Railway Act, and right-of-way was being granted according to how much construction was completed. CPRR had design plans for track extending into Weber Canyon, as did UPRR. It came to the attention of Congress that both railroad designs were parallel and were very close to overlapping in many places. The government quickly mandated that a meeting point would have to be established by the two companies or else it would be decided for them. Thus, the meeting point at Promontory Summit, in Utah Territory, was fixed. At that time, it was established that a permanent junction between the two lines would be “within eight miles of Ogden” (Strack 1997). This junction eventually came to be known as Hot Springs, but as a result of the public’s mediocre response to purchasing lots there, a new location was chosen in present-day Ogden, which soon earned the nickname of “Junction City” (Roberts and Sadler 1997; Strack 1997). On May 10, 1869, the final spike joining the CPRR and UPRR transcontinental line, celebrated as the “Golden Spike Ceremony,” was hammered into place at Promontory Summit. The first locally generated freight shipped on this line was mining ore from operations in the Wasatch and the Oquirrh Mountains (Strack 1997).

Also important to the growth of Cache Valley, and the community of Logan, was the expansion of the transcontinental railroad. Railroad spurs were quickly built to reach into many parts of

Utah, and Cache Valley farmers wanted a way to get more of their products to market. Construction of the Cache Valley segment of the Utah Northern Railroad (UNRR) began in 1871, reached Mendon in 1872, and finally reached Logan in January of 1873. Construction of the UNRR was completed entirely by Mormon farmers under the supervision of local church leaders who feared interference in their affairs by "eastern capitalists." The farmers donated their time, in response to a calling by Brigham Young, and received railroad vouchers in return. After the UNRR was bought by Jay Gould in 1877, workers were paid in cash (Peterson 1997:72–74). The railroad was eventually completed and ran between Ogden, Utah, and Montana via Collinston, Wellsville, and Logan, Utah. In 1878, it was reorganized as the Utah and Northern Railway, and then in 1889, it was reorganized again into the Oregon Short Line & Utah Northern Railroad (OSL&UNR), which was created when the UPRR merged eight different railroad companies. The UNRR line from Ogden, Utah, through Logan to Pocatello, Idaho, had been originally built as a narrow-gauge line but was converted to standard gauge by the OSL&UNR in 1890 (Strack 2019a). At the same time the line into Logan was being converted, approximately 50 miles of new standard-gauge rail was completed between Deweyville, Utah, and Oxford, Idaho, following the Bear River Gorge (Strack 2016). The OSL&UNR was reorganized into the Oregon Short Line Railroad in 1897 and fully merged with the UPRR in 1987 (Strack 2019b).

Although the settlers of Cache Valley had misgivings about the railroad in its early years, they benefited tremendously from the goods and services it transported. The railroad also stands as a key example of the fortitude of the Cache Valley settlers to develop the infrastructure needed to sustain and grow their communities and to maintain control of that infrastructure in the face of external economic pressures. The UPRR later bought the UNRR, which continues to operate today.

The impact of the railroads in Utah was deep and far-reaching. The railroads connected northern Utah to the rest of the nation and provided access to new and distant markets for both the sale and purchase of goods. They provided a means by which the mineral resources of the state could be more easily transported between the mines, the smelters, and the consumers. Perhaps most significantly, the railroads reduced the physical and ideological isolation of Utah residents and exposed them to the trends, beliefs, styles, and popular culture of the nation at large. Additionally, the railroads made cross-country travel and relocation much more attractive and

economical. As a result of this cost efficiency and subsequent burgeoning commercial and industrial opportunities throughout northern Utah, thousands of non-Latter Day Saint emigrants made their way to the communities in Cache Valley and the Bear River Valley in Box Elder County, attenuating the homogenous religious nature of Utah settlements and creating somewhat more secular and multi-ethnic communities (Peterson 1997:72).

2.2.7 INDUSTRY AND GROWTH PERIOD (1890–1929)

Agriculture in the region became more intensive and crop-specialized during the late nineteenth and early twentieth centuries. Private enterprise eventually became more common than ecclesiastically led projects. Land use intensified as arable and irrigable land could no longer expand, and railroads opened markets for those products, bringing capital to the region. In 1896, Utah became the forty-fifth state admitted into the United States. By the beginning of the twentieth century, agriculture was flourishing in the new state. Dairying, row crops, including sugar beets, orchards, and sheep and wool became primary focuses of agriculture in the region (Peterson 1997:159).

The establishment of the Agricultural College of Utah in 1888 (which would become Utah State University [USU], located in Logan) led to experimental research and the dissemination of improved agricultural methods throughout the region, particularly dry farming techniques. The formation of the Cache National Forest (originally called the Logan Forest Reserve) in 1905 resulted in limits on grazing, which decreased sheep populations by two-thirds over the next decade (Peterson 1997:167–168).

Cache County also saw a short-term mining boom during the 1890s for silver, lead, and copper. Three mining districts were recognized: Paradise, Hyrum, and Richmond. The most productive mine was La Plata in the southeastern corner of the county, but it was played out by the turn of the century. Other prominent mines include the Amazon and Cache Mammoth in Logan Canyon and the Blue Bell in the Paradise District. However, the mining boom in the area was short-lived, and by 1920, most mines had been abandoned (Peterson 1997:183–185).

World War I—specifically, the period between 1914 and 1919—brought considerable change to all of Utah, including Cache Valley. The material requirements of the war effort meant that

demand for resources increased. This stimulated the county's economy, which in turn benefited the farming and ranching industries. In particular, as a result of the growing need for wool and meat for the war effort, ranchers were encouraged by the federal government to borrow money in order to expand stock production (Oliver et al. 2017:37–38; Willison n.d. [1940]:64). But the sudden drop in demand when the war ended in 1918 caused overextended Utah farms to suffer (Seegmiller 1998).

2.2.8 GREAT DEPRESSION PERIOD (1929–1940)

When the stock market crashed in 1929, little seemed to change for Utah residents at first, but by the early 1930s, the effects of the nationwide economic collapse were being felt. Commercial crop prices plummeted and the demand for mineral resources ceased. At the same time, Utah experienced a severe and lengthy drought that devastated local farmers. Unemployed agricultural workers could not find jobs in Utah's urban centers and demand for the area's produce slipped. People defaulted on their loans, banks closed, and taxes were not paid. Utah residents slipped into economic despair.

As Cache and Box Elder Counties' economies were agriculturally based, families were not as hard hit as in urban areas. Even so, the Red Cross distributed wheat to people in need to feed both their families and their cattle, and both local and federal governments sought to provide relief. The county and the U.S. Forest Service established a community timber camp, employing over 100 men who were paid in finished boards that could be sold or put to personal use (Petersen 1997:284). Yet it was not until the New Deal funding for federal relief programs became available in the late 1930s that the state saw any economic turnaround. Three Civilian Conservation Corps camps were established in the Cache National Forest, and both residents and outsiders found jobs building camps, trails, and roads; planting trees; and installing flood control measures. The Federal Emergency Relief Administration also funded construction projects at USU, employing local workers. In the summers, the National Youth Administration hired students as well. The federal Works Progress Administration program paired with the Utah Works Progress Administration and funded a number of projects, including municipal culinary water systems, a countywide mosquito abatement program, and a fish hatchery near Logan (Petersen 1997:286–287).

Hyrum Dam, which created Hyrum Reservoir, and three canals were also built as part of a federal New Deal program known as the National Industrial Recovery Act, which was run through the United States Reclamation Service (later the Bureau of Reclamation). One of the three canals, the Wellsville-Mendon Lower Canal (originally called the Hyrum-Mendon Canal), runs through a small portion of the APE. It was constructed between 1934 and 1936 as part of a larger set of irrigation canal systems designed to provide water from the Hyrum Reservoir to about 6,800 acres of agricultural lands in southern Cache Valley (Williamson 2012).

2.2.9 WORLD WAR II PERIOD (1940–1945)

In Utah, similar to many places, World War II drove the recovery from the Great Depression. Demand grew for mineral exports, leading to the expansion of mining and the creation of jobs in the mines. All the young men America was sending to fight in the war required food and clothing, which caused the price of crops, beef, and wool to increase and helped the agricultural, cattle, and sheep ranching markets recover. However, in Cache County, alfalfa, corn, and grains replaced labor-intensive row crops, as the available workforce shrank (Petersen 1997:293). USU lost students to the war effort, but its Reserve Officer Training Corps programs for army, navy, air corps, and marine detachments were very active on campus (Petersen 1997:294–295). A small number of Italian and German prisoners of war were even confined on and near the campus and used as supervised farm workers (Petersen 1997:296). At the end of the war, Utah prepared for the inevitable economic shift caused by the cessation of hostilities and the return of soldiers.

2.2.10 POSTWAR PERIOD (1945–PRESENT)

World War II led to high demands for agricultural products and mineral exports from Utah, which dropped as soon as the war effort was over. But after the war, several new military installations including Hill Field, the Ogden Arsenal, and Dugway Proving Grounds bolstered the state economy. While agriculture remained important in Cache County, the number of farms and farmworkers decreased significantly during this period, while the average farm size increased dramatically. The cost of increased mechanization caused many small farmers to sell their acreage to more successful neighbors (Petersen 1997:302–303). However, dairying and ranching maintained their importance in the local economy. And from the 1960s through the

1990s, a number of high-technology businesses were established in and around Logan, often as spin-offs of research programs that began at USU (Petersen 1997:3 2–313).

2.3 PREVIOUS AND FUTURE CULTURAL RESOURCES INVENTORIES

Several efforts to identify and evaluate cultural resources within the APE (i.e., the FERC Project Boundary) have been carried out prior to the preparation of this HPMP. Utah Division of State History records indicate that these efforts began as early as 1977. Some have focused on the Project facilities themselves, and others were focused on investigating features, such as roads, bridges, and canals that are not specifically part of the Project's facilities but are located wholly or partially within the Project Boundary. The most recent and comprehensive of these efforts was carried out by SWCA Environmental Consultants (SWCA) in 2019 and 2020 (Collins and Eskenazi 2020) as part of the FERC relicensing application for the Project and in preparation for the development of this HPMP.

The studies conducted by SWCA included both archaeological and historic architectural inventories. Given the extremely large size of the APE and the generally limited areas within the APE where effects from Project operations and maintenance are likely to occur, the field inventories conducted did not encompass all lands within the APE. Rather, they focused on those portions of the APE where direct effects on historic properties from proposed Project operations, proposed capital improvements, or other Project-related activity may be anticipated. The studies included both intensive-level and reconnaissance-level field studies. Intensive-level studies are generally considered sufficiently comprehensive to identify the vast majority, if not all, surface-located historic properties that could be affected by an undertaking; fully buried or submerged cultural resources are typically not detected through these measures. As a matter of local professional practice, intensive-level surveys are considered to have a “shelf-life” of no more than 10 years, and new surveys would be required after that 10-year period. Specific factors related to such things as newly acquired information about past uses of an area or changes in survey standards may prompt the need for new surveys to be completed less than 10 years after a prior survey. Reconnaissance-level surveys, particularly those for archaeological resources, are typically used to identify larger scale and “obvious” cultural resources in a given area. Such surveys may not identify all surface-located cultural resources that are present and are most vulnerable to missing archaeological sites consisting solely of artifact scatters (as opposed to

sites containing above-ground structures). The sufficiency of such surveys for assessing Project effects on historic properties in compliance with 36 CFR 800 depends on the nature of the undertaking from which the potential effects would derive, and it is important to understand that in certain circumstances, additional survey at an intensive-level may be needed prior to making a finding of effect in areas previously subject only to reconnaissance-level inspections.

The study areas defined for the 2019 and 2020 field surveys by SWCA and the manner in which those areas were inventoried are listed in Table 2-1.

TABLE 2-1 STUDY AREAS FOR 2019-2020 CULTURAL RESOURCE INVENTORIES

PROJECT COMPONENT	STUDY AREA	STUDY TYPE
Project operations (fluctuating reservoir levels)	Shoreline and riverbanks within the zone of water level fluctuation	Archaeological: Intensive-level survey during the fall 2019 drawdown of portions of the reservoir shoreline and riverbanks within the zone of water level fluctuation in the Project Boundary.
	Wheelon Dam site	Historic architectural: intensive-level documentation and evaluation of dam during fall 2019 drawdown
Capital improvements	Cutler Hydroelectric Power Plant Historic District	Historic architectural: Amendment to National Register Registration Form
Recreational use: Concentrated use areas	Marinas, boat launches, and hiking trails listed in Cutler Hydroelectric Project PAD	Archaeological: Intensive-level survey of these plus a 100-foot buffer, or a 100-foot-wide corridor for trails
Recreational use: Boating	Shoreline in North Boater Zone A ¹ and Bear River Boater Zone C ²	Covered by the intensive-level archaeological shoreline survey described above
Irrigation	Known irrigation pumps/canal intakes and undocumented segments of known canals within the Project Boundary	Archaeological: Intensive-level survey of these plus a 100-foot buffer, or a 100-foot-wide corridor for canals
Agricultural leasing	Agricultural lease areas	Archaeological and historic architectural: Reconnaissance-level survey

¹ The area north of the Benson Railroad Trail/Fishing Bridge and west of the confluence with the Bear River.

² The Bear River area, east of the confluence with Cutler Reservoir (including the “horseshoe area”).

Under the terms of this HPMP, any portion of the APE that has not been surveyed for cultural resources to date would be subject to future efforts to identify historic properties. These additional identification efforts, including determinations of the area(s) to be inspected and the methods of the inspection, would occur at such time(s) as PacifiCorp proposes specific undertakings that have the potential to impact historic properties should they be located in those areas.

As part of the relicensing process, both FERC and PacifiCorp consulted with federally recognized Native American Tribes with patrimonial claims to the lands encompassing the Project. No lands or facilities owned by the Tribes are located within the Project Boundary. This consultation effort included the Northwestern Band of Shoshone Nation, the Shoshone-Bannock Tribes, the Ute Indian Tribe, the Skull Valley Band of Goshute, the Navajo Nation, the Paiute Indian Tribe of Utah, the San Juan Southern Paiute Tribe, and the White Mesa Band of the Ute Mountain Ute. The Tribes were invited to identify any cultural resources of concern to them that could be affected by ongoing Project operations and maintenance. No Tribe has identified any such resources as of the date this HPMP was prepared; however, PacifiCorp has issued a standing invitation to the Tribes to provide such information in the future should they identify resources of cultural concern.

2.4 KNOWN HISTORIC PROPERTIES

A total of 12 historic properties have been identified to date within the APE for the Cutler Project. As a reminder, “historic properties” are those resources that have been determined eligible for listing on the NRHP or are already listed on NRHP. Numerous other cultural resources have been identified and documented within the APE, but these resources were determined ineligible for the NRHP. Therefore, they do not qualify as historic properties subject to this HPMP. Additionally, one historic property—a ca. 1930 agricultural outbuilding—was documented during architectural resource surveys conducted by SWCA for the relicensing effort but later was determined to be located outside the Project boundary. As such, this resource is excluded from the HPMP.

All of the known historic properties in the APE date to the historic period. No prehistoric historic properties had been identified at the time this HPMP was prepared. The known historic

properties include hydroelectric facilities associated with the Project and with its predecessor, the Wheelon Hydroelectric Complex, as well as irrigation canals, roads, a railroad, and an agricultural outbuilding (Table 2-2). Three of the historic properties—42CA225 (Wheelon Dam), 42CA228 (Wheelon hydroelectric facilities), and 42CA227 (Wheelon power poles)—qualify as both individual/stand-alone historic properties and as contributing resources within the larger, collectively eligible Wheelon Hydroelectric Complex. Detailed site forms for each of the historic properties, as well as those resources not qualifying as historic properties but present in the APE, are available through the HPMP Coordinator (see Section 5.1, below). Summary information about the Wheelon Hydroelectric Complex and the District is provided after Table 2-2.

TABLE 2-2 HISTORIC PROPERTIES IN THE CUTLER PROJECT APE

RESOURCE ID	RESOURCE DESCRIPTION	ELIGIBILITY EVALUATION, CRITERION/A	RELEVANT APE COMPONENT[†]
42BO1182	West Canal	Eligible, A and C	Irrigation
42BO1507	Hammond East Branch Canal	Eligible, A and C	Irrigation
42CA143	Benson Canal	Eligible, A and C; non-contributing element	Irrigation
42CA174	Wellsville-Mendon Lower Canal	Eligible, A	Irrigation and Agricultural Lease Areas
42CA225	Wheelon Dam	Eligible, A and C	Project Operations
42CA227	Wheelon Power Poles	Eligible, A	Capital Improvements
42CA228	Wheelon hydroelectric facilities/Wheelon Hydroelectric Complex	Eligible, A and C	Capital Improvements
42CA229	Mendon Road	Eligible, A	Recreation: Concentrated Use
42CA230	SR 30/SR 69	Eligible, A	Recreation: Concentrated Use
42CA235	Pocatello Mainline, Oregon Short Line Railroad	Eligible, A	N/A
11-005-009	Circa 1930 agricultural building at 4301 West 600 Street, Young Ward, Utah	Eligible, A	Agricultural Lease Areas
NRIS #89000280	Cutler Hydroelectric Power Plant Historic District	Listed on the National Register	Capital Improvements

[†] See Table 2-1, for a description of the APE Components Wheelon Hydroelectric Complex

The Wheelon Hydroelectric Complex encompasses a significant area around what is now the Cutler Hydroelectric Power Plant Historic District (the District). It includes Wheelon Dam, the original segments of the West and Hammond Canals that are typically submerged and whose headworks are located approximately 1 mile east of the Cutler Dam, the historic Wheelon substation, a bridge over the Bear River, and the remains of the Wheelon generating plant,

including storage buildings, housing, remains of a historical transmission line, and livestock shelters located on the south side of the Bear River. Wheelon Dam and the historical, and now abandoned, portions of the West and Hammond Canals are typically submerged beneath Cutler Reservoir. The Wheelon Hydroelectric Complex is considered significant at the state level under Criteria A and C of the NRHP.

The Wheelon Hydroelectric Complex includes 12 contributing resources and 2 non-contributing (NC) resources (Table 2-3). Understanding which resources contribute to the district and which do not is important to appropriately managing this historic property. Impacts to contributing resources often, though not always, result in adverse effects to historic districts, while impacts to NC resources generally, though not always, do not.

TABLE 2-3 CONTRIBUTING STATUS OF RESOURCES IN THE WHEELON HYDROELECTRIC COMPLEX

RESOURCE NAME	CONTRIBUTING STATUS
West Canal	Contributing
Hammond East Branch Canal	Contributing
Wheelon Dam	Contributing
Wheelon Substation Structure	Contributing
Wheelon Substation Building 1	Contributing
Wheelon Substation Building 2	Contributing
Wheelon Power Poles (42CA227)	Contributing
Outbuilding 1	Contributing
Outbuilding 2	Contributing
Outbuilding 3	Contributing
Outbuilding 4	Contributing
Outbuilding 5	Contributing
Bridge	Contributing
Powerhouse Foundation	Non-contributing
Storage Building	Non-contributing

2.4.1 CUTLER HYDROELECTRIC POWER PLANT HISTORIC DISTRICT

The historic resources of the Cutler Hydroelectric Power Plant Historic District (as amended during the FERC relicensing process) represent an intact hydroelectric station dating to 1927. The district was originally listed on the NRHP in 1989, and the nomination form was updated by SWCA in 2020 as part of the Project relicensing studies. The 2020 amended District includes 17 contributing resources and five NC resources (Table 2-4). Four resources that were listed as contributing components of the district in the 1988 listing were subsequently demolished and are no longer present within the district. These resources are also shown in Table 2-4 for tracking purposes.

The District (as amended) is significant at the state level under Criterion A for its association with events that have made a significant contribution to the broad patterns of Utah's history in relation to the contexts of Industry and Engineering and under Criterion C in relation to the context of Architecture for the way in which 1) it embodies the distinctive characteristics of a hydroelectric facility established by UP&L Company, a predecessor company to PacifiCorp, during the early twentieth century, and 2) as a significant and distinguishable entity whose components may lack individual distinction—namely, a historic district. Its period of significance is 1925 to 1927.

TABLE 2-4 CONTRIBUTING STATUS OF RESOURCES IN THE CUTLER HYDROELECTRIC POWER PLANT HISTORIC DISTRICT

RESOURCE NAME	CONTRIBUTING STATUS
Cutler Powerhouse	Contributing
Switchyard	Contributing
Dam	Contributing
Conduit	Contributing
Surge Tank	Contributing
Penstock	Contributing
Operator's House 7	Contributing
Operator's Carport 7a	Contributing
Operator's House 8	Contributing

RESOURCE NAME	CONTRIBUTING STATUS
Operator's Carport 8a	Contributing
Operator's House 9	Contributing
Operator's Carport 9a	Non-contributing
Operator's House 10	Demolished
Operator's Carport 10a	Non-contributing
Operator's House 11	Demolished
Operator's Carport 11a	Non-contributing
Operator's House 12	Demolished
Operator's Carport 12a	Non-contributing
Operator's House 13	Demolished
Operator's Carport 13a	Non-contributing
Shop	Contributing
Vehicular Bridge 15	Contributing
Vehicular Bridge 16	Contributing
Steel Tower 17	Contributing
Steel Tower 18	Contributing
Steel Tower 19	Contributing

3.0 MANAGEMENT AND PRESERVATION GOALS AND PRIORITIES

As a company, PacifiCorp recognizes its responsibilities to the public for the provision of reliable and low-cost power within a context of sensitivity to the cultural and natural environment. PacifiCorp is committed to exercising good resource stewardship over historic properties that could be impacted by its operations by following all applicable Federal, State, and local laws, and through cooperative management efforts with resource agencies, Tribes, and other interested parties. The company will manage historic properties within the Cutler Project APE under a philosophy of: 1) preservation and avoidance of impacts when feasible and not otherwise contrary to employee safety or the efficient generation of power; 2) active seeking of ways to minimize impacts when avoidance of impacts is not possible; 3) appropriate mitigation of impacts when avoidance or minimization of impacts is not possible; and 4) cooperation with agencies, Tribes, and other interested parties to identify resources of importance and appropriate ways to manage those resources. The measures outlined in this HPMP are designed to aid PacifiCorp in integrating this philosophy into the company's project planning and budgeting decisions and its day-to-day operations, as well as instilling it in its employees.

4.0 PROJECT EFFECTS AND MITIGATION/MANAGEMENT MEASURES

PacifiCorp's proposed operations in the new license would mimic the existing operational range from elevation 4407.5 to 4406.5 feet at least 85 percent of the time ('normal' operations, occurring a minimum of 310 days per year, including the irrigation season) with a tolerance limit of +/-0.5 feet (primarily to accommodate high water events and occasional unforecast irrigation variation), and allow a wider operating range from elevation 4,406.5 to 4405.0 feet up to 15 percent of the time ('extended' range operations, up to 55 days per year, outside of the irrigation season and not during high flows) as determined by daily average adjusted elevations at Cutler Dam (see Exhibits B and E of the FLA for additional detail) as part of the relicensing associated with this HPMP. As such, known and potential impacts to historic properties are expected to be very similar moving forward as they have been under the previous license (see Section 3.0, Cultural Resources of Exhibit E of the FLA). The sources and nature of these effects is discussed below, followed by a discussion of the management measures PacifiCorp will employ to avoid, minimize, or mitigate adverse effects and a discussion of the schedule for implementing this HPMP.

4.1 KNOWN AND POTENTIAL SOURCES OF THE EFFECTS ON HISTORIC PROPERTIES

Sources of effects on historic properties from Project operations include the following:

- Maintenance of Project facilities;
- Efficiency (e.g., replacing generators) and safety upgrades;
- Large-scale equipment replacement;
- Capital development projects, including new construction and related ground disturbance and the introduction of new visual intrusions within the Project Boundary;
- Demolition of existing outdated or unused structures to accommodate development;
- Erosion induced by water level fluctuations during operations or (rarely) larger-scale drawdowns required by maintenance or new construction;
- Recreational activity on Project lands; and
- Livestock grazing or other agricultural leasing uses on Project lands.

At many hydroelectric developments, water level fluctuations within reservoirs and upstream and downstream from the Project can be induced by normal operations. Hydraulic modeling and related studies conducted during the relicensing process related to this HPMP demonstrated that the operating regime at Cutler—past, present, and proposed future—would not cause water level fluctuations sufficient to induce erosion that could adversely affect historic properties. Such potential effects are limited to the rare occurrences of intentional deeper reservoir drawdown when typically submerged resources are exposed and become more vulnerable to both removal by recreation users that may observe objects or features that are usually submerged, and/or erosion and deterioration during the cycle of drying out and becoming resubmerged.

At the time this HPMP was written, PacifiCorp had identified the following specific capital improvement projects, each of which could impact historic properties:

- Replacement of the spillway gates and flowline supports (as needed) with components that are similar in both form and function;
- Seismic upgrades to the surge tank, including new foundation anchors and exterior shell;
- Removal of now-uninhabited (and unsafe) operator's cottages, carports, and appurtenant structures in the historic camp;
- Replacement of the roof on the Cutler powerhouse;
- Possible replacement of windows in the Cutler powerhouse;
- Installation of dedicated lifting hoists in the powerhouse; and
- Installation of a new retaining wall between the flowline and the river near the base of the dam to protect the flowline from being undermined in high flow events.

PacifiCorp would implement the management and mitigation measures (as appropriate) outlined below prior to and during the execution of these improvements.

4.2 SCHEDULE FOR IMPLEMENTING THE HPMP

The measures outlined in this HPMP would become effective upon acceptance of the HPMP by FERC, and following consultation that was completed with the Utah SHPO, Tribes, and other consulting parties, following the consultation period for the Draft License Application in late 2021/early 2022. Both FERC staff and Utah SHPO responded with comments on the Draft HPMP. Schedules for specific actions under the HPMP, such as designating an HPMP

Coordinator, training Project personnel, review and revision of the HPMP, etc., are discussed in the sections that follow.

4.3 EVALUATING NATIONAL REGISTER ELIGIBILITY OF NEWLY IDENTIFIED CULTURAL RESOURCES

In the event that previously unknown cultural resources (excluding non-substantive isolated artifacts or features with no potential to be eligible for the National Register, e.g., fence posts, railroad spikes, etc.) are identified during Project operations and maintenance, PacifiCorp will evaluate each resource for its eligibility to the National Register of Historic Places. This evaluation will be carried out for all newly identified cultural resources of substance, some of which may be addressed according to inadvertent discovery procedures described later in this HPMP. This evaluation process is not intended to apply to isolated artifacts or features unless they clearly have the potential to be eligible for the National Register under the category of Object; such instances are extremely rare.

As part of the evaluation of National Register eligibility, PacifiCorp will ensure that a qualified professional meeting the Secretary of the Interior's Standards for the relevant resource or discipline (e.g., archaeology, architectural history, etc.) is involved in the assessment of resource eligibility. Together with the qualified specialist, PacifiCorp will assess the integrity of the resource relative to the seven factors set forth by the National Park Service: location, materials, design, workmanship, setting, feeling, and association. PacifiCorp will then consider 1) the prehistoric or historic events, themes, or persons with which the resource may be associated (i.e., Criteria A and B of the National Register); 2) the architectural, engineering, construction, or artistic merit of the resource (i.e., Criterion C); 3) the association of the resource with any established historical landscape or historic district (i.e., also criterion C); and 4) the degree to which the resource has yielded or may yield information important to improving our understanding of the past. Finally, PacifiCorp will prepare summary documentation regarding the identified resource, including a description of the resource, the evaluation of its National Register eligibility, and a statement of PacifiCorp's preliminary determination of eligibility. This documentation, which may also include formal site or property forms as appropriate to the resource, will be provided to the Utah SHPO and other appropriate consulting parties, including Tribes, for review and comment.

4.4 EVALUATING PROJECT EFFECTS

This section outlines the steps to be taken prior to the implementation of new operational, maintenance, administrative, and capital development efforts within the Project APE. These steps are adapted from those set forth in the previous CRMP for Cutler under the 1994 license and largely follow the steps outlined in the Section 106 process (36 CFR 800). The steps are geared toward providing on-site Project personnel and management staff with guidance on complying with the HPMP and meeting the standards of PacifiCorp's overall preservation priorities, goals, and objectives for the Project. This step-wise assessment of potential resource impacts (for all resources, including cultural) is now integral to all PacifiCorp renewable capital projects, resulting in any potential effects being identified early in the project planning phases. The steps listed here are intended to be carried out in coordination with the designated HPMP Coordinator.

Step 1 – Define the action: What work or activity is being proposed? What, exactly, will that work entail? Will ground disturbance occur at all, and if so, how much (e.g., horizontal and vertical/depth extent)? Will any existing structures, or character defining features be altered or demolished?

Step 2 – Assess anticipated effects to historic properties: After defining the work or activity, assess whether it has the potential to affect any historic properties (i.e., known historic properties or the potential for historic properties to be present in areas not previously surveyed for them). See 36 CFR 800 (the implementing regulations for the National Historic Preservation Act) and Attachment C for detailed definitions of different possible findings of effect (i.e., No Effect/No Historic Properties Affected, No Adverse Effect, or Adverse Effect). Project Managers/staff, in coordination with the HPMP Coordinator will assess anticipated effects through this process:

- Review the *Exempt Activities List* in Section 4.4 below. If the proposed activity meets those standards, contact the HPMP Coordinator to confirm this finding, and proceed as directed.

- In coordination with the HPMP Coordinator, review Project maps to determine whether the location of the proposed work or activity has been inventoried for cultural resources and whether any historic properties have been identified there. If no historic properties are known to be present in the area or if the area has not been inventoried for cultural resources, proceed as directed by the HPMP Coordinator.
- If historic properties are present, determine whether the work or activity would adversely affect the characteristics of the resource, including contributing resources within the historic district or larger site complexes, that qualify it for listing on the NRHP. Key factors to consider are whether the proposed effort would alter the location, materials, design, workmanship, setting, feeling, or association of the resource. As an example, the Cutler powerhouse is, in part, eligible for the NRHP because of its Art Deco architectural style. A work project that proposes to install siding over the exterior brick walls or enclose window openings would, at a minimum, alter the materials and design of the building and would constitute an adverse effect to that structure.
- If, after careful consideration of the effects, PacifiCorp determines the proposed effort would result in no adverse effect to historic properties, or if PacifiCorp staff are unclear about the finding of effects, the HPMP Coordinator will notify the Utah SHPO of this finding, or lack thereof, and request their comment(s) on it. If the SHPO agrees with or does not otherwise dispute the finding, PacifiCorp may proceed with the proposed work or activity. If SHPO disputes the finding, the HPMP Coordinator will work with them to resolve the disagreement and will involve FERC and the Advisory Council on Historic Preservation (ACHP) as necessary to assist in the resolution.

- If PacifiCorp determines the work or activity would result in adverse effects to historic properties, proceed to Step 3 and take into account the treatment measures outlined in Section 4.5.

Step 3 – Consultation on Adverse Effects: If PacifiCorp determines that a Project activity would result in an adverse effect on historic properties, the HPMP Coordinator will enter into consultation with the SHPO to resolve the effects. Consultation with Native American Tribes may also be necessary if prehistoric resources are discovered in the Project APE and would be subjected to adverse effects. As part of the consultation with the SHPO, PacifiCorp will describe and discuss the impact avoidance and minimization measures that were considered and incorporated into the proposed work or activity and provide an explanation for the basis of rejecting any such measures that were not incorporated into the work plan. PacifiCorp will work with the SHPO, and other consulting parties as appropriate, to identify measures to mitigate the adverse effect and will enter into a Memorandum of Agreement (MOA) or other agreement to document the agreed upon measures.

- Following the agreement between PacifiCorp, the SHPO, and other appropriate consulting parties, if any, as to the mitigation measures to be implemented, but prior to the formal execution of that agreement, the HPMP Coordinator will notify the ACHP that a determination of Adverse Effect has been made for the undertaking and that an agreement has been reached with the SHPO regarding resolution of those effects. Tribes should be consulted if prehistoric artifacts or features or ethnographic or historic period Native American sites would be affected or are discovered. The ACHP will also be invited to participate in the finalization and implementation of the MOA or other agreement.

- If no agreement can be reached between PacifiCorp and the SHPO (and/or other relevant consulting parties), the HPMP Coordinator will notify the ACHP of the situation and request their involvement to resolve the dispute.

4.5 ACTIVITIES WITH STREAMLINED REVIEW

Some activities carried out by PacifiCorp during daily operation of the Project pose little to no risk of adversely affecting historic properties. In balancing this low risk with the need for efficient operation of the Project, PacifiCorp has identified a list of activities that, when all listed conditions are met, can be carried out without entering into further consultation with the Utah SHPO or other consulting parties. These activities are summarized in Table 4-1. Activities not included in this list must be discussed with the HPMP Coordinator during project planning and prior to implementation and are subject to the review procedures outlined in Section 4.3 of this HPMP. PacifiCorp will report every two years to the Utah SHPO on Project activities, if any, carried out under this streamlined process, excluding those activities solely affecting resources less than 50 years old (see Table 4-1).

TABLE 4-1 STREAMLINED ACTIVITIES LIST

NOTE: The HPMP Coordinator must review the details of proposed activities potentially subject to the exemptions in this table prior to their implementation.	
ACTIVITY	ACTION
Surface disturbance in an area previously substantially disturbed (e.g., native soils excavated, plowed, churned, or otherwise moved from their natural condition at least as deep as the new project /activity depth) and/or previously surveyed and found to be devoid of cultural resources	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Replace existing power poles, fences, gates, cattle guards, culverts, signs or similar features that are less than 50 years old in the same location and within the same basic footprint	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Replace existing individual fence posts, signposts, and similar features more than 50 years old but qualifying as isolated features that do not have the potential to be eligible for the National Register.	<ul style="list-style-type: none"> • Proceeds with activity • Implement discovery protocols
Installation of new fencing and signs requiring <u>limited</u> potholing for footings	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Upgrading/repairing facilities (not historic properties) within existing road base or fill	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Sediment and vegetation removal from canals	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols • Dispose of dredged material along the canal or ditch or in a designated area that has been approved for avoidance of historic properties
Normal (i.e., approved operations regime) water level fluctuation in reservoir or river, as well as planned and FERC-approved deviations in the normal operation elevation regime	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Vegetation and other pest management through use of herbicides or pesticides	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Vegetation management through mechanical means (e.g., cutting, disking, plowing, chaining, etc.) at locations that have been previously manipulated by these methods or in areas previously surveyed and found to be devoid of cultural resources	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols
Grazing and other agricultural lease-covered activities	<ul style="list-style-type: none"> • Proceed with activity • Implement discovery protocols

NOTE: The HPMP Coordinator must review the details of proposed activities potentially subject to the exemptions in this table prior to their implementation.

ACTIVITY	ACTION
	<ul style="list-style-type: none"> • Monitor grazing and other agricultural lease activity for undue surface disturbance (e.g., entrenched trails, wallows, areas of increased erosion due to loss of vegetation) in areas of known historic properties and implement minimization and mitigation measures as needed
Painting the exterior of a building or structure without stripping paint or removing siding from existing surfaces	<ul style="list-style-type: none"> • Proceed with activity • Consult with HPMP Coordinator to ensure use historic color palette
Patching holes or leaks in the conduit, surge tank, or penstock with in-kind materials of similar appearance.	<ul style="list-style-type: none"> • Consult with PacifiCorp's HPMP Coordinator to ensure activity meets defined parameters. If so, proceed with activity.
Visual plant painting standards	<ul style="list-style-type: none"> • Proceed with activity
Installation of required safety upgrades (e.g., handrails, machine guarding, signage, etc.).	<ul style="list-style-type: none"> • Proceed with activity
Repair or rebuild of major interior historical equipment (e.g., turbines, generators, valves, etc.).	<ul style="list-style-type: none"> • Proceed with activity
Replacement of <u>minor</u> interior historical equipment (e.g., fuses, wiring, plumbing, light bulbs, etc.).	<ul style="list-style-type: none"> • Consult with PacifiCorp's HPMP Coordinator to ensure activity meets defined parameters. If so, proceed with activity.
Installation of new heating/cooling or climate control systems (i.e., duct work and placement of interior and/or exterior heating/cooling units) that do not require more than minor (less than 4-foot by 4-foot) building envelope penetrations	<ul style="list-style-type: none"> • Proceed with activity
Repair or replacement of windows with in-kind materials and with in-kind appearance following the Secretary of the Interior's Guidelines for the Treatment of Historic Structures and the NPI's <i>Preservation Briefs</i> .	<ul style="list-style-type: none"> • Consult with HPMP Coordinator to ensure appropriate rehabilitation guidelines are implemented. If so, proceed with activity.
Repair or replacement of roofing with in-kind materials and with in-kind appearance (e.g., same texture, color, roof pitch, etc.) following the Secretary of the Interior's Guidelines for the Treatment of Historic Structures and the NPI's <i>Preservation Briefs</i> .	<ul style="list-style-type: none"> • Consult with HPMP Coordinator to ensure appropriate rehabilitation guidelines are implemented. If so, proceed with activity.

NOTE: The HPMP Coordinator must review the details of proposed activities potentially subject to the exemptions in this table prior to their implementation.

ACTIVITY	ACTION
Patching holes in concrete, stucco, brick and mortar walls using in-kind materials and with in-kind appearance (e.g., same texture, same roof pitch, etc.) following the Secretary of the Interior's Guidelines for the Treatment of Historic Structures and the NPI's <i>Preservation Briefs</i> .	<ul style="list-style-type: none"> • Consult with HPMP Coordinator to ensure appropriate rehabilitation guidelines are implemented. If so, proceed with activity.

4.6 TREATMENT STANDARDS

PacifiCorp's plan for the treatment of historic properties within the Project APE was set forth in the 1995 CRMP (and which this document updates to current standards) for the Project and is derived from the Secretary of the Interior's Standards for the Treatment of Historic Properties. The treatment standards are summarized below and are based on the concept that actions involving the least degree of intervention are most preferable. The techniques described in this section are listed in order of their degree of intervention (from least to most). The National Park Service (NPS) and the National Preservation Institute (NPI) both offer very detailed descriptions of and procedures for some of these standards, such as preservation, rehabilitation, and restoration. Because this guidance is continually revised to account for new methods and materials, copies are not included in this HPMP. Rather, PacifiCorp will consult the most recent version of the appropriate guidance at the time an undertaking requiring intervention is considered. Implementation of any measures pursuant to the treatment standards outlined below must be considered in balance with the safe and efficient operation of the Project for both the public benefit and for employee health and safety.

4.6.1 PROTECTION

This standard involves the application of measures to defend a property from loss, deterioration, or damage from environmental sources (e.g., water damage, slope creep, livestock trampling) during Project operations. Measures to meet this standard could include installation of retaining walls, fences, or other barriers to prevent access to areas or prevent damage from slope "creep" or erosion. Other examples include the installation of stormwater drainage features to channel runoff away from vulnerable historic properties. Because the resources in the Project have been appropriately maintained over the years and no imminent threats to historic properties have been

identified, protection measures are not an anticipated need for the Project except in cases of emergency conditions or unanticipated discoveries.

4.6.2 STABILIZATION

This standard involves measures to reestablish the structural stability of an unsafe or deteriorated resource. On the whole, Project facilities have been properly maintained over the years and are not in need of stabilization measures; however, the normal deterioration of materials or inadvertent neglect of abandoned structures may necessitate stabilization measures to prevent the loss of the structure or address health and safety concerns. Note that removal of older and/or abandoned buildings (due to changes in operations, facilities, and staff over the long periods of time that the projects operate through) may be the most appropriate action, particularly in the interests of public and staff safety (given lead, asbestos, and other environmental contamination and structural safety concerns).

4.6.3 PRESERVATION

This standard involves measures to sustain the existing form, integrity, and material of a historic resource. To date, PacifiCorp has applied preservation techniques in maintaining the existing facility and equipment through painting, retooling, and repairing existing equipment, and in using in-kind material when replacement is needed. With the previous caveat regarding older building removal, these practices will continue under this HPMP wherever they are feasible and prudent.

4.6.4 REHABILITATION

This standard involves preserving the character-defining features of a historic property while making changes or additions to extend the useful life of the property. Rehabilitation involves major repairs or additions that allow the extension of the current use or a different use of the property (also termed adaptive reuse). This technique would be applicable, for example, if expansion of the powerhouse or changes to the dam or water conveyance system were needed to allow for efficient continued operation.

4.6.5 RESTORATION

This standard involves accurately recovering the form and details of a property and its setting as it appeared at a particular period of time by means of the removal of later work or the replacement of missing earlier work. As a general rule, treatment pursuant to this standard is not applicable to the Project as long as the Project remains in operation, because efficient and economical operation requires that previous changes remain. That said, limited restoration efforts, such as removing modern siding from historical buildings or replacing previously installed replacement windows with ones more compatible with the original design and materials, could be applicable in select cases.

4.6.6 RECONSTRUCTION

This standard involves reproducing by new construction the exact form and detail of a vanished structure as it appeared at a specific period in time. This technique is not applicable to the Project as long as the Project remains in operation; the purpose of the Project is to provide electricity safely, efficiently, and economically to consumers and not to recreate historical features.

4.7 TREATMENT OF HUMAN REMAINS

Both State and Federal law afford special consideration to human remains encountered in archaeological contexts. Both sets of laws make it a felony to knowingly disturb, damage, or otherwise injure such remains. Further, human remains have deep cultural meaning for modern populations, especially, but not limited to, Native American Tribes. As the State and Federal laws regarding human remains are consistent with each other, no distinction is made between the two for the purpose of implementing discovery protocols.

In the event that PacifiCorp personnel or its contractors or their subcontractors believe they have encountered any human remains, regardless of age, the following actions will be taken:

Step 1 – All activity associated with the discovery will stop, and the work supervisor, if not on-site, will be notified immediately.

Step 2 – The work supervisor or their designee will immediately take steps to secure and protect the discovery, preferably including covering the discovery with a

tarp or other protective cover. Photographs of the discovery should be acquired solely for the purpose of communicating the nature of the discovery to the appropriate parties, including law enforcement and staff of the Utah SHPO's office. **No personal photographs are to be taken.**

Step 3 – The work supervisor will contact the designated HPMP Coordinator, who will either proceed in leading the response to the discovery or will contact an appropriate PacifiCorp representative to continue with implementing the protocol.

Step 4 – The work supervisor and HPMP Coordinator or other designated PacifiCorp representative will determine the size of the work-stoppage zone (the buffer zone) so as to be sufficient for providing protection and preservation of the discovery in place until such time that the Coordinator (or designee) notifies the work supervisor that work can resume. If space allows, the minimum protective buffer should be no less than 100 feet in all directions from the location of the discovery. No equipment, unauthorized personnel, vehicles, or ground disturbing activity will be permitted within the buffer zone during this time.

Step 5 – The work supervisor, with support from the HPMP Coordinator or other designated PacifiCorp representative, will direct personnel working in the vicinity of the discovery that any and all human remains, associated burial objects, and archaeological materials present with the discovery are to be left alone for examination by the county medical examiner/sheriff, agency archaeologist, or other professional archaeologist as appropriate. Anyone disturbing the burial site by removing objects from it will be subject to felony prosecution under State and Federal laws.

Step 6 – The HPMP Coordinator or other designated PacifiCorp representative will immediately contact the appropriate Sheriff or county medical examiner and notify them of the discovery. The Coordinator or other designated PacifiCorp representative will request that the Sheriff or county medical examiner

inspect the discovery to determine whether or not the remains represent a crime scene.

- Step 7 –** The HPMP Coordinator or other designated PacifiCorp representative will contact the assigned FERC archaeologist and the director or compliance archaeologist of the Utah SHPO and notify them of the discovery and the prior contacts with the Sheriff/medical examiner. FERC and the SHPO will be kept informed of the progress and results of the Sheriff's or medical examiner's inspection and determination of age and origin for the remains.
- Step 8 –** The HPMP Coordinator or other designated PacifiCorp representative will contact the Tribes identified in Section 1.0 of this HPMP and notify them of the discovery and the protocols currently underway. Tribal representatives will be invited to be present during the Sheriff's or medical examiner's inspection of the remains; however, given the time-sensitive nature of such discoveries, failure of the Tribes to respond to the invitation or to require an extended time period to participate in the examination will neither delay nor prohibit the inspection by law enforcement or the medical examiner.
- Step 9 –** If the Sheriff or county medical examiner determines that the remains are of modern origin and are not related to a Native American population, then PacifiCorp personnel will follow the instructions of the Sheriff or county medical examiner regarding further treatment of the remains.
- Step 10 –** If the remains are determined by the Sheriff/medical examiner to be of Native American origin, PacifiCorp will immediately notify the Tribes, if representatives are not present at the time of determination. PacifiCorp will also notify FERC and the SHPO of the results of the determination and will work with the FERC, Tribes, and SHPO to implement an appropriate treatment regime for the remains.

Step 11 – If the remains are determined to be of historical origin but not from a Native American, PacifiCorp will notify the FERC and the SHPO and will consult with these agencies to implement an appropriate treatment strategy.

Step 12 – Upon completion of agency and/or Tribal consultation and implementation of any on-site treatment or mitigation measures related to the discovery of the human remains, the HPMP Coordinator or other designated PacifiCorp representative will prepare a draft report of the discovery. This report will be prepared in consultation with the SHPO and Tribes as appropriate to the nature and location of the discovery, and will, at a minimum, include a description of the contents of the discovery, a summary of consultation efforts and outcomes, and a description of the treatment or mitigation efforts as completed. PacifiCorp will provide this draft report to FERC, the SHPO, and Tribes within 6 months after the completion of treatment or mitigation. These parties will have 30 days to review the report and submit comments to PacifiCorp. PacifiCorp will consider the comments, revise the report as appropriate, and provide the final document to the reviewing parties.

4.8 UNANTICIPATED DISCOVERIES

Much of the Project APE was surveyed in 2019 and 2020 as part of the FERC relicensing process (Section 2.3). Despite these efforts and those of other cultural resource surveys in the APE, it is always possible that additional, previously unidentified cultural resources could be inadvertently discovered as a result of Project operations, recreation user activities, agricultural lease activity, or ongoing mitigation measure implementation or monitoring. It is also possible that emergency situations, such as catastrophic equipment or facilities failures could result in unintended effects to historic properties despite PacifiCorp's best efforts to proactively avoid or minimize impacts from daily operations and maintenance activities. Most inadvertently discovered cultural resources are likely to be encountered below the ground surface, and therefore would not be visible during a standard pedestrian inventory. Such discoveries could occur during ground disturbing activities associated with facilities development, maintenance, or improvement, as a result of shoreline or riverbank erosion caused by fluctuating water levels (primarily from natural precipitation events as normal operations, ranging from elevation

4,407.5-4,406.5 feet, as measured at Cutler Dam, is proposed to occur at least 85 percent of the time; the extended range, proposed to occur 15 percent of the time or less would add an additional 1-1.5 feet of elevation range, to the lower operating limit of 4,405.0 at Cutler result in relatively little fluctuation of water levels within the APE), or as a result of vandalism, looting, or other activities associated with recreational or agricultural uses occurring within the Project Boundary. In the case of impacts to historic properties from emergency situations, the affected resources could be surficial or subsurface or both. Emergencies such as catastrophic equipment failure or fire cannot be predicted in advance and generally result in situations where employee or public safety outweighs other concerns.

To address impacts to cultural resources that could be identified through inadvertent discoveries or could be affected in emergency situations, PacifiCorp has developed protection and mitigation protocols. Protection protocols are designed to physically protect inadvertently discovered resources until such time as consultation can occur with the Utah SHPO, Tribes (where appropriate), and/or other consulting parties and an appropriate resolution as to the treatment of the discovery has been reached. To this end, two separate discovery protocols have been established: one for archaeological resources and one for emergency situations. Protocols for addressing human remains are discussed in Section 4.6.

4.8.1 PROTOCOLS FOR THE INADVERTENT (NON-EMERGENCY) DISCOVERY OF ARCHAEOLOGICAL RESOURCES

Inadvertent discoveries of archaeological resources on historical hydroelectric facilities are not uncommon. These resources may include, but are not limited to, such things as prehistoric sites or burials for which the surface evidence has been destroyed by historical or modern development or ground disturbance, earlier components of the hydroelectric facilities themselves that were built upon during later improvements to the property, or individual artifacts obscured by vegetation. When determining the response to archaeological discoveries, it is important to consider whether the resource has the potential to qualify as a historic property. Individual artifacts or a very small number of artifacts rarely qualify as historically significant resources that are eligible for the National Register and are, therefore, not historic properties. Unique

items, such as prehistoric tools, may still qualify as historic properties, so care must be taken to fully consider the nature of the item before proceeding with the next steps.

As of 2018, the SHPO defined archaeological sites as:

- At least 10 artifacts of a single class (e.g. debitage, ceramics, glass, cans) within 10-meter diameter area, except when all are from a single source (e.g. single pot, bottle).
- At least 15 artifacts of at least two classes within a 10-meter diameter area.
- One or more archaeological features in temporal association with any number of artifacts.
 - A single structure or building such as a barn, concrete reservoir tank, or similar construction, should be documented as a site as it meets this definition.
- Two or more temporally associated archaeological features without artifacts.

As a general rule, any discovery of an archaeological site or a potential archaeological site—the extent of the resource may not be clear upon initial discovery—requires at least some review and documentation of the discovery prior to proceeding with the activity that resulted in the discovery. In the event that PacifiCorp personnel or its contractors or their subcontractors believe they have encountered archaeological resources that appear to be greater than 50 years of age and are or may qualify as a site, the following actions will be taken:

Step 1 – All activity that could result in additional disturbance of the discovery will stop, and the work supervisor, if not on-site, will be notified immediately.

Step 2 – The work supervisor or his/her designee will secure the discovery from any additional impacts and will contact the HPMP Coordinator. Together, they will determine the size of the work stoppage zone (the buffer zone) so as to be sufficient for providing protection and preservation of the resource in place until such time that the Coordinator notifies the work supervisor that work can resume. No equipment, unauthorized personnel, vehicles, or ground disturbing activity will be permitted within the buffer zone during this time.

- Step 3 –** The HPMP Coordinator will immediately contact the director or compliance archaeologist of the Utah SHPO and notify him/her of the discovery. The Coordinator will enter into consultation with the SHPO regarding the evaluation of the discovery and appropriate mitigation, if applicable.
- Step 4 –** If the discovery is determined to contain prehistoric or historical materials related to Native American occupation or use of the area, PacifiCorp will promptly notify FERC and the Tribes identified in Section 1.0 of this HPMP of the discovery and afford them the opportunity to consult with PacifiCorp regarding the determination of cultural patrimony and significance of the discovery. PacifiCorp will continue consultation with the Tribes, either with or without FERC and/or SHPO involvement, until such time as a mutually agreeable resolution is achieved. If the Tribes fail to respond within 48 hours of contact, PacifiCorp will proceed with consultation with the appropriate agencies and will provide the Tribes with copies of any documents or reports describing the discovery and its treatment that are generated at resolution of the situation.
- Step 5 –** Once the agreed-upon treatment of the discovery has been completed, if any, PacifiCorp's HPMP Coordinator will request notification (preferably in writing) from the SHPO and/or Tribes, as applicable, that the agency or Tribes concur that all required elements of the in-field treatment or mitigation have been fulfilled and work in the “off limits” or no-work zone defined in Step 2 for the discovery may proceed. Upon receipt of this notification from the relevant parties, the HPMP Coordinator will notify the work supervisor that work may proceed. At this time, all restrictions on activity within the buffer zone are cancelled.
- Step 6 –** Upon completion of agency and/or Tribal consultation and implementation of any treatment or mitigation measures related to the discovery, the HPMP Coordinator will prepare a draft report of the discovery. This report will be prepared in consultation with the SHPO and Tribes, if applicable, and will, at

a minimum, include a description of the contents of the discovery, a summary of consultation efforts and outcomes, and a description of the treatment or mitigation efforts as completed. PacifiCorp will provide this draft report to the SHPO and the Tribes, if applicable, within 6 months after the completion of treatment or mitigation. The SHPO and the Tribes will have 30 days to review the report and submit comments to PacifiCorp. PacifiCorp will consider the comments, revise the report as appropriate, and provide the final document to FERC, the SHPO and the Tribes.

4.8.2 PROTOCOLS FOR EMERGENCY SITUATIONS

In the event of an emergency situation (e.g., structural failure, wildfire, flooding) involving historic properties, the following actions will be taken, though it is important to note that the protection of human life, safety, and health supersede the protection of historic properties:

- Step 1 –** If the emergency occurs in an area of a known historic property, such as within a building or the breach of a water conveyance structure, every effort will be made to respond to the emergency in a manner that protects the historically important characteristics of that property. Efforts to protect the resources may include setting up temporary fencing or other obstacles to guide emergency responders around historic properties such as archaeological sites.
- Step 2 –** If impacts to a known historic property are unavoidable during an emergency situation, the on-site supervisor will notify PacifiCorp's HPMP Coordinator as soon as practicable that the resource has been affected.
- Step 3 –** Unless necessary to protect human life, safety, or health, restoration or repair efforts of operations equipment that could further impact the historic property following the resolution of the emergency situation will not begin until such time as the HPMP Coordinator notifies the on-site manager that such activities can begin.

- Step 4 –** Together with the HPMP Coordinator, and as feasible, the on-site manager will identify and implement any measures necessary to ensure no further impacts to the resource occur prior to consultation with appropriate agencies, Native American Tribes, or other consulting parties. These measures may include the establishment of a buffer zone as called for in the protocols for inadvertent discoveries.
- Step 5 –** As soon as practicable, the HPMP Coordinator will notify the Utah SHPO that the emergency situation occurred and that a known historic property was impacted. The Coordinator will discuss with the SHPO appropriate measures for assessing the nature and degree of the impacts on the affected historic resources. The Coordinator will work with the SHPO to implement appropriate actions to mitigate any adverse impacts that are identified. This mitigation may include actions such as restoration, repair, or data recovery, or may involve some form of in-kind mitigation such as public interpretation, informational brochures, archival research, etc.
- Step 6 –** If known prehistoric resources, regardless of their NRHP eligibility status, are impacted by the emergency situation or the response to it, PacifiCorp's HPMP Coordinator will notify the Tribes listed in Section 1.0 of the situation and will invite the Tribes to participate in the assessment of impacts to the resource. The Coordinator will work with the Tribes to implement appropriate actions to mitigate adverse impacts that are identified during the assessment.
- Step 7 –** If the emergency situation occurs in an area where no known historic properties are located, the on-site manager will notify the HPMP Coordinator that an emergency has occurred and will describe the location and extent of the incident. The Coordinator will review existing records to determine the survey status of the area or resource in question (i.e., Has the area been inventoried for the presence of cultural resources? Has the resource been documented and evaluated for the NRHP?).

- Step 8 –** If the HPMP Coordinator determines that the area or resource in question has been inventoried and a historic property was present, he/she will implement Steps 4-6 above.
- Step 9 –** If the HPMP Coordinator determines that the area or resource in question has been inventoried and no historic properties were identified, he/she will arrange for an inspection of any new ground disturbance (e.g., blading of fire breaks) associated with the emergency response to determine if previously unknown cultural resources have been newly exposed.
- a. If previously unknown resources are identified, they will be treated as a non-emergency inadvertent discovery (see Section 4.7.1), including protection of the resource and notification of the appropriate agency and/or Tribes.
 - b. If no previously unknown resources are identified, the Coordinator will make a note or otherwise include information in the Project file to document this outcome in the event of future inquiries by PacifiCorp staff or outside parties.
- Step 10 –** If the HPMP Coordinator determines that the area or resource in question has not been inventoried for historic properties, they will notify the SHPO of the situation and will arrange in consultation with the agency to have an inventory of the area/resource completed along with a damage assessment, if applicable. A written report of the results of the inventory and assessment will be provided to the SHPO within 90 days of the resolution of the emergency situation, and the Coordinator will work with the agency to identify mitigation measures if adverse impacts to historic properties are determined to have occurred. The Coordinator will notify the Tribes if any prehistoric resources are identified during the area/resource inventory and assessment and will work with the Tribes to implement appropriate mitigation measures, if applicable.

4.9 PUBLIC INTERPRETATION AND OUTREACH

PacifiCorp is committed to sharing information about the unique and historically significant features of the Cutler Project with the public. To that end, the following efforts will be initiated upon approval of the HPMP:

- Updating the Project website to include information about the history of the Project, its facilities, and its historical significance; and,
- Development and installation of interpretive signs within the Project Boundary as necessary and when and where feasible.

5.0 IMPLEMENTATION PROCEDURES

This section addresses the procedures PacifiCorp will employ to implement this HPMP.

5.1 HPMP COORDINATOR

PacifiCorp will appoint a staff member as the Project's HPMP Coordinator within one month after acceptance of the HPMP by FERC and as needed after that if the position is vacated. This position will be responsible for administering the HPMP and ensuring compliance with its measures. The employee who holds the position will have, or be required to and supported in acquiring, training in cultural resources management. PacifiCorp will provide the staff member with access to periodic training in federal and state cultural resource workshops that address issues related to the Project's compliance with applicable cultural resource laws and regulations. These include Section 106 of the National Historic Preservation Act, anti-vandalism procedures (such as covered in Archaeological Resource Protection Act training), historic building maintenance and preservation, and the application of new technologies in cultural resource management.

5.1.1 USE OF CONSULTANTS

As necessary and appropriate, PacifiCorp will hire consultants to assist the company in implementing the procedures outlined in this HPMP. Consultants retained by PacifiCorp will meet the Secretary of the Interior's standards for professional qualifications for the discipline or disciplines that are appropriate to the work being undertaken (e.g., archaeology, architectural history, or historic preservation).

5.2 TRAINING OF PERSONNEL

The employee education component of the HPMP implementation program will consist of annual training (beginning within one year after implementation of the HPMP) of on-site employees regarding issues related to historic properties and other cultural resources within the Project APE. This training will include, at a minimum: instruction on the cultural resource laws and regulations governing PacifiCorp's operations; instruction on the requirements of the HPMP and procedures for using the plan in decision-making and project development; instruction on how to respond to inadvertent discoveries of cultural resources or human remains; instruction on

recognizing, documenting, and responding to incidents of looting or vandalism; and discussion of the importance of some cultural resource sites, burials, and natural landscape features to modern day Native American Tribes. The training will also include information on PacifiCorp's internal disciplinary measures for wantonly failing to follow the stipulations of the HPMP and/or willfully damaging historic properties or inducing others to do so.

In providing the aforementioned training, PacifiCorp will protect information on archaeological sites from public disclosure per the requirements of the National Historic Preservation Act of 1966, as amended. Only those staff members needing protected information to execute their assignments in compliance with the HPMP will have access to it, and they will receive additional instruction from the HPMP Coordinator regarding measures to ensure site location details remain confidential.

5.3 REPORTING AND MEETINGS

Annually, within 45 days of the date the Project license is issued, PacifiCorp will offer to host a meeting with the Utah SHPO, Tribes, and other consulting parties as defined in 36 CFR 800 regarding the status of HPMP implementation and execution. The purpose of the annual meeting would be to share information regarding Project activities that have taken place during the preceding year, to discuss cultural resource concerns, to discuss site conditions, protection measures, and/or other activities that have been carried out that affect cultural resources, to provide an overview of anticipated upcoming Project activities, and to discuss any concerns with and proposed changes to the protocols established in the HPMP. Every 10 years following issuance of the license, the annual meeting will consider any possible cumulative effects to historic properties in the project's APE as a result of operations that may have occurred or developed over the 10-year span. The meeting also will include review of whether any changes to the HPMP are necessary to address any identified cumulative effects or other concerns related to the management of historic properties within the APE.

5.4 REVIEW AND REVISION OF THE HPMP

Every 10 years following the acceptance of this HPMP by FERC, or more frequently if the need is identified, PacifiCorp will review the HPMP for adequacy and continued applicability to the Project's operations. If needed, revisions to the plan will be developed and presented to FERC,

the Utah SHPO, and, as appropriate, the Tribes and other consulting parties for review and comment. PacifiCorp will duly consider all comments received and incorporate changes as necessary. Once all reviewing parties have agreed upon the updates, PacifiCorp will finalize the revised HPMP and distribute digital copies to the appropriate parties.

5.5 DISPUTE RESOLUTION

Any disputes that arise between PacifiCorp and any consulting parties regarding this HPMP, implementation of its measures, or treatment of cultural resources will be resolved through the dispute resolution process set forth in the Agreement executed as part of the Project license.

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ATTACHMENT A

LISTS OF ALL PREVIOUSLY DOCUMENTED CULTURAL RESOURCES

ISOLATED OCCURRENCES AND ISOLATED FEATURES

The 2019–2020 archaeological survey resulted in the identification of two Isolated Occurrences (IOs) and five Isolated Features (IFs) (see table below). All of the isolated cultural resources date to the general Historic period. IOs consist of aqua glass and a boat, and IFs consist of transportation-related resources such as a road, a bridge, and a culvert as well as a generator station, a cluster of cars, a historic structure, and a berm. None of these IOs or IFs qualify as historic properties.

Isolated Occurrences Identified in the Study Area

IO NUMBER	FIELD NUMBER	ISOLATE TYPE	ISOLATE DESCRIPTION
IO-01	DS-IO-01	Historic artifact	The isolate is a single broken aqua glass insulator with no maker's mark. The isolate is located below the normal water level in Cutler Reservoir.
IO-02	DS-IO-02	Historic artifact	The isolate is a badly corroded triangular boat with a wood frame and iron hull. The hull was originally held to the wood frame by 3-inch rivets, but they have separated from the hull due to corrosion and rotting wood. The boat measures 141 inches long × 56 inches wide. The height of the boat is unknown as it is almost completely buried in sediment. The isolate is located on a bar in the Bear River below the normal water level in Cutler Reservoir and is presumed to date to the Historic period.
IF-01	HW-IF-01	Historic road	The isolate consists of a northeast-southwest-trending two-track road in the Cutler Hydroelectric Power Plant Historic District. The isolate runs from the Cutler power plant to the Wheelon substation, and it measures 1,053 feet long and 13 feet wide. It does not appear on any available historic maps and its age is unknown, but it is presumed to date to the Historic period based on the age of the Cutler power plant.
IF-02	KM-IF-01	Historic car cluster	The isolate consists of cluster of three cars in various stages of structural decay surrounded by various tires. One is a Ford and the other two models are unknown. The isolate is located on the west bank of Cutler Reservoir. The cars are located below the normal water level in Cutler Reservoir and appear to have been dumped into the reservoir; they are not held in place on the shore as an erosion control feature. The cars themselves were produced during the Historic period, but the date when they were deposited in the river is unknown.

IO NUMBER	FIELD NUMBER	ISOLATE TYPE	ISOLATE DESCRIPTION
IF-03	RJ-IF-01	Historic culvert	The isolate is a culvert that runs between two of the braided channels of the Bear River approximately 0.5 mile north of Benson School in Benson, Utah. The culvert consists of two corrugated metal pipes that are 2-1/2 feet in diameter. The south side of the culvert has a square face. The north side of the culvert is exposed culvert metal of unknown thickness. The culvert is buried with no concrete casing. There are no associated artifacts and the culvert does not appear on any available historical maps. The isolate's age is unknown, but it is presumed to date to the Historic period.
IF-04	RJ-IF-02	Historic structure	The isolate is a wooden structure with an unknown function. The structure has milled wooden lumber collapsed around the base, with two standing log posts that are 6 inches in diameter. One of the logs is about 8 feet tall, and the other is approximately 6 feet tall. The posts are held together with two milled lumber crossbeams attached with machine-cut nails and square lag bolts that are approximately 1 foot long. A third post is leaning against one of the crossbars. The nails are rusted, but new nails also exist. A colorless glass bottle base fragment with liquor codes but no maker's mark is located near the feature, but as the bottle cannot be dated, it is unclear whether it is of Historic age or modern. The age of the feature is also unknown but, based on its partial collapse, it is presumed to date to the Historic period. This was recorded as an isolate as no definitive age of the structure or the bottle base fragment could be discerned.
IF-05	RJ-IF-03	Historic berm	The isolate is a segment of berm with twin ditches on either side, transecting a high floodplain area just south of the confluence of the Logan River and the Little Bear River. The berm is 7 feet wide while the entire feature, including ditches, is 13 feet wide. The height varies but is roughly 1-1/2 feet. The berm may connect to an access road to the east and appears to continue west and south beyond this documented segment, dividing the Little Bear River floodplain from the Logan River floodplain. The berm follows the high ground along the south bank of the Logan River, and as it travels east, the depressions become deeper, with the northern ditch widening to 8 feet and the southern ditch widening to 9 feet. The northern ditch is deeper than the southern ditch. There is a concrete culvert with a corrugated metal lining located near the midpoint of the feature. The isolate does not appear on any available historic maps, its age is unknown, and it does not appear to be associated with a larger system of water control in the area.

ARCHAEOLOGICAL SITES

See the table below for all of the known archaeological sites in the Project APE.

Archaeological Sites Identified in the FERC Project Boundary

SITE NUMBER	SITE TYPE	SITE DESCRIPTION	ELIGIBILITY EVALUATION, CRITERION/A	RELEVANT STUDY AREA COMPONENT
42BO1182	Historic	West Canal	Eligible, A and C	Irrigation
42BO1507	Historic	Hammond East Branch Canal	Eligible, A and C	Irrigation
42CA143	Historic	Benson Canal	Eligible, A and C; non-contributing element	Irrigation
42CA174	Historic	Wellsville-Mendon Lower Canal	Eligible, A	Irrigation and Agricultural Lease Areas
42CA178	Historic	Cow Pasture Canal	Not eligible	Irrigation and Agricultural Lease Areas
42CA195	Historic	Newton Branch, West Cache Canal	Not eligible	Irrigation
42CA211	Historic	Ditch	Not eligible	Irrigation
42CA224	Historic	Erosion control	Not eligible	Irrigation
42CA225	Historic	Wheelon Dam	Eligible, A and C	Project Operations
42CA226	Historic	Water control	Not eligible	Irrigation
42CA227	Historic	Wheelon power poles	Eligible, A	Capital Improvements
42CA228	Historic	Wheelon hydroelectric facilities	Eligible, A	Capital Improvements
42CA229	Historic	Mendon Road	Eligible, A	Recreation: Concentrated Use
42CA230	Historic	SR 30/SR 69	Eligible, A	Recreation: Concentrated Use
42CA231	Historic	Benson Branch of Oregon Short Line Railroad	Not eligible	Recreation: Concentrated Use
42CA232	Historic	Black Rock Road	Not eligible	Recreation: Concentrated Use
42CA233	Historic	SR 23	Not eligible	Recreation: Concentrated Use
42CA234	Historic	Foundation and spring	Not eligible	Agricultural Lease Areas
42CA235	Historic	Pocatello Mainline, Oregon Short Line Railroad	Eligible, A	N/A*
42CA236	Historic	Newton to Logan Road	Not eligible	Recreation: Concentrated Use
42CA237	Historic	Benson-Bear Lake Canal	Not eligible	Irrigation

HISTORIC ARCHITECTURE RESOURCES

Historic architecture resources in the Project APE include the following:

1. Wheelon Hydroelectric Complex
2. Cutler Hydroelectric Power Plant Historic District
3. The structures listed in the table below:

Historic Architecture Resources in the Project APE

Current Parcel Number	Street Address	Utah Division of State History Rating	National Register of Historic Places Eligibility (criterion/a)	Construction Date	Period	Primary Use
11-007-0012	75400 West 600 South, Wellsville	Noncontributing (NC)	Not eligible	Ca. 1950	Postwar Period (1945–present)	Agricultural (animal facility)
12-004-0004	75600 West 4000 North, Petersboro	NC	Not eligible	Ca. 1900	Industry and Growth Period (1890–1929)	Residential
12-003-0005	72899 North 4100 West, Benson	NC	Not eligible	Ca. 1900	Industry and Growth Period (1890–1929)	Agricultural (general)
12-027-0009	71500 North 3200 West, Benson	NC	Not eligible	Ca. 1950	Postwar Period (1945–present)	Agricultural (animal facility)
12-027-0006	71841 North 3200 West, Benson	NC	Not eligible	Ca. 1950	Postwar Period (1945–present)	Agricultural (animal facility)
15-053-0010	5152 North 4800 West, Smithfield	NC	Not eligible	Ca. 1950 (1981)*	Postwar Period (1945–present)	Residential

* The main building dates to 1981 but the historic age resources are likely ca. 1950.

ATTACHMENT B
DEFINING EFFECTS FROM UNDERTAKINGS

There are three categories of potential impact or effect that must be evaluated before proceeding with planned work at the Cutler Project. These three categories or levels of effect are: 1) **No Effect**, 2) **No Adverse Effect**, and 3) **Adverse Effect**. The criteria for determining the level of effect of an activity to be undertaken are defined in 36 CFR 800.3 and are summarized below.

No Effect

Under “No Effect” the proposed undertaking is not expected to alter or otherwise impact the character-defining features of the historic property. Character-defining features are those that contribute to or constitute the reason(s) why the property is eligible for the National Register. Only minor changes to properties, such as minimal repairs using in-kind materials or painting typically fall into this category of effect.

No Adverse Effect

An effect occurs “when an undertaking changes the integrity of location, design, materials, workmanship, setting, feeling, or association of the property that contributes to its significance in accordance with the National Register criteria. Although the undertaking may cause a change or alter a property, that change would be considered to have No Adverse Effect if it does not diminish the historical or scientific value of the resource or damage, remove, or substantially change the character-defining features of the resource. Example of undertakings typically falling into this category are window replacements with in-kind materials or at least similar-looking windows, roof re-shingling or even replacement of decking with no change in pitch, eave depth, etc.

Adverse Effect

An Adverse Effect occurs when the undertaking changes or diminishes the integrity of the character-defining features of the property in question. Adverse effects typically occur in cases such as (but not limited to): destruction/demolition of all or part of a resource; substantial changes to the surrounding environment of a property; relocation of a structure; neglecting maintenance and repairs such that the resource deteriorates to the point of instability or destruction; ground disturbance affecting historically or scientifically important cultural deposits; or sale or transfer of a property without restrictions or conditions for preservation or maintenance.

ATTACHMENT C
CHARACTER-DEFINING FEATURES OF HISTORIC PROPERTIES AT CUTLER

Wheelon Hydroelectric Complex

Resource	Character-Defining Features
Wheelon Dam	Location; Adjustable height; Canal intakes as currently extant
West Canal (above Cutler Dam)	Location; Intake structure with headgate(s); Open canal channel roughly 20 feet wide and 8 feet deep
Hammond East Canal (above Cutler Dam)	Location; Intake structure with headgate(s) and stone walls; Open canal channel roughly 15 feet wide and 6 feet deep
Wheelon Substation Structure	Location; Steel racks and towers bolted to poured concrete pads and footings; Transformers and switchracks; Tunnels (size, shape, location)
Bear River Bridge	Location; Pratt deck truss style; Concrete pilings and abutments; Steel I-beam truss structure; Wooden deck
Wheelon Substation Building 1 (SW corner of substation)	Location; 2-story height; East-facing primary façade; Art Deco style; Brick construction; Fenestration; 6-over-6 wood sash windows topped by six fixed panes; Flat or low-slope roof
Wheelon Substation Building 2 (N side of substation)	Location; 1-story height; West-facing primary façade; Post-War Modern style; Concrete block wall construction; Flat roof with narrowly overhanging eaves
Wheelon Power Poles (42CA227)	Location; Materials (wooden poles, insulators); Design (single, double, and triple poles)
Outbuilding 1	Location; 1-story height; Southeast-facing primary façade; Brick wall construction; Side-gable roof form with moderately deep eaves; Current fenestration with wood sash, divided-pane windows and concrete lintels and sills
Outbuilding 2	Location; 1-story height; South-facing primary façade; Front gable roof form; Wood framing and cladding; Current fenestration with wood-framed openings
Outbuilding 3	Location; 1-story height; North-facing primary façade; Wood framing with wood plank siding; Shed-style roof; Current fenestration with wood framing; Livestock chute
Outbuilding 4	Location; 1-story height; South-facing primary façade; Wood framing with wood drop siding; Shed-style roof; Current fenestration with wood framing; Livestock chute
Outbuilding 5	Location; 1-story height; South-facing primary façade; Wood framing with wood drop siding; Shed-style roof with exposed rafter tails; Current fenestration with wood framing
Powerhouse foundation	N/A; non-contributing resource
Storage building	N/A; non-contributing

Cutler Hydroelectric Power Plant Historic District

Resource	Character-Defining Features
Powerhouse (Resource #1)	Location; 2-story height; West-facing primary façade; Art Deco style (e.g., pilasters, parapet walls, decorative concrete geometric inserts); Brick wall construction; Hipped roof with copper shingles; Current fenestration with paired windows and steel-framed, multi-pane awning windows; Interior room configuration; Historical crane, generators, turbines
Switchyard (Resource #2)	Location; Steel lattice switchrack with transformers and switches
Cutler Dam (Resource #3)	Location; Arch dam form; Reinforced concrete construction; 125-foot height; Spillway at center of dam with four tainter gates with drum-type chain hoist; Compressor building of concrete construction; Canal intake sluice gates with motor-driven worm gears; Concrete apron/stilling basin and base of spillway; Conduit intake; Gantry crane
Conduit (Resource #47)	Location; Steel pipe with 18-foot diameter; Riveted steel construction; Concrete saddles; Regularly spaced ship channel stiffeners
Surge Tank (Resource #5)	Location; 81-ft height and 45-ft diameter; Riveted steel plate construction; Walkway on top of structure and steel ladder;
Penstock (Resource #6)	Location; 2 16-foot diameter riveted steel pipes with ship channel stiffeners; Allis-Chalmers butterfly valves
Operator's House 1 (Resource #7)	Location; 1-story height; Bungalow style with deep overhanging eaves and low hipped roofs; with Wood fasciae and soffits; Wood frame construction with asbestos-cement shingle cladding; Brick chimneys with concrete caps; Simple raised concrete stoops with steel pipe railings; Fenestration with wood sash and wood casement windows (main story) and/or metal hopper windows (basements) with single and divided pane styles.
Operator's Carport 1 (Resource #7a)	Location; 1-story height; Wood-framed partial walls and wood posts; Low-pitched gable roof
Operator's House 2 (Resource #8)	Location; Location; 1-story height; Bungalow style with deep overhanging eaves and low hipped roofs; with Wood fasciae and soffits; Wood frame construction with asbestos-cement shingle cladding; Brick chimneys with concrete caps; Simple raised concrete stoops with steel pipe railings; Fenestration with wood sash and wood casement windows (main story) and/or metal hopper windows (basements) with single and divided pane styles.
Operator's Carport 2 (Resource #8a)	Location; Location; 1-story height; Wood-framed partial walls and wood posts; Low-pitched gable roof
Operator's House 3 (Resource #9)	Location; Location; 1-story height; Bungalow style with deep overhanging eaves and low hipped roofs; with Wood fasciae and soffits; Wood frame construction with asbestos-cement shingle cladding; Brick chimneys with concrete caps; Simple raised concrete stoops with steel pipe railings; Fenestration with wood sash and wood casement windows (main story) and/or metal hopper windows (basements) with single and divided pane styles.
Operator's Carport 3	N/A; non-contributing
Operator's Carport 4	N/A; non-contributing
Operator's Carport 5	N/A; non-contributing
Operator's Carport 6	N/A; non-contributing
Operator's Carport 7	N/A; non-contributing
Shop (Resource #14)	Location; 1-story height; South-facing primary façade; Art Deco style; Rectangular footprint; Brick wall construction; Flat roof with parapet wall; Exposed rafter tails; Current fenestration with window sets of divided light wood framed windows with concrete sills;
Vehicular Bridge 1 (Resource #15)	Location; Concrete footings; Vertical L-beam members and diagonal braces; Steel I-beam stringers; Wood deck; Metal railings; Non-linear configuration
Vehicular Bridge 2 (Resource #16)	Location; Concrete footings; Vertical L-beam members and diagonal braces; Steel I-beam stringers; Wood deck; Metal railings; Linear configuration
Steel Tower 1 (Resource #17)	Location; Steel L-beam construction; approx. 20-foot height
Steel Tower 2 (Resource #18)	Location; Steel L-beam construction; approx. 15-foot height
Steel Tower 3 (Resource #19)	Location; Steel L-beam construction; approx. 15-foot height

Cutler Archaeological Historic Properties

Resource ID	Resource Description	Character-Defining Features
42BO1182	West Canal	Location; Open, unlined channel; historical water control structures
42BO1507	Hammond East Branch Canal	Location; Open, unlined channel; historical water control structures
42CA143	Benson Canal	Location; For unpiped segments—open, unlined channel; historical water control structures
42CA174	Wellsville-Mendon Lower Canal	Location; open, unlined channel; historical water control structures
42CA225	Wheelon Dam	Location; Adjustable height; Canal intakes as currently extant
42CA228	Wheelon hydroelectric facilities	Location;
42CA229	Mendon Road	Location; Two-lane width with narrow/no shoulders
42CA230	SR 30/SR 69	Location; Two-lane road with narrow shoulders; Historical bridges/culverts—reinforced concrete material with concrete parapets exhibiting embossed panels and cut-outs
42CA235	Pocatello Mainline, Oregon Short Line Railroad	Location; Standard-gauge rails with wooden ties on gravel ballast

FINAL LICENSE APPLICATION
EXHIBIT F (PUBLIC)
DESIGN DRAWINGS

CUTLER HYDROELECTRIC PROJECT
(FERC No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC No. 2420)**

**FINAL APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT F
DESIGN DRAWINGS**

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1.0 DRAWINGS OF ALL MAJOR STRUCTURES

In order to protect critical energy infrastructure information (CEII), such as the facilities that comprise the Cutler Hydroelectric Project, the Federal Energy Regulatory Commission (FERC) has enacted regulations to govern public access to certain information related to relicensing proceedings. Special handling of this information is required to protect the security of critical energy infrastructure. This information is therefore only available to FERC and individuals or agencies with CEII clearance. Agencies may file a CEII request under 18 CFR § 388.113 or a Freedom of Information Act request under 17 CFR § 388.1018 to obtain the Exhibit F information. This Final License Application Exhibit F filing contains Design Drawings, a one-line diagram, and a copy of the Supporting Technical Information Document (STID), all of which are CEII (Volume II, Final License Application).

1.1 DESIGN DRAWINGS

The Exhibit F (Design Drawings) (Volume II, Attachment F-1) referenced herein contain sensitive and detailed engineering information that, if used improperly, may compromise the safety of the Project and those responsible for its operation. Therefore, the Exhibit F drawings have been labeled “Contains Critical Energy Infrastructure Information – Do Not Release.” The drawings have been submitted to FERC under separate cover.

1.2 ONE-LINE DIAGRAM

PacifiCorp is including a one-line diagram of the generators (Project infrastructure) and the substation that is associated with, but not part of, the Project (also commonly referred to as a single-line diagram) under the Exhibit F CEII cover (Volume II, Attachment F-2). The diagram shows the interconnection with the power grid and transmission lines. As the diagram also shows the breakers, transformers, and generators, PacifiCorp maintains these diagrams as CEII-protected for operational security, and as such, this one-line diagram is not available for public view.

1.3 SUPPORTING TECHNICAL INFORMATION DOCUMENT

The STID (Volume II, Attachment F-3) contains various components including the suitability of the site condition of structures, geology and lab test reports, borrow/quarry sites and needed

material, major structures stability and stress test reports, and seismic loading and spillway flood design. The STID is CEII-protected and not available for public view.

FINAL LICENSE APPLICATION

EXHIBIT G

PROJECT BOUNDARY MAPS

CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC No. 2420)**

**FINAL APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT G
PROJECT MAPS**

TABLE OF CONTENTS

1.0	PROJECT WORKS & FEATURES	1-1
2.0	PROJECT BOUNDARY MAP	2-1
2.1	APPLICANT OWNED LANDS AND LANDS TO BE ACQUIRED	2-1
2.2	FEDERAL LANDS	2-3
3.0	REFERENCES	3-1

LIST OF ATTACHMENTS

ATTACHMENT G-1	PROPOSED EXHIBIT G PROJECT MAPS
----------------	---------------------------------

1.0 PROJECT WORKS & FEATURES

The Cutler Hydroelectric Project (Project) is located in Cache and Box Elder Counties in the state of Utah. The Project's original Exhibit G for the current license period was submitted on November 4, 1996, following the 1995 Resource Management Plan (Article 402), and approved by the Federal Energy Regulatory Commission (FERC) on March 19, 1998. Since 1998, additional property transactions have occurred over a period of several years as part of implementation of the 1994 Cutler Resource Management Plan. The Cutler Project Boundary (Project Boundary) was revised and filed with FERC on April 14, 2008, to encompass all lands required by the FERC license. The most recent Exhibit G FERC Project Boundary was approved by FERC on April 3, 2009 and was depicted in the Draft License Application (2021) in order to clearly show the changes to the proposed FERC Project Boundary. Similar to the 2009 FERC Project Boundary, this proposed Exhibit G contains seven map sheets as listed below, which define the location of the Project Boundary, and the Project's principal features, although the number of sheets needed for the property description has increased to four, for a total of eleven sheets which make up Attachment G-1 to this Exhibit G:

<u>SHEET NO.</u>	<u>TITLE</u>
Sheet G-1	Project Boundary – Location Map
Sheet G-2	Project Boundary Map
Sheet G-3	Project Boundary Map
Sheet G-4	Project Boundary Map
Sheet G-5	Project Boundary Map
Sheet G-6	Project Boundary Map
Sheet G-7	Project Boundary Map
Sheet G-8	Project Boundary Description
Sheet G-9	Project Boundary Description
Sheet G-10	Project Boundary Description
Sheet G-11	Project Boundary Description

PacifiCorp is proposing to add and remove lands from the Project Boundary as part of this license application process. The lands detailed in this Exhibit G are needed for operation and maintenance of the Project or for recreational or resource protection purposes. Attachment G-1 shows the proposed Project Boundary.

2.0 PROJECT BOUNDARY MAP

The proposed Project Boundary occupies a total of 9,277 acres, of which approximately 76 acres are lands belonging to the state, county, or private entities. No federal lands are located within the Project Boundary.

2.1 APPLICANT OWNED LANDS AND LANDS TO BE ACQUIRED

A calculation of the existing and proposed Project Boundary acreage is outlined below in Table 2-1. Data have been derived from a variety of sources, including field surveys, federal, state, and county GIS data sources.

TABLE 2-1 PROJECT BOUNDARY ACREAGE CALCULATION

LAND DESCRIPTION	EXISTING ACREAGE (2009)	PROPOSED ACREAGE (2022)
PacifiCorp Owned Land	9,115	9,201
State Land	9	4
County Land	2	0
Private (Non-PacifiCorp) Land	66	72
Total Acreage within the FERC Project Boundary:	9,192	9,277

Source: PacifiCorp 2009 and 2022

PacifiCorp proposes the Project Boundary include additional areas needed for operation and maintenance and exclude areas outside of or with no Project influence. The exhibit maps improve the alignment of the Project Boundary with existing features based on new survey data and improved aerial imagery. Minor changes were expected due to advances in GIS and surveying technology.

There are several changes to the Project Boundary, including the removal of county roads that were previously in the Project Boundary, and the removal of State Highway 23 (road and bridge) from the Project Boundary (Table 2-2, items E and G, and DLA Attachment G-1). Additionally, the Utah Department of Transportation (UDOT) has proposed, received approval for (per the project Environmental Impact Statement and resultant Record of Decision), and is currently in the final engineering stages of a significant road and bridge widening project for State Road 30, a main Cache Valley access arterial road which crosses the Project east-to-west in the vicinity of the southern Project tributaries. In preparation for their road widening project across Cutler

Reservoir, UDOT has requested the acquisition of Cutler FERC Project Boundary lands owned by PacifiCorp; due to the nature of UDOT's project, it cannot proceed without acquisition of these lands. A final agreement regarding the disposition of these lands should be completed prior to the completion of the relicensing process for the Project, and the expected resultant changes are included in the proposed Project Boundary (Table 2-2, Item I). The other small Project Boundary proposed adjustments are primarily due to the inclusion of PacifiCorp lands (or interests, i.e., flooding easement lands; items A, B, C, D, J, and H, respectively) and/or access to PacifiCorp lands, to align with maintenance and protection of existing Project mitigation lands. Attachment G-1 of this FLA shows the proposed FERC Project Boundary. The Cutler DLA (2021) Attachment G-1, Exhibit G, shows the proposed Project Boundary with red areas and corresponding reference letters that indicate Project Boundary additions and removals, as outlined in Table 2-2.

TABLE 2-2 PROJECT BOUNDARY CHANGES PROPOSED BETWEEN CURRENT (2009) AND REVISED (2021) DLA EXHIBIT G

DLA REFERENCE LETTER	DLA SHEET NUMBER	NARRATIVE DESCRIPTION	ADD OR REMOVE	ACRES
A	G-2	Boundary expanded to include existing ownership, including a portion of the Cutler Historic District in the vicinity of the historic cottages, as well as several sheds and outbuildings used for the Project.	Add	79.01
B	G-2	Boundary will follow property line instead of fence.	Add	2.02
C	G-2	Boundary will follow property line instead of fence.	Add	2.35
D	G-2	Boundary will follow property line instead of fence.	Add	3.77
E	G-2	State highway removed. Underlying land not owned by PacifiCorp.	Remove	4.80
F	G-4	Access easement added.	N/A	N/A
G	G-4	County road removed. Underlying land not owned by PacifiCorp.	Remove	3.43
H	G-4	Existing flooding easements added to boundary.	Add	11.27
I	G-6	UDOT highway and bridge widening project	Remove	6.79
J	G-7	Boundary expanded to include existing ownership.	Add	0.46
N/A	N/A	Improvements to boundary accuracy throughout Project Boundary, resulting from technology advancements and recent surveys.	Net addition	1.15

Source: PacifiCorp 2021

As outlined above in Table 2-2, a total of approximately 100 acres are proposed to be added to the existing Project Boundary and 15 acres are proposed to be removed from the Project Boundary, for a net expansion of 85 acres to the Project Boundary compared to the existing 2009 Project Boundary. Most of that expansion comes from lands located downstream of the powerhouse, as noted by reference letter ‘A’. The last line of the table notes the cumulative changes (additions and removals) throughout the Project Boundary resulting from improvements in GIS and surveying technology, totaling a net addition of approximately 1.2 acres.

2.2 FEDERAL LANDS

There are no federal lands located within the Project Boundary.

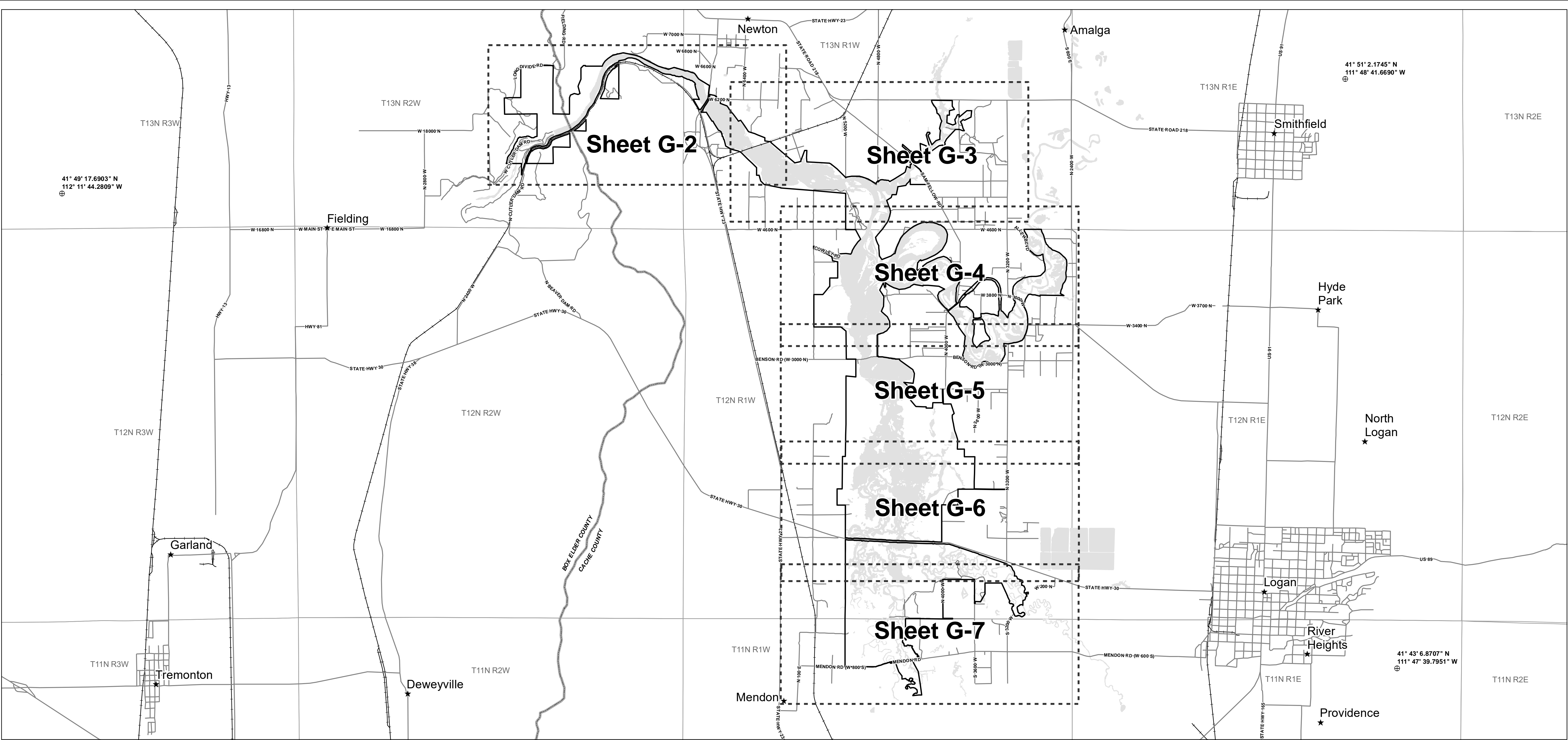
3.0 REFERENCES

PacifiCorp. 2009. PacifiCorp Energy's Revised Exhibit G Project Boundary Drawings for the Cutler Hydroelectric Project under P-2420.

_____. 2021. PacifiCorp's Proposed Exhibit G Project Boundary Drawings for the Cutler Hydroelectric Project under P-2420, Attachment G-1, Current and Proposed Exhibit G Project Maps, Draft License Application, November 2021.

_____. 2022. PacifiCorp's Project Boundary updated data for the Cutler Hydroelectric Project under P-2420.

ATTACHMENT G-1
PROPOSED EXHIBIT G PROJECT MAPS



- Project Boundary
- Water Body
- County
- PLSS-Township
- ★

City
- Road
- Railroad
- Map Sheet
- ⊕

Reference Point *

Map Projection: UTM Zone 12, NAD 83, meters
* Reference points are in Geographic Coordinate System WGS 1984.



This Document is Considered Public Information.

PROJECT BOUNDARY ACREAGE	
1) ACREAGE WITHIN PROJECT BOUNDARY	9276.8 ACRES
2) PACIFICORP LAND	9200.8 ACRES
3) STATE LAND	4.4 ACRES
4) PRIVATE (NON-PACIFICORP LAND)	71.7 ACRES

ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

I hereby state that the project boundary represented on this drawing is developed with reasonable accuracy in accordance with FERC requirements. PLSS is based on the Utah BLM PLSS/GCDB Cadastre Data set coupled with field measurements for surveyed corners. Other data has been developed from orthophotos and other sources including Federal, State, County, and PacifiCorp GIS sources. All reasonable efforts have been made to ensure that positional accuracy conforms to National Map Accuracy Standards for maps at 1:24,000 scale. Public Land Survey lines and Property lines are based on the Salt Lake Meridian.

PacifiCorp has reviewed the Project boundary shown herein. PacifiCorp possesses property rights* for all non-federal lands drawn on this map that are inside the boundary, with the exception of parcels identified as "PacifiCorp Interest Lands" for which additional overflow rights are needed.

*See Easement/Property Rights Reference Table. Further records research may expose private land easements inside the project boundary that are not shown herein. It is not the intent of this map to impede the bona fide property rights of those private land easements that may exist for purposes unrelated to the operation and maintenance of the project (non-Project uses).

License Application of March 28, 2022

Incorporates and supersedes pursuant to Article 402

DESCRIPTION

P-2420-28

P-2420-23

OLD FERC NO.

3/28/2022

4/3/08

DATE

3b

2

NO.

Exhibit G - 1

Cutler Hydroelectric Project, FERC No. P-2420

License Application of March 28, 2022

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1

0.5

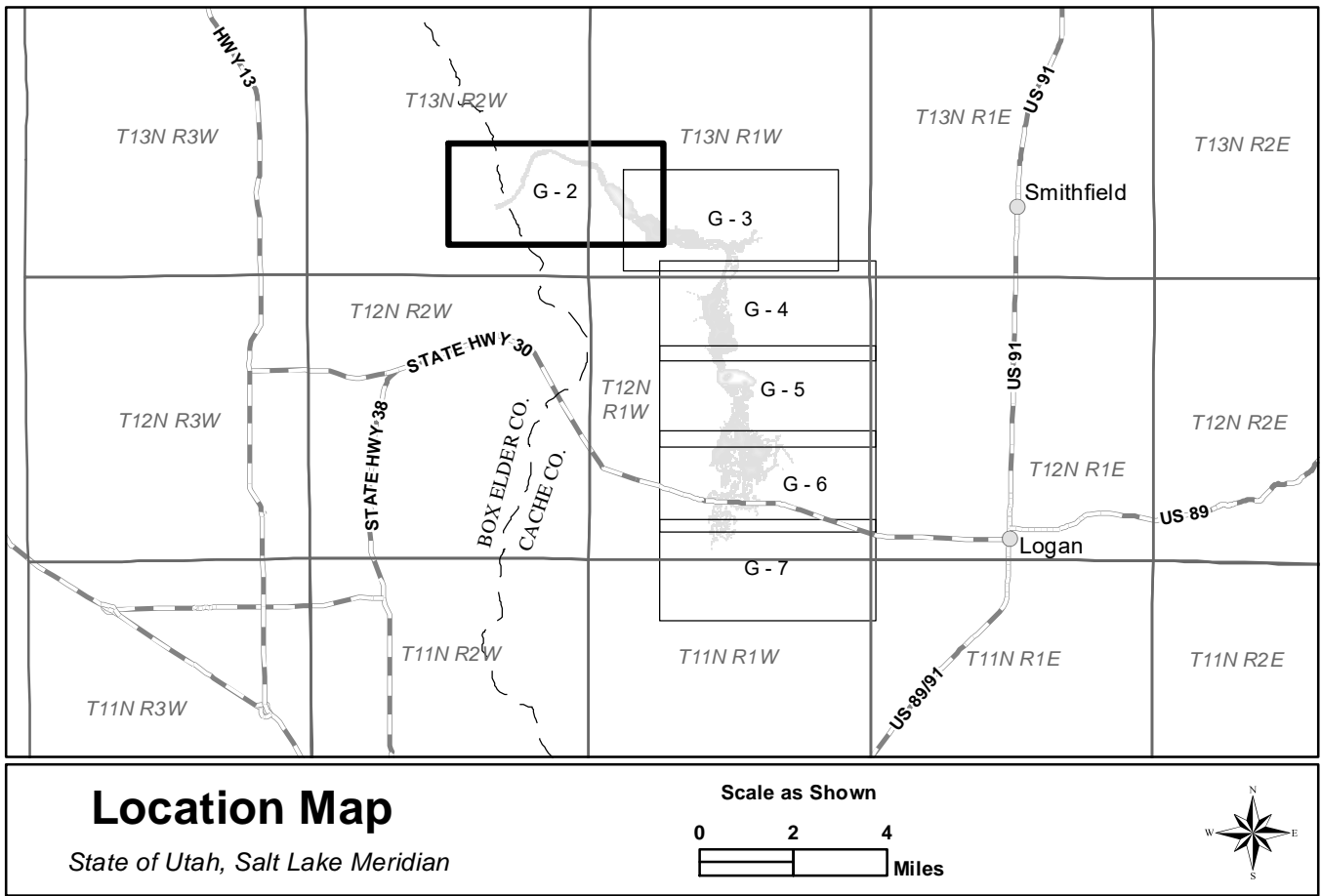
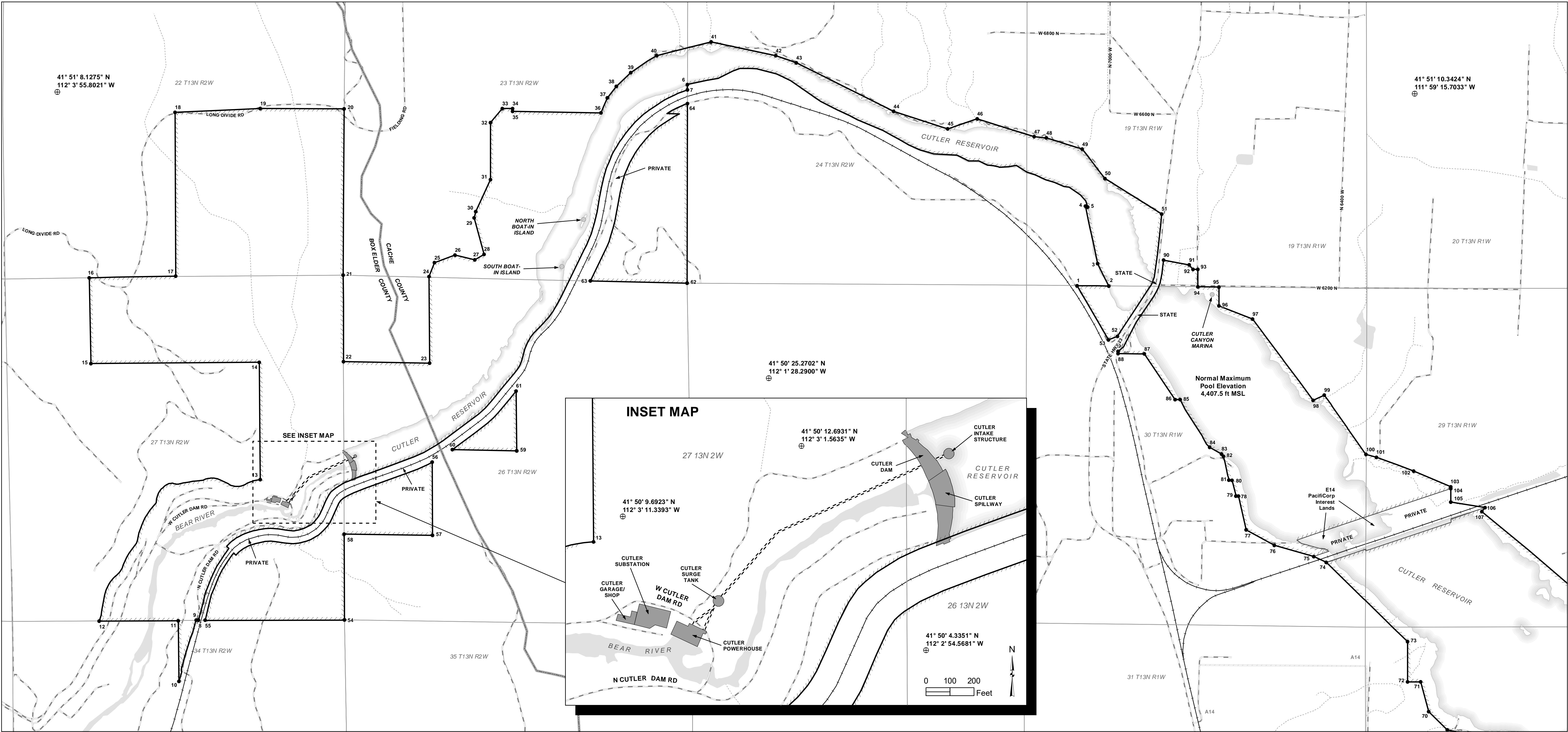
0

1

Miles

N

FERC Drawing No. P-2420-28



- Legend:**
- Project Boundary
 - PacifiCorp Ownership
 - Non-PacifiCorp Ownership
 - Easement
 - PacifiCorp Facility
 - Water Body
 - County
 - PLSS-Section
 - Area Not in FERC Boundary
 - Reference Point *
 - Boundary Point **
 - Recreation Facility
 - PacifiCorp Water Conveyance
 - Road
 - Railroad
 - Stream

* Reference points are in Geographic Coordinate System WGS 1984.
** Boundary point numbers correspond to the boundary description table.
Map Projection: UTM Zone 12, NAD 83, meters

MAP TEXT ABBREVIATIONS:

- A# = Access Road (see Sheet 11)
- E# = Easement (see Sheet 11)
- STATE = State owned land
- COUNTY = County owned land
- PRIVATE = Non-PacifiCorp land



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PROJECT BOUNDARY ACREAGE

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2) PACIFICORP LAND	9200.8 ACRES
3) STATE LAND	4.4 ACRES
4) PRIVATE (NON-PACIFICORP LAND)	71.7 ACRES

ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

I hereby state that the project boundary represented on this drawing is developed with reasonable accuracy in accordance with FERC requirements. PLSS is based on the Utah BLM PLSS/GCDB Cadastre Data set coupled with field measurements for surveyed corners. Other data has been developed from orthophotos and other sources including Federal, State, County, and PacifiCorp GIS sources. All reasonable efforts have been made to ensure that positional accuracy conforms to National Map Accuracy Standards for maps at 1:24,000 scale. Public Land Survey lines and Property lines are based on the Salt Lake Meridian.

PacifiCorp has reviewed the Project boundary shown herein. PacifiCorp possesses property rights* for all non-federal lands drawn on this map that are inside the boundary, with the exception of parcels identified as "PacifiCorp Interest Lands" for which additional overflow rights are needed.

*See Easement/Property Rights Reference Table. Further records research may expose private land easements inside the project boundary that are not shown herein. It is not the intent of this map to impede the bona fide property rights of those private land easements that may exist for purposes unrelated to the operation and maintenance of the project (non-Project uses).

License Application of March 28, 2022 Incorporates and Equivalents pursuant to Article 402		DESCRIPTION	
P-2420-29	P-2420-24	OLD FERC NO.	
3/28/2022	4/30/09	DATE	
3b	2	NO.	

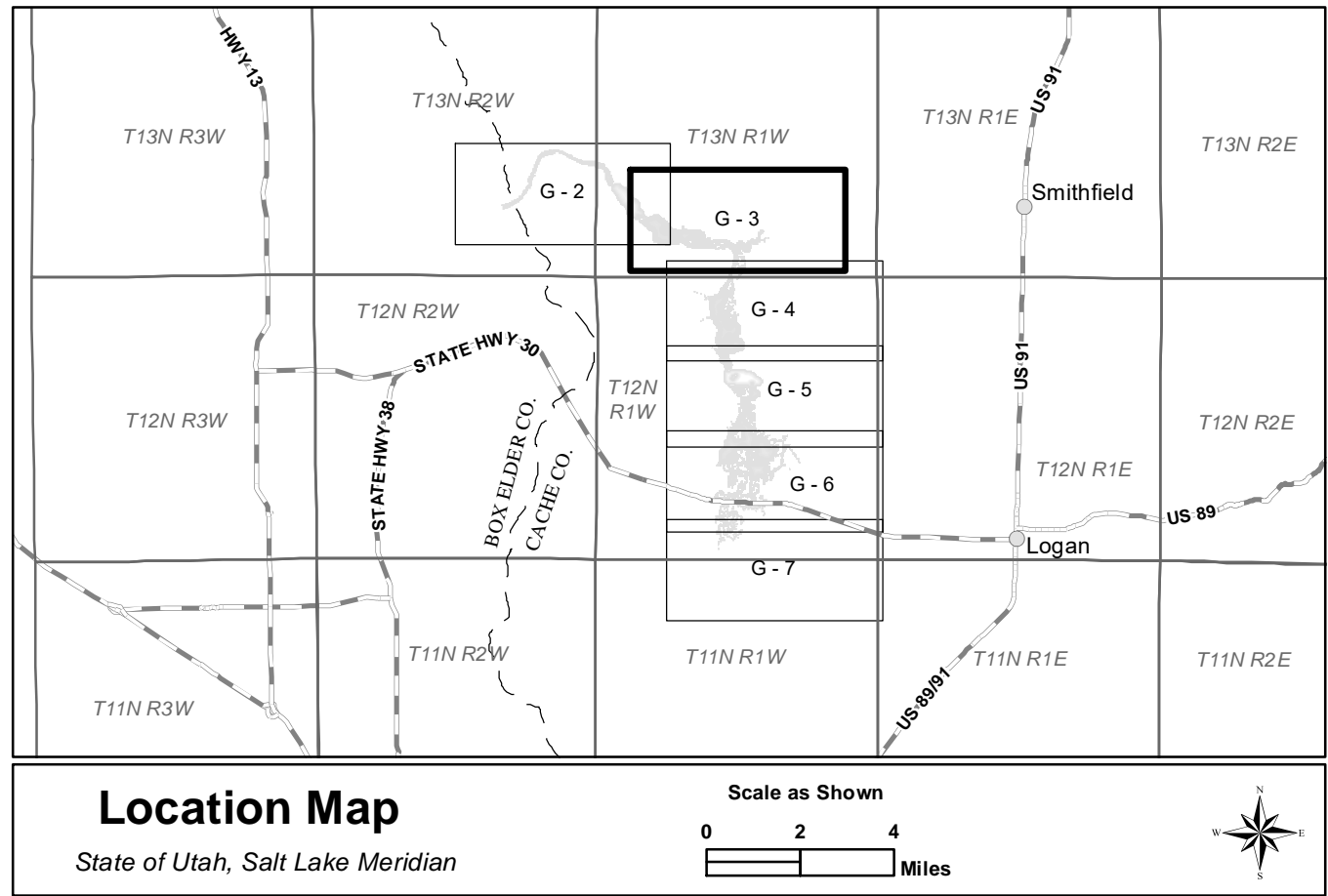
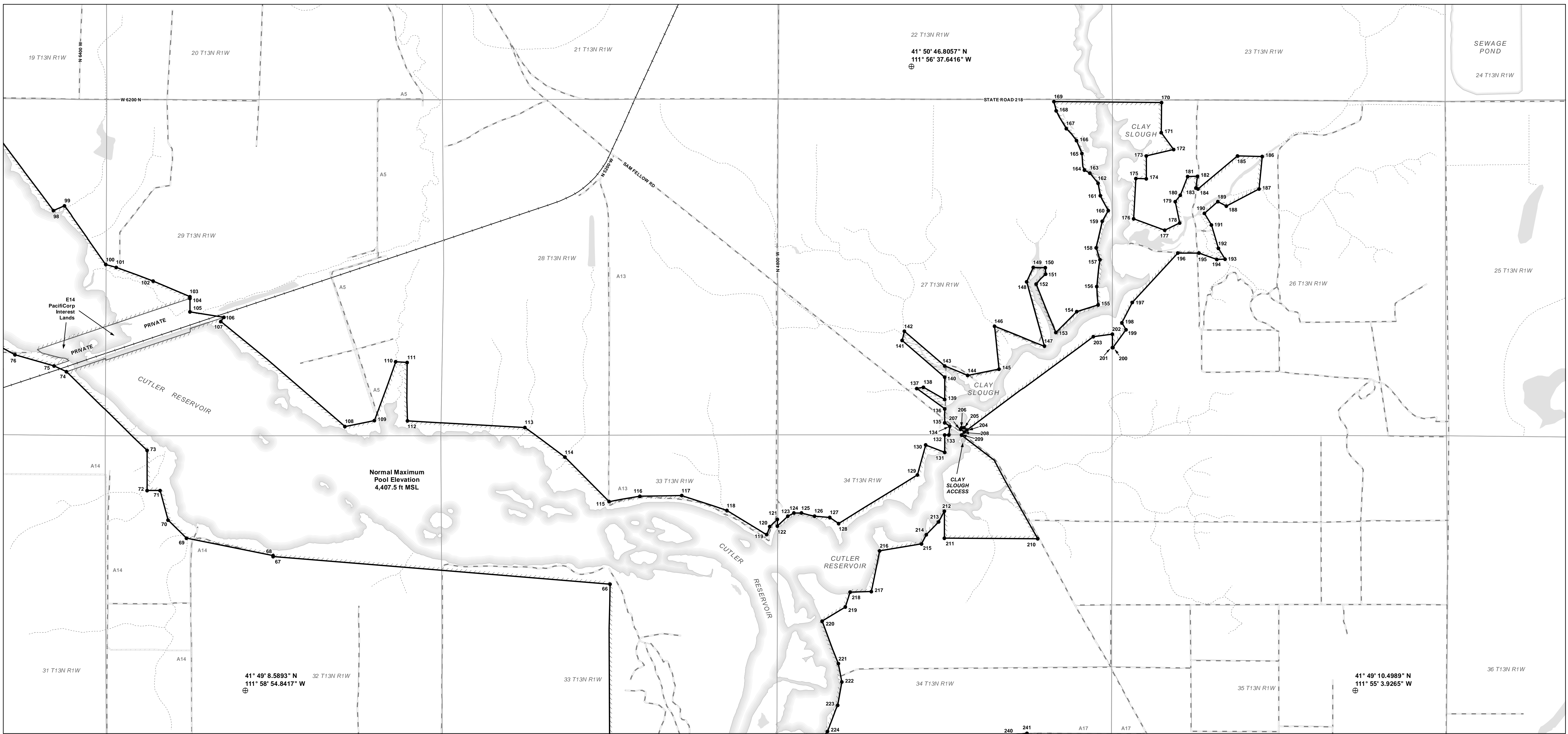
Exhibit G - 2
Cutler Hydroelectric Project, FERC No. P-2420
License Application of March 28, 2022
Project Boundary Map
Original Drawing Dated December, 2007

Scale as shown
1,000 500 0 1,000 Feet

Rev. 3b

N

FERC Drawing No. P-2420-29



- Project Boundary
- PacifiCorp Ownership
- Non-PacifiCorp Ownership
- Easement
- PacifiCorp Facility
- Water Body
- County
- PLSS-Section
- Area Not in FERC Boundary
- Reference Point *
- Boundary Point **
- Recreation Facility
- PacifiCorp Water Conveyance
- Road
- Railroad
- Stream

* Reference points are in Geographic Coordinate System WGS 1984.
** Boundary point numbers correspond to the boundary description table.
Map Projection: UTM Zone 12, NAD 83, meters

MAP TEXT ABBREVIATIONS:
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PACIFICORP

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License Application of March 28, 2022

3/28/2022

2

NO.

INCORPORATES AND ACQUISITION PURSUANT TO ARTICLE 402

4/3/20

DATE

DESCRIPTION

OLD FERC NO.

Exhibit G - 3

Cutler Hydroelectric Project, FERC No. P-2420

License Application of March 28, 2022

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

Rev. 3b

3/28/2022

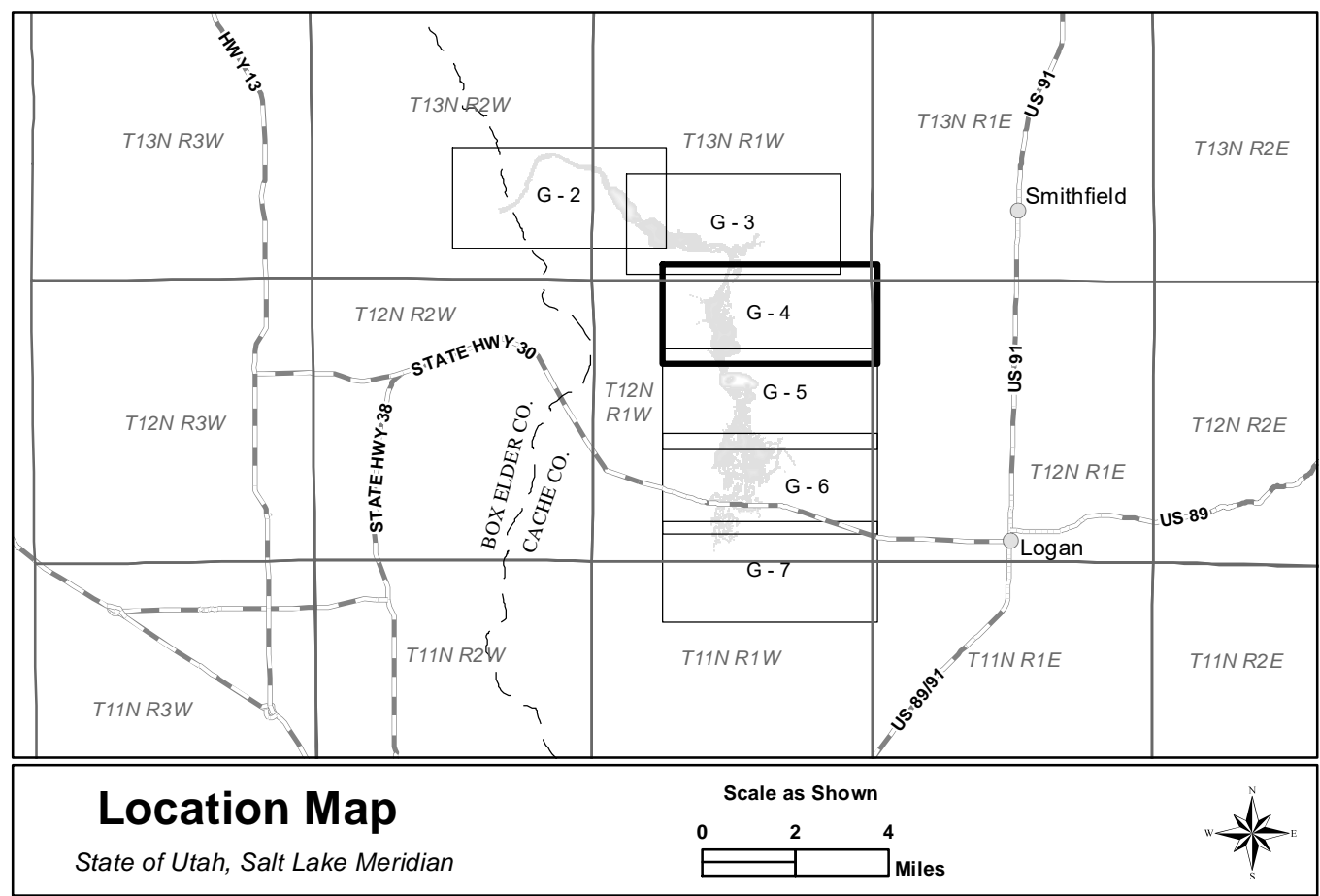
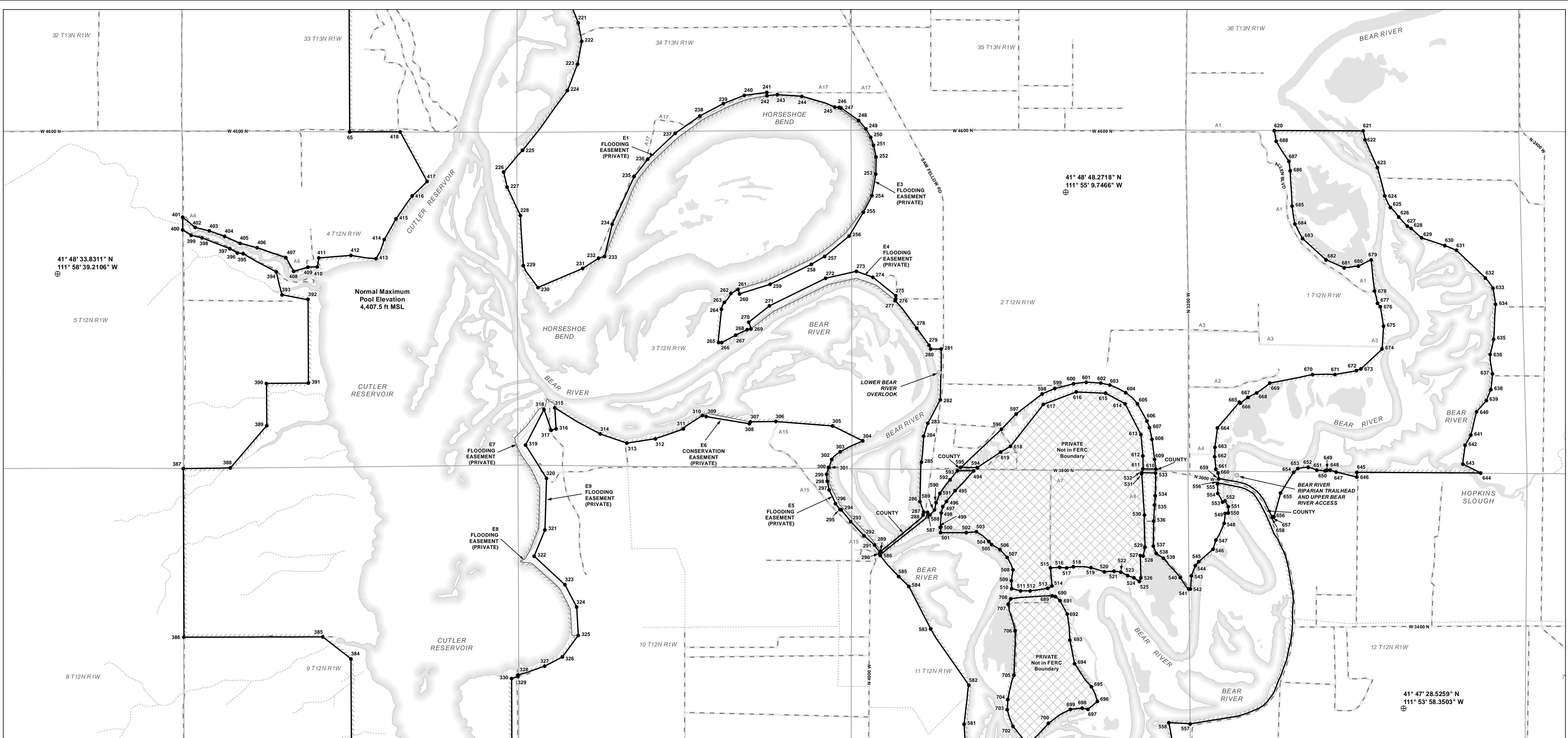
4/3/20

DATE

DESCRIPTION

OLD FERC NO.

FERC Drawing No. P-2420-30



- | | | | |
|--|--------------------------|--|-----------------------------|
| | Project Boundary | | Area Not in FERC Boundary |
| | PacifiCorp Ownership | | Reference Point * |
| | Non-PacifiCorp Ownership | | Boundary Point ** |
| | Easement | | Recreation Facility |
| | PacifiCorp Facility | | PacifiCorp Water Conveyance |
| | Water Body | | Road |
| | County | | Railroad |
| | PLSS-Section | | Stream |

* Reference points are in Geographic Coordinate System WGS 1984.
** Boundary point numbers correspond to the boundary description table.
Map Projection: UTM Zone 12, NAD 83, meters

MAP TEXT ABBREVIATIONS:
- A# = Access Road (see Sheet 11)
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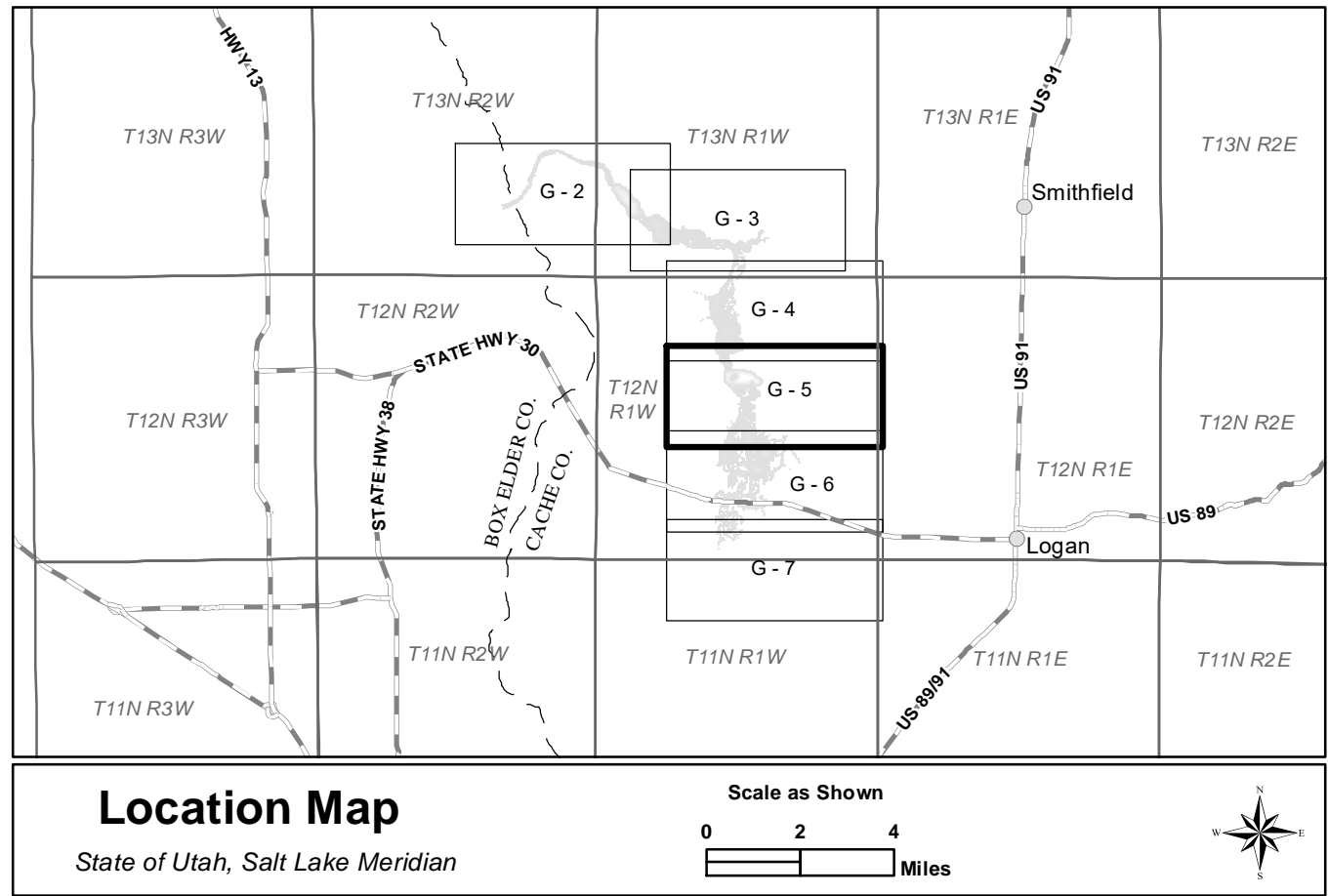
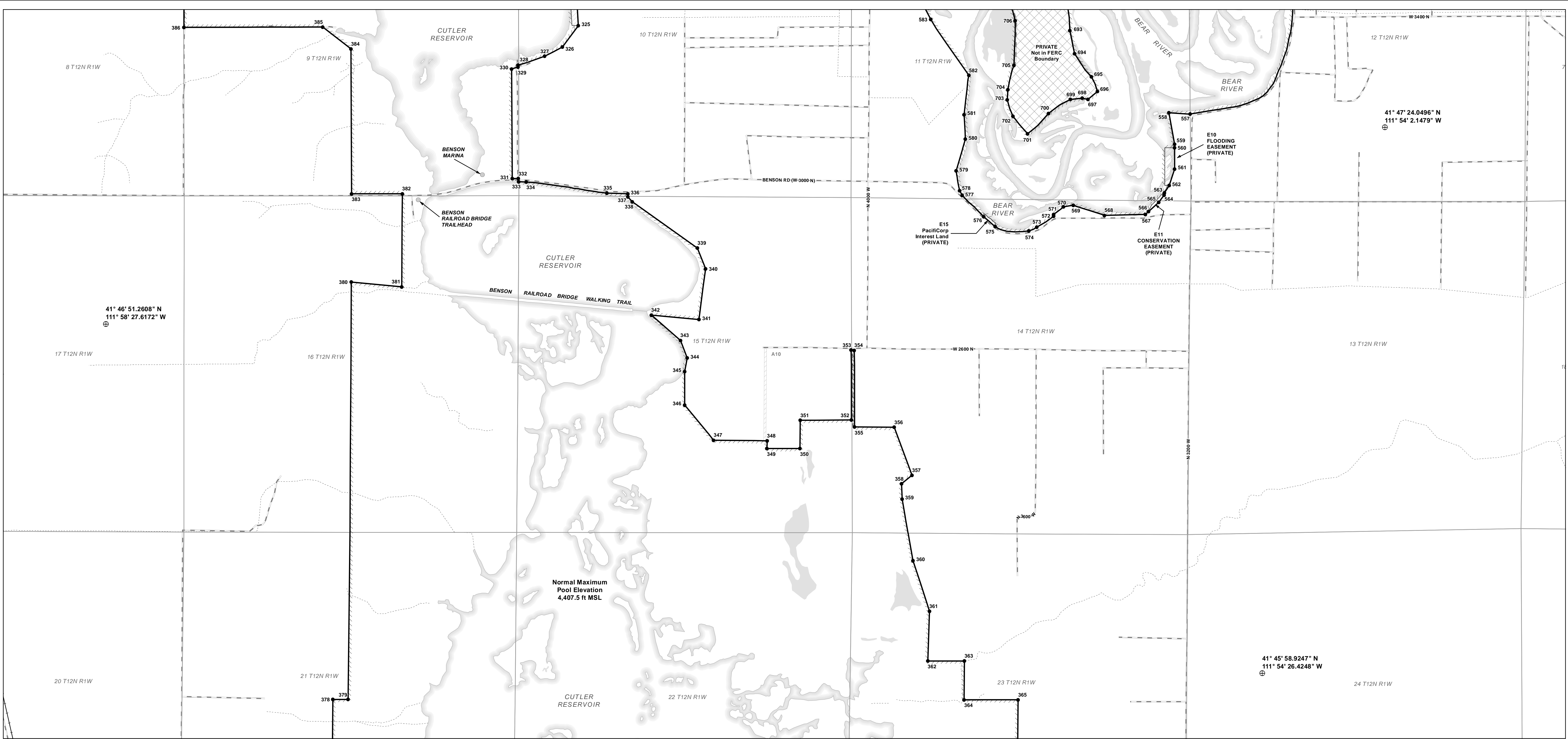
ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

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3b		3/28/2022	P-2420-31	DESCRIPTION	Rev. 3b
2		4/3/09	P-2420-25		
NO.		DATE	OLD FERC NO.		
<div>Exhibit G - 4</div> <div>Cutler Hydroelectric Project, FERC No. P-2420</div> <div>License Application of March 28, 2022</div> <div>Project Boundary Map</div> <div>Original Drawing Dated December, 2007</div> <div>Scale as shown</div> <div><div>1,00050001,000</div><div></div><div>Feet</div></div> <div>N</div>					



- Project Boundary
- PacifiCorp Ownership
- Non-PacifiCorp Ownership
- Easement
- PacifiCorp Facility
- Water Body
- County
- PLSS-Section
- Area Not in FERC Boundary
- Reference Point *
- Boundary Point **
- Recreation Facility
- PacifiCorp Water Conveyance
- Road
- Railroad
- Stream

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** Boundary point numbers correspond to the boundary description table.
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License Application of March 28, 2022

P-2420-32

3/28/2022

3b

Incorporates land acquisition pursuant to Article 402

P-2420-326

4/30/20

2

DESCRIPTION

OLD FERC NO.

DATE

NO.

Exhibit G - 5

Cutler Hydroelectric Project, FERC No. P-2420

License Application of March 28, 2022

Project Boundary Map

Original Drawing Dated December, 2007

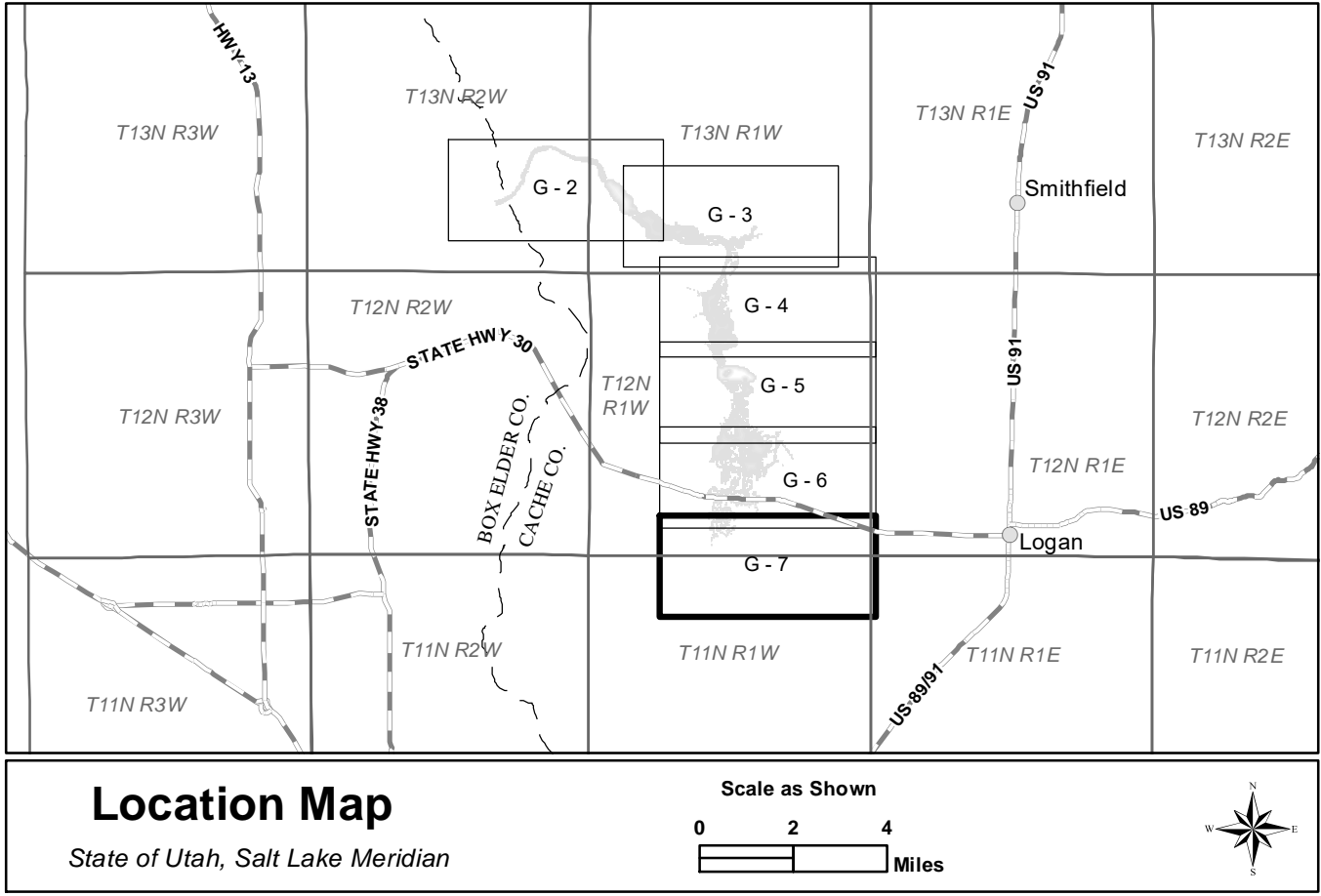
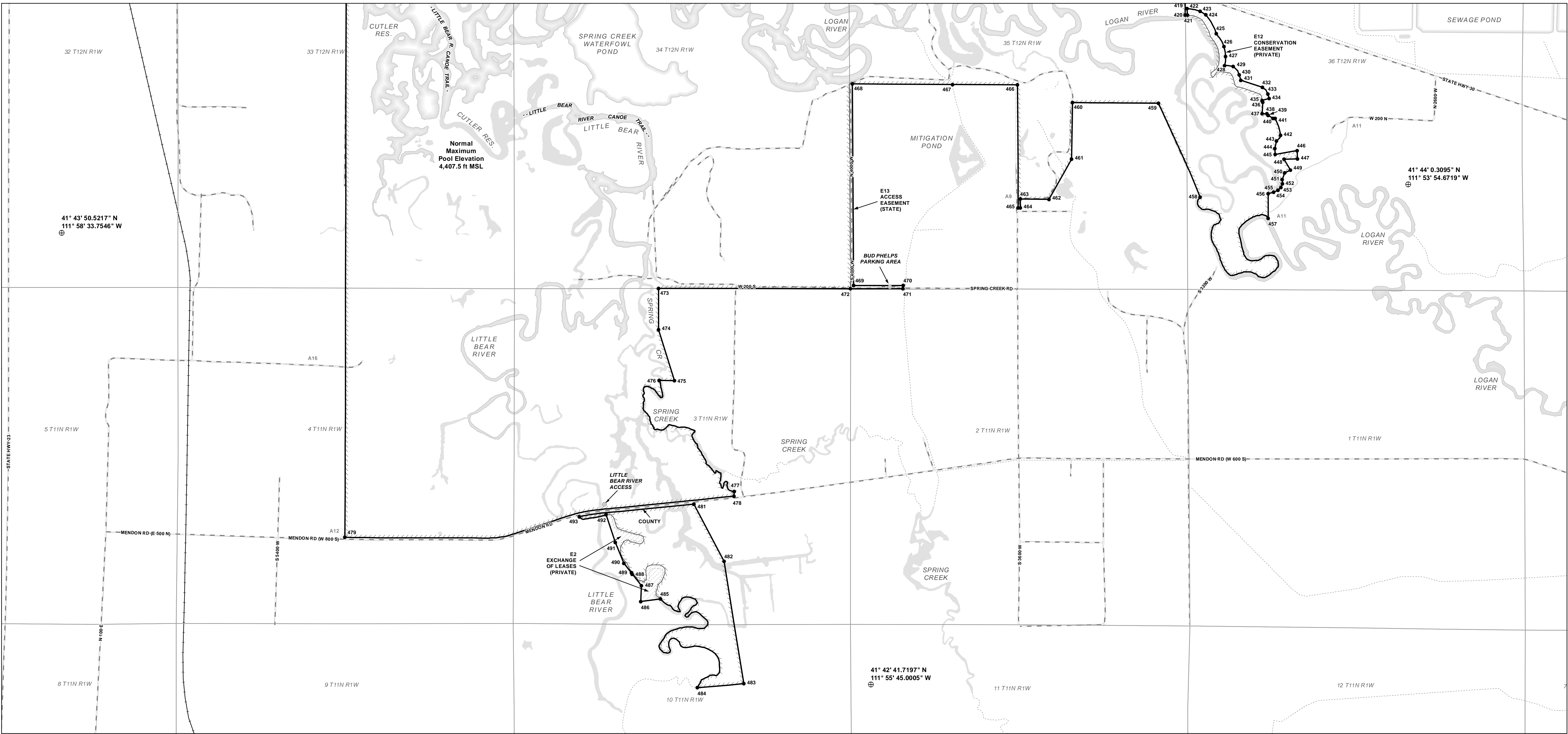
Scale as shown

1,000 500 0 1,000 Feet

Rev. 3b

North Arrow

FERC Drawing No. P-2420-32



- MAP TEXT ABBREVIATIONS:**
- A# = Access Road (see Sheet 11)
 - E# = Easement (see Sheet 11)
 - STATE = State owned land
 - COUNTY = County owned land
 - PRIVATE = Non-PacifiCorp land
- PROJECT BOUNDARY ACREAGE**
- | | |
|------------------------------------|--------------|
| 1) ACREAGE WITHIN PROJECT BOUNDARY | 9276.8 ACRES |
| 2) PACIFICORP LAND | 9200.8 ACRES |
| 3) STATE LAND | 4.4 ACRES |
| 4) PRIVATE (NON-PACIFICORP LAND) | 71.7 ACRES |
- ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS
- I hereby state that the project boundary represented on this drawing is developed with reasonable accuracy in accordance with FERC requirements. PLSS is based on the Utah BLM PLSS/GCDB Cadastre Data set coupled with field measurements for surveyed corners. Other data has been developed from orthophotos and other sources including Federal, State, County, and PacifiCorp GIS sources. All reasonable efforts have been made to ensure that positional accuracy conforms to National Map Accuracy Standards for maps at 1:24,000 scale. Public Land Survey lines and Property lines are based on the Salt Lake Meridian.
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License Application of March 28, 2022		Incorporates land acquisition pursuant to Article 402		DESCRIPTION	
P-2420-34	P-2420-34	P-2420-36	P-2420-36	OLD FERC NO.	
3/28/2022	4/3/08	DATE			
2	NO.				

Exhibit G - 7
Cutler Hydroelectric Project, FERC No. P-2420
License Application of March 28, 2022
Project Boundary Map
Original Drawing Dated December, 2007

Scale as shown
1,000 500 0 1,000 Feet

Rev. 3b

BOUNDARY DESCRIPTION

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
1	4632998	416407			BEGINNING AT A POINT S 89-22-20 E 789.92 FEET (GIS CALCULATED) FROM THE NORTHWEST CORNER OF SEC 30 T13N R1W, THENCE ALONG PACIFICORP PROPERTY LINE, THE FOLLOWING COURSES BETWEEN POINTS 1 AND 5:
2	4632996	416558	S89-15-1E	494	
3	4633103	416505	N26-25-51W	391	
4	4633377	416447	N11-55-10W	919	
5	4633372	416458	S66-18-2E	40	TO THE WEST BANK OF THE BEAR RIVER
6	4633956	414553	S0-27-50E	86	8880 ALONG WEST BANK OF THE BEAR RIVER APPROX. 6880 FEET BEND POINT ON PACIFICORP PROPERTY LINE LOCATED ON THE WEST SECTION LINE OF SEC 24 T13N R2W
7	4633930	414553		12158	86 ALONG PACIFICORP PROPERTY LINE (WEST SECTION LINE OF SEC 24 T13N R2W) TO THE NORTH RIGHT OF WAY LINE OF RAILROAD PARCEL ALONG NORTH RIGHT OF WAY LINE OF RAILROAD PARCEL APPROX 12158 FEET
8	4631405	412226	S89-36-11W	39	BEND POINT ON PACIFICORP PROPERTY LINE LOCATED ON THE SOUTH SECTION LINE OF SEC 27 T13N R2W ALONG PACIFICORP PROPERTY LINE (SOUTH SECTION LINE OF SEC 27 T13N R2W)
9	4631405	412215		999	TO THE WEST RIGHT OF WAY LINE OF N CUTLER DAM ROAD ALONG THE WEST RIGHT OF WAY LINE OF N CUTLER DAM ROAD APPROX 999 FEET
10	4631113	412133			BEND POINT ON PACIFICORP PROPERTY LINE LOCATED ON THE NORTH-SOUTH CENTER LINE OF SEC 34 T13N R2W, THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 10 AND 12:
11	4631402	412130	N0-38-17W	949	
12	4631401	411753	S89-47-31W	1236	TO THE NWLY LINE OF A 100 FOOT BUFFER OF CUTLER WEST CANAL
13	4632074	412520		3958	TO THE NWLY LINE OF A 100 FOOT BUFFER OF CUTLER WEST CANAL APPROX. 3958 FEET BEND POINT ON PACIFICORP PROPERTY LINE, THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 13 AND 51:
14	4632634	412516	N0-25-59W	1837	
15	4632627	411714	S89-32-9W	2633	
16	4633035	411706	N0-59-40W	1340	
17	4633043	412118	N89-1-24E	1349	
18	4633824	412114	N0-16-5W	2562	
19	4633842	412520	N87-26-7E	1333	
20	4633840	412920	S89-49-32E	1313	
21	4633048	412914	S0-24-37W	2602	
22	4632636	412916	S0-14-9E	1350	
23	4632628	413326	S88-53-6E	1347	
24	4633041	413324	N0-22-35W	1356	
25	4633107	413349	N21-10-23E	231	
26	4633143	413447	N89-42-1E	341	
27	4633121	413540	S76-53-3E	316	
28	4633147	413585	N59-38-46E	168	
29	4633321	413538	N15-4-58W	589	
30	4633351	413546	N14-23-6E	104	
31	4633503	413615	N24-35-25E	548	
32	4633775	413615	N0-2-40E	891	
33	4633842	413672	N40-14-21E	288	
34	4633841	413721	S89-18-25E	161	
35	4633827	413721	S0-10-6E	45	
36	4633821	414141	S89-6-48E	1378	
37	4633892	414172	N23-25-56E	254	
38	4633947	414215	N37-32-32E	230	
39	4634013	414283	N46-12-21E	310	
40	4634093	414407	N57-8-51E	484	
41	4634159	414665	N75-35-6E	875	
42	4634093	414974	S77-53-10E	1037	
			S70-43-35E	335	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
43	4634059	415071	S63-25-34E	1700	
44	4633827	415534	S72-12-24E	891	
45	4633744	415793	N70-49-3E	484	
46	4633793	415932	S72-25-7E	934	
47	4633707	416203	S84-34-35E	191	
48	4633701	416261	S72-29-23E	589	
49	4633647	416433	S37-41-59E	576	
50	4633508	416540	S58-0-49E	1047	
51	4633339	416811			TO THE WESTERLY RIGHT OF WAY LINE OF UTAH STATE HWY 23 2087 ALONG THE WESTERLY RIGHT OF WAY LINE OF UTAH STATE HWY 23 APPROX. 2087 FEET TO THE WEST PACIFICORP PROPERTY LINE (EASTERLY RIGHT OF WAY LINE OF RAILROAD); THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 52, 53 AND 1:
52	4632757	416599			
53	4632740	416557	S68-8-0W	150	
1	4632998	416407	N29-59-1W	979	BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
54	4631406	412921			BEGINNING AT THE SOUTHEAST CORNER OF SEC 27 T13N R2W; THE POB;
			S89-57-36W	2175	ALONG PACIFICORP PROPERTY LINE
55	4631406	412258			TO THE EASTERLY RIGHT OF WAY LINE OF RAILROAD PARCEL
				4783	ALONG THE EASTERLY RIGHT OF WAY LINE OF RAILROAD PARCEL APPROX. 4783 FEET
56	4632157	413339			BEND POINT ON PACIFICORP PROPERTY LINE, THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 56, 57, 58 AND 54:
			S0-17-25E	1144	
57	4631808	413340	N89-2-7W	1382	
58	4631815	412919	S0-12-48E	1344	
54	4631406	412921			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
59	4632211	413741			BEGINNING AT A POINT BEARING N 89-2-52 W 2703.45 FEET (GIS CALCULATED) TO A CORNER POINT FROM THE EAST QUARTER CORNER OF SEC 26 T13N R2W, THE POB;
60	4632217	413435	N88-57-20W	1005	ALONG PACIFICORP PROPERTY LINE
				1361	TO THE EASTERLY RIGHT OF WAY LINE RAILROAD PARCEL
61	4632496	413738			ALONG THE EASTERLY RIGHT OF WAY LINE OF RAILROAD PARCEL APPROX. 3624 FEET
			S0-34-6E	936	BEND POINT ON PACIFICORP PROPERTY LINE
59	4632211	413741			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
62	4633010	414552			BEGINNING AT THE SOUTHEAST CORNER OF SEC 23 T13N R2W; THE POB;
			N88-41-43W	1513	ALONG PACIFICORP PROPERTY LINE (SOUTH SECTION LINE OF SEC 23 T13N R2W)
63	4633020	414091			TO THE EASTERLY RIGHT OF WAY LINE OF RAILROAD PARCEL
				3624	ALONG THE EASTERLY RIGHT OF WAY LINE OF RAILROAD PARCEL APPROX. 3624 FEET
64	4633865	414553	S0-4-52W	2807	BEND POINT ON PACIFICORP PROPERTY LINE
62	4633010	414552			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
65	4629757	420201			BEGINNING AT THE SOUTH QUARTER CORNER OF SEC 33 T13N R1W, THE POB; THENCE ALONG PACIFICORP PROPERTY LINE, THE FOLLOWING COURSES BETWEEN POINTS 65 AND 74:
66	4630661	420202	N0-5-5E	2965	
67	4630793	418586	N85-18-8W	5320	
68	4630797	418586	N1-0-9E	13	
69	4630882	418169	N78-32-24W	1395	
70	4630969	418081	N45-27-35W	405	
71	4631111	418043	N14-58-56W	483	
72	4631111	417981	N89-38-26W	204	
73	4631302	417980	N0-20-44W	626	
74	4631681	417593	N45-37-13W	1776	
					TO THE SOUTHERLY RIGHT OF WAY LINE OF RAILROAD PARCEL (E15)
			N64-50-11W	214	ACROSS RAILROAD PARCEL

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
75	4631708	417534			BEND POINT ON PACIFICORP PROPERTY LINE ON NORTHERLY RIGHT OF WAY LINE OF RAILROAD PARCEL (E15); THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 75 AND 89:
76	4631761	417347	N74-9-13W	639	
77	4631834	417213	N61-32-18W	499	
78	4631996	417176	N12-53-44W	545	
79	4631996	417164	S87-32-18W	38	
80	4632071	417145	N14-14-55W	256	
81	4632072	417130	N85-5-56W	50	
82	4632184	417104	N13-7-1W	378	
83	4632196	417095	N34-13-34W	48	
84	4632227	417038	N61-28-54W	213	
85	4632455	416898	N31-43-54W	878	
86	4632455	416873	S89-58-35W	80	
87	4632672	416727	N33-50-37W	859	
88	4632674	416603	N89-18-36W	409	
89	4632685	416602	N2-40-42W	37	
90	4633120	416819			TO EASTERLY RIGHT OF WAY LINE OF UTAH STATE HWY 23 1626 ALONG EASTERLY RIGHT OF WAY LINE OF UTAH STATE HWY 23 BEND POINT ON PACIFICORP PROPERTY LINE, THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 90 AND 104:
91	4633097	416940	S79-4-29E	404	
92	4633075	416959	S41-2-46E	94	
93	4633075	416983	S89-44-41E	77	
94	4632993	416983	S0-12-45E	270	
95	4632991	417083	S88-58-13E	328	
96	4632901	417083	S0-1-36W	296	
97	4632838	417243	S68-45-26E	564	
98	4632453	417531	S36-44-15E	1580	
99	4632476	417585	N65-58-17E	193	
100	4632193	417782	S34-56-11E	1133	
101	4632181	417832	S75-40-11E	167	
102	4632115	418009	S69-39-23E	620	
103	4632041	418186	S67-7-21E	628	
104	4632032	418186	S0-2-12E	30	
			S0-2-13E	211	TO THE NORTHERLY RIGHT OF WAY LINE OF RAILROAD PARCEL (E15), THENCE ALONG PACIFICORP PROPERTY LINE THE FOLLOWING COURSES BETWEEN POINTS 104 AND 106:
105	4631967	418186	S81-2-50E	541	
106	4631942	418349			BEND POINT ON PACIFICORP PROPERTY LINE ON THE SOUTHERLY RIGHT OF WAY LINE OF RAILROAD PARCEL (E15); THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 106 AND 208:
107	4631921	418334	S34-46-36W	82	
108	4631417	418930	S49-48-35E	2560	
109	4631446	419071	N78-33-57E	472	
110	4631727	419174	N20-6-10E	983	
111	4631724	419229	S86-52-1E	180	
112	4631444	419231	S0-17-33E	919	
113	4631413	419793	S86-47-50E	1849	
114	4631270	419986	S53-20-55E	786	
115	4631057	420198	S44-54-45E	987	
116	4631083	420346	N79-53-16E	495	
117	4631085	420547	N89-25-40E	657	
118	4631014	420763	S71-47-52E	746	
119	4630898	420964	S58-46-39E	734	
			N22-11-25E	135	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
120	4630936	420969			
121	4630971	421006	N45-52-42E	165	
			S0-11-SW	102	
122	4630940	421005	N46-56-23E	223	
123	4630987	421055	N63-14-6E	109	
124	4631002	421085	N90-0-0E	119	
125	4631002	421121	S76-54-51E	210	
126	4630987	421183	S85-22-7E	244	
127	4630981	421258	S55-36-3E	168	
128	4630952	421300	N58-22-42E	1458	
129	4631186	421678	N15-25-53E	487	
130	4631328	421718	S68-52-45E	318	
131	4631294	421808	N0-9-7E	272	
132	4631377	421809	N90-0-0E	64	
133	4631377	421828	N6-59-3E	140	TO THE SW'LY LINE OF SAM FELLOWS ROAD
134	4631419	421833	N56-41-15W	97	ALONG THE SW'LY LINE OF SAM FELLOWS ROAD
135	4631435	421809	N0-2-16W	221	
136	4631502	421809	N53-54-52W	543	
137	4631600	421675	N79-27-50E	108	
138	4631606	421707	S59-51-21E	385	
139	4631547	421809	N0-4-49E	351	
140	4631654	421809	N49-18-6W	886	
141	4631830	421604	N13-32-42E	148	
142	4631874	421615	S49-27-54E	838	
143	4631708	421809	S67-7-53E	393	
144	4631661	421919	N78-7-24E	502	
145	4631693	422069	N5-51-5W	678	
146	4631898	422048	S68-12-42E	846	
147	4631803	422287	N15-29-13W	1053	
148	4632112	422202	N25-28-35E	247	
149	4632180	422234	S89-30-12E	189	
150	4632179	422292	S3-49-13E	102	
151	4632148	422294	S44-33-50W	216	
152	4632101	422247	S22-7-48E	829	
153	4631867	422343	N44-43-18E	468	
154	4631969	422443	N72-32-28E	352	
155	4632001	422545	N4-9-50W	288	
156	4632088	422539	N7-2-12E	424	
157	4632217	422555	N18-37-10W	200	
158	4632274	422535	N12-58-22E	425	
159	4632401	422564	N28-22-7E	197	
160	4632454	422593	N27-51-43W	266	
161	4632525	422555	N10-26-0W	195	
162	4632584	422544	N38-9-50W	207	
163	4632633	422505	N63-7-3W	98	
164	4632647	422479	N8-43-15W	266	
165	4632727	422466	N22-36-5W	219	
166	4632789	422441	N39-49-37W	248	
167	4632847	422392	N29-38-33W	319	
168	4632931	422344	N13-43-55W	150	
169	4632976	422334	S89-28-6E	1691	
170	4632971	422849	S0-12-52W	471	

BOUNDARY DESCRIPTION

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
219	4630551	421332	S59-19-35W	428	
220	4630485	421220	S20-51-17E	718	
221	4630280	421298	S10-26-9E	295	
222	4630191	421315	S10-10-26W	368	
223	4630081	421295	S21-13-57W	442	
224	4629955	421246	S36-53-23W	1175	
225	4629669	421031	S40-32-56W	456	
226	4629563	420941	S12-52-1E	243	
227	4629491	420957	S25-14-63E	488	
228	4629357	421020	S3-25-32E	794	
229	4629115	421035	S33-38-33E	410	
230	4629011	421104	N67-21-44E	767	
231	4629101	421320	N57-8-15E	299	
232	4629150	421396			TO THE WLY LINE OF E10 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 232 AND 241:
			N71-45-54E	97	
233	4629160	421424			TO WLY LINE OF E10 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 233 AND 242:
			N13-40-9E	522	
234	4629314	421462	N24-31-3E	823	
235	4629542	421566	N38-4-27E	348	
236	4629626	421631	N47-0-13E	591	
237	4629749	421763	N54-19-9E	478	
238	4629834	421882	N62-36-9E	417	
239	4629892	421995	N67-57-9E	355	
240	4629933	422095	N83-15-9E	357	
241	4629946	422203	S0-31-49E	51	
242	4629930	422203			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 242 AND 245:
			N83-35-9E	168	
243	4629936	422254	S85-37-9E	387	
244	4629927	422372	S72-11-17E	546	TO THE NLY LINE OF E3 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 245 AND 261:
245	4629876	422530	S86-38-18E	69	
246	4629875	422551	S64-0-36E	31	
247	4629871	422560	S55-5-57E	337	
248	4629812	422644	S40-7-51E	181	
249	4629770	422679	S29-50-52E	146	
250	4629731	422701	S21-32-51E	133	
251	4629694	422716	S11-43-51E	191	
252	4629637	422728	S1-36-9W	271	
253	4629554	422726	S10-2-9W	343	
254	4629451	422708	S26-51-9W	294	
255	4629371	422667	S31-18-9W	438	
256	4629257	422598	S50-17-30W	500	
257	4629160	422481	S58-56-9W	245	
258	4629121	422417	S64-21-9W	722	
259	4629026	422218	S72-16-9W	500	
260	4628980	422073	N19-40-50W	75	
261	4629001	422065			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 261 AND 269:
			S59-29-41W	131	
262	4628981	422031	S37-11-25W	172	
263	4628939	421999	S21-17-59W	119	
264	4628905	421986	S5-9-44W	524	
265	4628746	421972	N89-44-57E	52	
266	4628746	421988	N61-44-27E	248	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
267	4628782	422054	N65-1-43E	202	
268	4628808	422110	N75-29-26E	60	
269	4628813	422128			TO THE WLY LINE OF E4 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 269 AND 277:
			N19-0-49W	106	
270	4628843	422117	N61-37-12E	412	
271	4628921	422216	N83-54-11E	987	
272	4629054	422486	N77-6-11E	497	
273	4629087	422634	S70-25-49E	274	
274	4629059	422712	S51-8-49E	463	
275	4628971	422822	S0-32-49E	49	
276	4628956	422822	S20-23-37W	28	
277	4628948	422819			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 277 AND 287:
			S37-55-29E	553	
278	4628815	422923	S35-59-55E	331	
279	4628733	422962	S21-23-42E	69	
280	4628714	422990	N89-59-59E	167	
281	4628714	423041	S1-16-13W	799	
282	4628470	423035	S27-49-42W	410	
283	4628360	422977	S18-25-56W	220	
284	4628297	422956	S4-50-15W	410	
285	4628172	422945	S2-18-11W	621	
286	4627983	422938	S20-34-51E	173	
287	4627933	422956			TO THE NORTHERLY RIGHT OF WAY LINE OF SAM FELLOWS ROAD ALONG THE NORTHERLY RIGHT OF WAY LINE OF SAM FELLOWS ROAD APPROX. 930 FEET BETWEEN POINTS 287 AND 289:
			S8-5-31W	48	
288	4627919	422954			TO THE SLY LINE OF E5 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 289 AND 301:
289	4627745	422750	S27-6-54W	38	
290	4627734	422745	N31-10-1W	152	
291	4627774	422721	N48-20-25W	221	
292	4627819	422671	N43-21-24W	307	
293	4627887	422606	N38-56-31W	240	
294	4627944	422560	N77-49-36W	18	
295	4627945	422555	N37-33-28W	122	
296	4627974	422532	N25-0-49W	235	
297	4628039	422502	N12-33-49W	141	
298	4628081	422493	N4-35-24W	107	
299	4628114	422490	N14-38-40E	118	
300	4628148	422495	S85-33-37E	11	
301	4628148	422502			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 301 AND 307:
			N18-42-4E	132	
302	4628186	422515	N48-32-14E	176	
303	4628222	422555	N64-24-9E	395	
304	4628274	422604	N63-49-53W	530	
305	4628345	422519	N85-18-11W	898	
306	4628367	422246	S89-19-40W	399	
307	4628366	422125			TO THE ELY LINE OF E6 CONSERVATION EASEMENT (PRIVATE); THENCE ALONG CONSERVATION EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 307 AND 310:
			S27-54-25W	34	
308	4628357	422120	N80-39-25W	687	
309	4628391	421913	N73-51-0W	63	
310	4628396	421894			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 310 AND 315:
			S55-15-36W	365	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
311	4628333	421803	S70-27-0W	465	
312	4628285	421669	S81-6-16W	460	
313	4628264	421531	N70-55-58W	442	
314	4628308	421404	N60-12-47W	824	
315	4628432	421186			TO THE WLY LINE OF E7 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 315 AND 318:
			S3-40-47E	331	
316	4628331	421192	S75-58-1W	81	
317	4628325	421168	N19-4-0W	347	
318	4628425	421134			TO THE SELY LINE OF E9 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 318 AND 325:
			S27-10-19W	630	
319	4628255	421046	S31-48-9E	619	
320	4628094	421145	S1-37-48W	810	
321	4627848	421138	S22-22-0W	449	
322	4627721	421086	S47-16-1E	663	
323	4627584	421235	S27-27-0E	396	
324	4627477	421291	S3-34-36E	447	
325	4627341	421299			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 325 AND 333:
			S37-0-3W	423	
326	4627238	421221	S62-25-0W	313	
327	4627194	421137	S71-32-24W	443	
328	4627151	421009	S0-13-31E	27	
329	4627143	421009	S73-6-59W	104	
330	4627133	420978	S0-14-53E	1727	TO THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 NORTH
331	4626607	420981	N89-53-59E	100	ALONG THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 NORTH
332	4626607	421011	S0-25-32E	51	TO THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD (3000 NORTH)
333	4626591	421011			BEND POINT ON PACIFICORP PROPERTY LINE (SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 NORTH); THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 333 AND 336:
			S89-9-35E	122	
334	4626591	421048	S82-5-43E	1285	
335	4626537	421436	S87-52-23E	326	
336	4626533	421535			BEND POINT ON PACIFICORP PROPERTY LINE ; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 336 AND 353:
			S4-5-34E	49	
337	4626518	421536	S41-59-28E	100	
338	4626496	421557	S54-43-49E	1260	
339	4626274	421870	S21-17-26E	350	
340	4626175	421909	S7-13-58W	809	
341	4625930	421878	N84-25-54W	757	
342	4625952	421649	S48-52-22E	610	
343	4625830	421789	S21-0-11E	296	
344	4625746	421821	S10-14-45W	217	
345	4625681	421809	S0-2-16E	524	
346	4625521	421809	S39-18-13E	719	
347	4625352	421948	S89-22-24E	843	
348	4625349	422205	S1-33-3W	123	
349	4625311	422204	N89-47-51E	520	
350	4625312	422362	N0-37-16E	442	
351	4625447	422364	N89-24-30E	806	
352	4625449	422609			TO THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 2600 NORTH
353	4625784	422608			ALONG PACIFICORP PROPERTY LINE AND SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 2600 NORTH
			S88-6-44E	51	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
354	4625783	422623			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 354 AND 367:
			S0-14-31E	1208	
355	4625415	422625	S89-35-56E	625	
356	4625413	422815	S20-16-51E	804	
357	4625183	422900	S50-49-14W	213	
358	4625142	422850	S1-39-34E	238	
359	4625070	422852	S10-8-5E	987	
360	4624774	422905	S17-59-27E	837	
361	4624531	422984	S1-56-12W	785	
362	4624292	422976	N89-53-49E	577	
363	4624293	423152	S0-19-24W	611	
364	4624106	423151	S89-57-51E	850	
365	4624106	423409	S0-56-11W	2646	
366	4623300	423396	S89-24-56E	2647	
367	4623292	424203			TO THE WEST RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3200 WEST
			S0-21-30W	25	
368	4623284	424203			25 ALONG PACIFICORP PROPERTY LINE AND WEST RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3200 WEST
			N89-22-43W	3978	
369	4623297	422990	S0-21-47E	1293	
370	4622903	422993	N89-14-11W	1327	
371	4622908	422589	S0-16-38E	3044	
372	4621981	422593			TO THE NORTHERLY RIGHT OF WAY LINE OF UTAH STATE HWY 30
				7940	
373	4622087	420189			ALONG THE NORTHERLY RIGHT OF WAY LINE OF UTAH STATE HWY 30 APPROX. 7940 FEET
					BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 373 AND 65:
			N0-3-4W	2676	
374	4622903	420189	S89-43-47W	664	
375	4622902	419986	N0-10-32E	1330	
376	4623307	419987	S89-53-33E	412	
377	4623307	420113	N0-28-47E	2630	
378	4624108	420120	S89-57-35E	243	
379	4624108	420194	N0-25-24E	6567	
380	4626110	420209	S84-42-37E	801	
381	4626087	420452	N0-14-9E	1467	
382	4626534	420454			TO THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 NORTH
			N89-54-46W	798	
383	4626535	420210			ALONG THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 NORTH
			N0-13-43W	2278	
384	4627229	420208	N52-23-56W	562	
385	4627333	420072	S89-54-53W	2185	
386	4627333	419406	N0-13-28W	2654	
387	4628141	419403	N89-21-54E	740	
388	4628144	419628	N40-36-0E	879	
389	4628348	419803	N0-11-45W	663	
390	4628549	419802	N89-34-8E	658	
391	4628551	420003	N0-11-27W	1321	
392	4628953	420002	N80-3-35W	418	
393	4628976	419876	N13-51-15W	368	
394	4629084	419849	N61-3-11W	129	
395	4629172	419690	N68-54-13W	474	
396	4629177	419661	N77-13-30W	171	
397	4629196	419626	N58-1-54W	161	
398	4629248	419492			
399	4629259	419441			
400	4629286	419399			
			N0-21-24W	200	

BOUNDARY DESCRIPTION

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
448	4620689	424681			
			S31-22-21E	200	
449	4620638	424713			
			S63-45-9W	101	
450	4620624	424685			
			S21-38-12W	116	
451	4620591	424672			
			S7-29-29E	66	
452	4620571	424675			
			S23-48-59W	63	
453	4620554	424667			
			S48-34-35W	60	
454	4620542	424653			
			S62-53-51W	83	
455	4620530	424631			
			S78-4-25W	87	
456	4620524	424605			
			S0-23-47E	389	
457	4620406	424606			TO THE NORTHERLY SHORELINE OF LOGAN RIVER
				4216	ALONG THE NORTHERLY SHORELINE OF THE LOGAN RIVER APPROX 4216 FEET
458	4620508	424280			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 458 AND 468:
			N24-1-53W	1614	
459	4620957	424079			
			N89-43-18W	1350	
460	4620959	423668			
			S0-51-26W	886	
461	4620689	423664			
			S29-30-28W	726	
462	4620497	423555			
			N89-35-10W	450	
463	4620498	423418			
			S0-21-17E	138	
464	4620456	423418			
			S90-0-0W	34	
465	4620456	423408			
			N0-20-24W	1936	
466	4621046	423404			
			N89-43-22W	1021	
467	4621047	423093			TO AN IRRIGATION DITCH
			N89-46-8W	1573	ALONG PACIFICORP PROPERTY LINE
468	4621049	422613			TO THE UTAH DEPT. OF NATURAL RESOURCES ACCESS EASEMENT (BK 738 PG 914); THENCE ALONG ACCESS EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 468 AND 472:
			S0-21-28E	3169	
469	4620083	422619			
			S89-57-16E	783	
470	4620083	422858			
			S6-7-17W	46	
471	4620069	422857			
			S89-56-59W	825	
472	4620069	422605			ALONG PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 472 AND 476:
			N89-54-26W	3018	
473	4620070	421685			
			S0-3-39W	650	
474	4619872	421685			
			S17-12-38E	841	
475	4619627	421761			
			N88-49-19W	239	
476	4619629	421688			TO SPRING CREEK
				3671	ALONG SPRING CREEK APPROX. 3671 FEET
477	4619098	422049			BEND POINT ON PACIFICORP PROPERTY LINE
			S6-42-57W	76	ALONG PACIFICORP PROPERTY LINE
478	4619075	422046			TO THE NORTHERLY RIGHT OF WAY LINE OF MENDON ROAD
				6180	ALONG THE NORTHERLY RIGHT OF WAY LINE OF MENDON ROAD APPROX 6186 FEET
479	4618878	420183			BEND POINT ON PACIFICORP PROPERTY LINE
			N0-6-44E	10377	ALONG PACIFICORP PROPERTY LINE
480	4622041	420189			TO THE SOUTHERLY RIGHT OF WAY LINE OF UTAH STATE HWY 30
				13560	ALONG THE SOUTHERLY RIGHT OF WAY LINE OF UTAH STATE HWY 30 APPROX 13546 FEET
419	4621441	424208			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
488	4618702	421559			
489	4618707	421566	N37-51-30W	20	ALONG PACIFICORP PROPERTY LINE TO THE WLY LINE OF THE HEBER HARDMAN LEASE; THENCE ALONG LEASE THE FOLLOWING COURSES BETWEEN POINTS 489 AND 492:
490	4618754	421519	N37-51-29W	193	
491	4618855	421478	N22-27-39W	359	
492	4618987	421434	N18-26-23W	457	
493	4618976	421306		441	TO THE INTERSECTION OF THE PACIFICORP PROPERTY LINE AND THE EASTERLY BANK OF LITTLE BEAR RIVER (HISTORIC CHANNEL) ALONG THE EASTERLY BANK OF THE LITTLE BEAR RIVER (HISTORIC CHANNEL) APPROX. 441 FEET TO THE SOUTHERLY RIGHT OF WAY LINE OF MENDON ROAD ALONG THE SOUTHERLY RIGHT OF WAY LINE OF MENDON ROAD APPROX 1813 FEET
481	4619037	421855			BEND POINT ON PACIFICORP PROPERTY LINE, THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
494	4628130	423195			BEGINNING AT A POINT BEARING S 88-56-46 W 731.14 FEET (GIS CALCULATED) FROM THE NORTH QUARTER CORNER OF SEC 11 T12N R1W, ON THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH; THENCE ALONG PACIFICORP PROPERTY LINE, THE FOLLOWING COURSES BETWEEN POINTS 494 AND 532:
			S42-48-45W	423	
495	4628036	423108	S40-1-2W	216	
496	4627985	423065	S32-43-19W	102	
497	4627959	423049	S14-57-48W	103	
498	4627929	423041	S33-30-16W	225	
499	4627860	423036	N72-48-59E	9	
500	4627861	423039	S3-20-53W	90	
501	4627834	423037	N89-45-12E	404	
502	4627834	423160	N84-28-55E	161	
503	4627839	423209	S52-32-66E	248	
504	4627793	423269	S42-42-23E	68	
505	4627778	423263	S57-28-25E	149	
506	4627753	423322	S43-8-14E	170	
507	4627715	423357	S24-23-5E	215	
508	4627656	423384	S7-8-14W	173	
509	4627603	423377	S1-38-39E	126	
510	4627565	423379	S76-57-12E	144	
511	4627555	423421	S89-38-15E	150	
512	4627555	423467	N81-10-12E	277	
513	4627568	423550	N65-58-40E	77	
514	4627577	423572	N4-31-37W	287	
515	4627664	423565	N86-38-52E	146	
516	4627667	423609	S86-38-19E	109	
517	4627665	423643	N79-12-47E	104	
518	4627671	423674	S86-46-59E	281	
519	4627666	423759	S72-38-1E	219	
520	4627646	423823	N86-26-41E	151	
521	4627649	423869	S82-56-48E	114	
522	4627645	423903	S62-22-45E	116	
523	4627628	423935	S70-26-41E	107	
524	4627618	423965	S55-40-37E	104	
525	4627600	423991	N21-17-45E	64	
526	4627618	423999	N1-30-32W	346	
527	4627723	423996	S83-53-20E	45	
528	4627722	424010	N12-25-21E	140	
529	4627764	424019	N1-21-4W	508	
530	4627918	424015	N3-44-40W	646	
531	4628115	424002	N13-13-23E	23	
532	4628122	424004	S88-30-22E	215	TO THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH ALONG THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH APPROX. 215 FEET

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
533	4628120	424069			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 533 AND 536:
			S0-50-40W	354	
534	4628012	424068	S4-59-30W	149	
535	4627967	424064	S2-38-4W	257	
536	4627889	424060	S0-36-45W	390	
537	4627770	424059	S20-6-29E	123	
538	4627735	424072	S57-5-22E	140	
539	4627712	424108	S40-45-42E	402	
540	4627619	424188	S35-49-52E	223	
541	4627564	424228	S87-13-55E	30	
542	4627563	424237	N4-25-23E	207	
543	4627626	424241	N20-49-36E	171	
544	4627675	424280	N37-39-9E	86	
545	4627696	424276	N49-15-30E	298	
546	4627755	424345	N17-0-7E	148	
547	4627798	424358	N26-50-51E	292	
548	4627877	424398	N6-13-24E	158	
549	4627925	424403	N78-35-19E	47	
550	4627928	424417	N1-33-30E	99	
551	4627958	424418	N27-39-45W	106	
552	4627987	424403	S62-19-48W	46	
553	4627980	424391	N28-32-4W	160	
554	4628023	424368	N2-15-10W	145	
555	4628067	424366	N14-28-54E	15	
556	4628072	424367			TO THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH
				5373	ALONG THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH AND THE WESTERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 WEST APPROX. 5373 FEET
557	4626916	424234			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 557 AND 560:
			N86-47-21W	332	
558	4626922	424133	S9-59-50E	502	
559	4626772	424160	S0-30-48E	56	
560	4626754	424160			TO THE NLY LINE OF E10 FLOODING EASEMENT (PRIVATE); THENCE ALONG FLOODING EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 560 AND 562:
			S0-30-50E	332	
561	4626653	424161	S18-49-10W	276	
562	4626574	424134			TO THE NLY LINE OF E11 CONSERVATION EASEMENT (PRIVATE); THENCE ALONG CONSERVATION EASEMENT THE FOLLOWING COURSES BETWEEN POINTS 562 AND 566:
			S31-50-56W	136	
563	4626538	424112	S7-18-26W	35	
564	4626528	424111	S36-17-31W	144	
565	4626492	424085	S47-59-44W	217	
566	4626448	424035			ALONG PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 566 AND 574:
			S47-58-20W	69	
567	4626434	424020	S88-59-55W	642	
568	4626431	423824	N72-21-13W	517	
569	4626478	423674	S80-47-41W	154	
570	4626471	423628	S53-7-48W	197	
571	4626435	423580	S0-7-38W	30	
572	4626426	423580	S57-4-38W	313	
573	4626374	423500	S64-12-53W	142	
574	4626355	423461			TO THE NORTHERLY RIGHT OF WAY LINE OF BENSON ROAD (3000 NORTH)
				546	ALONG THE NORTHERLY RIGHT OF WAY LINE OF BENSON ROAD (3000 NORTH) APPROX 546 FEET
575	4626377	423300			TO THE ELY LINE OF E15 INTEREST LANDS
				240	ALONG THE NORTHEASTERLY RIGHT OF WAY LINE OF BENSON ROAD (3000 NORTH) TO THE WLY LINE OF THE E15 INTEREST LANDS APPROX 240 FEET

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
576	4626424	423244			
			N45-25-20W	477	ALONG THE NORTHEASTERLY RIGHT OF WAY LINE OF BENSON ROAD (3000 NORTH) APPROX 447 FEET
577	4626527	423141			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 576 AND 586:
			N29-5-1W	82	
578	4626548	423129			
			N9-54-20W	317	
579	4626644	423112			
			N16-18-45E	521	
580	4626796	423157			
			N2-53-46W	388	
581	4626914	423151			
			N6-48-24E	620	
582	4627102	423173			
			N34-13-38W	1070	
583	4627371	422990			
			N27-7-44W	758	
584	4627577	422894			
			N46-26-28W	221	
585	4627623	422835			
			N40-53-1W	437	
586	4627724	422748			TO THE SOUTHEASTERLY RIGHT OF WAY LINE OF SAM FELLOWS ROAD
				1023	ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF SAM FELLOWS ROAD APPROX 1023 FEET
587	4627931	422974			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 587 AND 593:
			S45-10-47E	59	
588	4627919	422987			
			N39-59-30E	106	
589	4627943	423008			
			N14-24-58E	118	
590	4627978	423017			
			N22-22-58E	156	
591	4628022	423035			
			N36-4-28E	270	
592	4628089	423083			
			N40-0-18E	180	
593	4628131	423119			TO THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH
			S89-38-38E	253	ALONG THE SOUTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH APPROX 253 FEET
494	4628130	423195			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
594	4628147	423214			BEGINNING AT A POINT BEARING N 86-34-3 W 671.68 FEET (GIS CALCULATED FROM THE SOUTHEAST CORNER OF SEC 2 T12N R17W, ON THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH
			N89-39-15W	262	ALONG THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH APPROX 262 FEET
595	4628147	423134			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 595 AND 610:
			N46-54-37E	878	
596	4628330	423329			
			N44-11-31E	336	
597	4628403	423401			
			N52-25-8E	517	
598	4628499	423525			
			N66-47-8E	217	
599	4628525	423586			
			N75-11-3E	304	
600	4628549	423676			
			N83-9-25E	199	
601	4628556	423736			
			S86-0-57E	235	
602	4628551	423807			
			S77-59-9E	143	
603	4628542	423850			
			S64-37-52E	277	
604	4628506	423926			
			S46-2-21E	252	
605	4628453	423982			
			S28-58-39E	308	
606	4628371	424027			
			S20-59-20E	116	
607	4628337	424040			
			S12-29-47E	188	
608	4628281	424052			
			S7-37-44E	315	
609	4628186	424065			
			S6-5-56E	156	
610	4628139	424070			TO THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH
			N88-50-6W	203	ALONG THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH APPROX 203 FEET
611	4628140	424008			BEND POINT ON PACIFICORP PROPERTY LINE; THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 611 AND 594:
			N0-29-18E	202	
612	4628202	424009			
			N5-40-13W	338	
613	4628304	423999			
			N27-5-43W	547	
614	4628453	423923			
			N61-37-18W	347	
615	4628503	423830			
			N87-41-53W	466	

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
616	4628509	423688			
617	4628449	423531	S69-11-2W	551	
618	4628248	423373	S38-0-19W	839	
619	4628221	423326	S60-5-36W	176	
			S56-22-44W	443	TO THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3800 NORTH
594	4628147	423214			BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
620	4629763	424638			BEGINNING AT A POINT BEARING S 89-49-35 E 1388.88 FEET (GIS CALCULATED) FROM THE NORTHWEST CORNER OF SEC 1 T12N R1W, THENCE ALONG PACIFICORP PROPERTY LINE, THE FOLLOWING COURSES BETWEEN POINTS 620 AND 658:
			S89-49-38E	1400	ALONG THE NORTH SECTION LINE OF SECTION 1 T12N R1W
621	4629762	425065			
622	4629718	425074	S 12-14-24E	145	
623	4629585	425134	S24-12-10E	479	
624	4629449	425169	S 14-21-33E	460	
625	4629395	425197	S27-20-56E	203	
626	4629348	425236	S39-51-15E	198	
627	4629305	425277	S43-40-57E	197	
628	4629294	425296	S60-26-34E	71	
629	4629248	425347	S47-25-12E	224	
630	4629212	425457	S71-55-3E	383	
631	4629188	425514	S67-17-44E	200	
632	4629057	425653	S46-35-59E	628	
633	4629006	425689	S35-30-11E	202	
634	4628929	425701	S8-55-5E	257	
635	4628762	425693	S24-45-22W	548	
636	4628689	425676	S 12-47-52W	246	
637	4628595	425686	S6-7-55E	311	
638	4628520	425678	S5-53-19W	248	
639	4628468	425656	S22-59-42W	185	
640	4628414	425610	S40-41-15W	234	
641	4628301	425583	S 13-33-12W	381	
642	4628252	425555	S29-28-46W	183	
643	4628163	425544	S7-20-38W	297	
644	4628120	425629	S63-24-2E	313	TO THE SOUTH SECTION LINE OF SECTION 1 T12N R1W
645	4628124	425036	N89-36-8W	1947	ALONG THE SOUTH SECTION LINE OF SECTION 1 T12N R1W
646	4628101	425036	S0-9-1E	75	
647	4628124	424936	N76-57-12W	335	
648	4628134	424907	N71-34-15W	102	
649	4628134	424892	N89-41-0W	48	
650	4628131	424883	S71-49-50W	31	
651	4628133	424844	N87-0-31W	129	
652	4628147	424802	N71-28-17W	146	
653	4628141	424751	S82-52-40W	168	
654	4628124	424732	S47-33-48W	83	
655	4628024	424669	S32-17-49W	386	
656	4627910	424637	S15-43-33W	388	
657	4627911	424629	N89-12-30W	26	
658	4627906	424629	S5-9-24W	14	TO THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 WEST
				1124	ALONG THE NORTHERLY RIGHT OF WAY LINE OF CACHE COUNTY ROAD 3000 WEST APPROX. 1124 FEET
659	4628093	424373			BEND POINT ON PACIFICORP PROPERTY LINE, THENCE THE PROJECT BOUNDARY FOLLOWS THE PACIFICORP PROPERTY LINE AS APPROX. REPRESENTED BY THE FOLLOWING COURSES BETWEEN POINTS 659 AND 620:
660	4628121	424369	N7-24-45W	90	
661	4628139	424359	N29-10-19W	68	
			N6-17-28W	195	

Notes:

1) Information in table is based on GIS derived coordinates and measurements and is not intended to be a traverse with station points and measurements established by ground surveys but rather a generalized representation of the project boundary.

2) Project is located in the state of Utah, Salt Lake Meridian.

3) Reference points on the map sheets are in Geographic Coordinate System WGS 1984.

4) Coordinates in the table are in UTM Zone 12, NAD 83, meters.

PROJECT BOUNDARY ACREAGE

1) ACREAGE WITHIN PROJECT BOUNDARY	9276.8	ACRES
2) PACIFICORP LAND	9200.8	ACRES
3) STATE LAND	4.4	ACRES
4) PRIVATE (NON-PACIFICORP LAND)	71.7	ACRES

ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

I hereby state that the project boundary represented on this drawing is developed with reasonable accuracy in accordance with FERC requirements. PLSS is based on the Utah BLM PLSS/GCDB Cadastre Data set coupled with field measurements for surveyed corners. Other data has been developed from orthophotos and other sources including Federal, State, County, and PacificCorp GIS sources. All reasonable efforts have been made to ensure that positional accuracy conforms to National Map Accuracy Standards for maps at 1:24,000 scale. Public Land Survey lines and Property lines are based on the Salt Lake Meridian.

PacifiCorp has reviewed the Project boundary shown herein. PacifiCorp possesses property rights for all non-federal lands drawn on this map that are inside the boundary, with the exception of parcels identified as "PacifiCorp Interest Lands" for which additional overflow rights are needed.

*See Easement/Property Rights Reference Table. Further records research may expose private land easements inside the project boundary that are not shown herein. It is not the intent of this map to impede the bona fide property rights of those private land easements that may exist for purposes unrelated to the operation and maintenance of the project (non-Project uses).

Exhibit G - 10
Cutler Hydroelectric Project, FERC No. P-2420
License Application of March 28, 2022

Rev. 3b

Project Boundary Description

Original Drawing Dated December, 2007

License Application of March 28, 2022

P.2420-35

2

26

FERC Drawing No. P2420-

BOUNDARY DESCRIPTION

Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
662	4628196	424352	N2-24-42E	150	
663	4628243	424354			
664	4628337	424367	N7-31-16E	310	
665	4628460	424471	N40-28-35E	528	
666	4628456	424476	S49-26-26E	19	
667	4628482	424512	N53-53-47E	149	
668	4628504	424554	N62-33-50E	154	
669	4628551	424618	N53-46-3E	259	
670	4628593	424822	N78-19-3E	684	
671	4628592	424930	S89-41-13E	354	
672	4628611	425033	N79-59-56E	344	
673	4628621	425056	N66-27-12E	81	
674	4628715	425156	N46-51-21E	453	
675	4628824	425164	N4-0-48E	360	
676	4628918	425148	N9-50-18W	311	
677	4628934	425135	N37-44-3W	68	
678	4628994	425121	N13-38-33W	200	
679	4629144	425104	N6-30-34W	495	
680	4629113	425043	S62-50-19W	223	
681	4629104	424974	S83-21-5W	228	
682	4629144	424887	N65-59-36W	315	
683	4629245	424774	N47-59-9W	497	
684	4629314	424737	N27-47-6W	258	
685	4629401	424724	N8-51-4W	287	
686	4629569	424715	N2-52-34W	552	
687	4629615	424709	N7-58-11W	152	
688	4629710	424648	N32-27-41W	371	
620	4629763	424638	N10-44-23W	175 TO THE NORTH SECTION LINE OF SECTION 1 T12N R1W BEND POINT ON PACIFICORP PROPERTY LINE; THE POB	

EXCEPTION AREA DESCRIPTION					
Point	Northing (Meters)	Easting (Meters)	Bearing	Distance (feet)	Remarks
689	4627531	423573			BEGINNING AT A POINT BEARING S 14-23-31 E 2044.40 FEET (GIS CALCULATED) FROM THE NORTH QUARTER CORNER OF SEC 12 T12N R1W, AND THENCE ALONG PACIFICORP PROPERTY LINE, THE FOLLOWING COURSES BETWEEN POINTS 689 AND 708:
690	4627528	423589	S80-19-28E	52	
691	4627507	423610	S45-14-4E	96	
692	4627443	423645	S28-42-20E	242	
693	4627318	423658	S5-52-47E	412	
694	4627206	423680	S11-13-13E	374	
695	4627095	423761	S35-57-16E	451	
696	4627024	423791	S22-48-47E	252	
697	4626987	423745	S50-43-57W	194	
698	4626993	423717	N77-22-57W	92	
699	4626986	423661	S83-38-35W	185	
700	4626920	423555	S57-53-21W	410	
701	4626821	423455	S45-32-15W	463	
702	4626905	423384	N40-6-21W	360	
703	4626985	423357	N18-28-56W	277	
704	4627034	423361	N4-3-37E	159	
705	4627149	423390	N14-5-45E	391	
706	4627365	423396	N1-38-57E	708	
707	4627491	423362	N15-17-9W	429	
708	4627517	423374	N25-23-25E	95	
689	4627531	423573	N86-6-52E	655	BEND POINT ON PACIFICORP PROPERTY LINE; THE POB

Easement Reference Table

Map #	Description	Cache Co. Recorder Number	Sheet Location
E = Easement in Project Boundary			
E1	Cardon Flooding Easement	Entry # 194903	G-4
E2	Hardman Lease Exchange	UNRECORDED	G-7
E3	Falslev Flooding Easement	BK 19 MISC PG 152	G-4
E4	Falslev Flooding Easement	BK 19 MISC PG 152	G-4
E5	Watterson Flooding Easement	Entry # 803495	G-4
E6	Watterson Conservation Easement	Entry # 803494	G-4
E7	Wildflower Ranch Flooding Easement	Entry # 803489	G-4
E8	Wildflower Ranch Flooding Easement	Entry # 803490	G-4
E9	Watterson Flooding Easement	Entry # 578248	G-4
E10	Maughn Flooding Easement	Entry # 121743	G-5
E11	Kunzler Conservation Easement	Entry # 863961	G-5
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E15	PacifiCorp Interest Lands - under review		G-5
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A1	Allen Access Easement		G-4
A2	Ballard Access Easement		G-4
A3	Ballard Access Easement		G-4
A4	Ballard Access Easement		G-4
A5	Benson Access Easement	Entry # 665473	G-3
A6	CC Ranch Access Easement		G-4
A7	Harold Falslev Access Easement	Entry # 784203	G-4
A8	Lary Falslev Access Easement		G-4
A9	Hibbard Access Easement		G-7
A10	Larsen Access Easement	Entry # 632714	G-5
A11	Lundberg Access Easement	Entry # 929562	G-7
A12	Maurer Access Easement	Entry # 575998	G-7
A13	Jay Rigby Access Easement	Entry # 662016	G-3
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A15	Watterson Access Easement	Entry # 803493	G-4
A16	Willmore Access Easement	Entry # 575999	G-7
A17	Cardon Access Judgement	Entry # 1060453	G-4

Notes:

- 1) Information in table is based on GIS derived coordinates and measurements and is not intended to be a traverse with station points and measurements established by ground surveys but rather a generalized representation of the project boundary.
- 2) Project is located in the state of Utah, Salt Lake Meridian.
- 3) Reference points on the map sheets are in Geographic Coordinate System WGS 1984.
- 4) Coordinates in the table are in UTM Zone 12, NAD 83, meters.



PROJECT BOUNDARY ACREAGE

- 1) ACREAGE WITHIN PROJECT BOUNDARY9276.8 ACRES
- 2) PACIFICORP LAND9200.8 ACRES
- 3) STATE LAND4.4 ACRES
- 4) PRIVATE (NON-PACIFICORP LAND)71.7 ACRES

ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

I hereby state that the project boundary represented on this drawing is developed with reasonable accuracy in accordance with FERC requirements. PLSS is based on the Utah BLM PLSS/GCDB Cadastre Data set coupled with field measurements for surveyed corners. Other data has been developed from orthophotos and other sources including Federal, State, County, and PacifiCorp GIS sources. All reasonable efforts have been made to ensure that positional accuracy conforms to National Map Accuracy Standards for maps at 1:24,000 scale. Public Land Survey lines and Property lines are based on the Salt Lake Meridian.

PacifiCorp has reviewed the Project boundary shown herein. PacifiCorp possesses property rights* for all non-federal lands drawn on this map that are inside the boundary, with the exception of parcels identified as "PacifiCorp Interest Lands" for which additional overflow rights are needed.

*See Easement/Property Rights Reference Table. Further records research may expose private land easements inside the project boundary that are not shown herein. It is not the intent of this map to impede the bona fide property rights of those private land easements that may exist for purposes unrelated to the operation and maintenance of the project (non-Project uses).

Exhibit G - 11
Cutler Hydroelectric Project, FERC No. P-2420
License Application of March 28, 2022

Rev. 3b

Project Boundary Description
Original Drawing Dated December, 2007

3b		License Application of March 28, 2022 Incorporates land acquisition pursuant to Article 402		DESCRIPTION	<div>Exhibit G - 11</div> <div>Cutler Hydroelectric Project, FERC No. P-2420</div> <div>License Application of March 28, 2022</div> <div>Project Boundary Description</div> <div>Original Drawing Dated December, 2007</div> <div>Rev. 3b</div>
3b		3/28/2022	P-2420-35	OLD FERC NO.	
2		DATE			
NO					

FINAL LICENSE APPLICATION

EXHIBIT H

PROJECT MANAGEMENT AND NEED FOR POWER

CUTLER HYDROELECTRIC PROJECT

(FERC PROJECT No. 2420)

Prepared for:



Prepared by:



MARCH 2022

**CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)**

**FINAL LICENSE APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM**

**EXHIBIT H
PROJECT MANAGEMENT AND NEED FOR POWER**

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1.0 INTRODUCTION

PacifiCorp is seeking a new license for the Cutler Hydroelectric Project (Project), which is an existing 30 megawatt (MW) generating facility owned and operated by PacifiCorp and licensed by the Federal Energy Regulatory Commission (FERC) (Project No. 2420). The proposed 9,277-acre Project Boundary is located in both Cache and Box Elder counties, in northern Utah, on the Bear River, approximately 6 miles west of Logan, Utah.

The Project consists of a reservoir, a concrete gravity arch dam, a gated-overflow spillway that contains four radial gates which are operated with a traveling carriage-type electric chain hoist, a (currently inoperable) low-level gate located near the base of the dam, an intake tower and cylinder gate, two irrigation canal intakes, a steel flowline equipped with trash racks and a cylindrical gate operated by an electrical hoist and serviced by a gantry crane, a riveted steel surge tank, two steel penstocks, a brick powerhouse, two generating units with a total installed capacity of 30 MW, two turbines, two circuit breakers, two transformers, two accumulator tanks, one air compressor, a bubbler system with compressor, an emergency generator, and a backup power unit for the cylinder gate (see Exhibit A).

The Project is normally operated in a run-of-river mode, but when sufficient inflows are available, operations can be utilized for minor load-following purposes.

2.0 ABILITY OF PACIFICORP TO OPERATE AND MAINTAIN THE PROJECT

PacifiCorp, a wholly owned subsidiary of Berkshire Hathaway Energy Company (BHE), is a United States-regulated electric utility company headquartered in Oregon that serves almost 2 million retail electric customers and employs approximately 6,500 people. PacifiCorp is composed of two name-brand entities across the states it does business in: Pacific Power and Rocky Mountain Power. Pacific Power serves customers in Oregon, Washington, and California, while Rocky Mountain Power serves customers in Utah, Idaho, and Wyoming. PacifiCorp operates a broad portfolio of power-generation, distribution, and transmission assets to ensure low-cost energy is available for customers. PacifiCorp is principally engaged in the business of generating, transmitting, distributing, and selling electricity.

PacifiCorp's combined service territory covers approximately 143,000 square miles and includes diverse regional economies across six states (a seventh state, Montana, has generation resources but no service territory). No single segment of the economy dominates the service territory, which helps mitigate PacifiCorp's exposure to economic fluctuations. In the western portion of the service territory, consisting of Oregon, southern Washington, and northern California, the principal industries are agriculture, manufacturing, forest products, food processing, technology, government, and primary metals. In the eastern portion of the service territory, consisting of Utah, Idaho, and Wyoming, the principal industries are agriculture, manufacturing, energy generation and mining, technology, and government industries. In addition to retail sales, PacifiCorp buys and sells electricity on the wholesale market with other utilities, independent system operators, energy marketing companies, financial institutions, and other market participants to balance and optimize the economic benefits of electricity generation, retail customer loads, and existing wholesale transactions.

PacifiCorp's operations are conducted under numerous franchise agreements, certificates, permits, and licenses obtained from federal, state, and local authorities. The average term of the franchise agreements is approximately 27 years, although their terms range from five years to indefinite. Several of these franchise agreements allow the municipality the right to seek amendment to the franchise agreement at a specified time during the term. PacifiCorp generally

has an exclusive right to serve electric customers within its service territories and, in turn, has an obligation to provide electric service to those customers. In return, the state utility commissions have established rates on a cost-of-service basis, which are designed to allow PacifiCorp an opportunity to recover its costs of providing services and to earn a reasonable return on its investments.

PacifiCorp was initially incorporated in 1910 under the laws of the State of Maine under the name Pacific Power & Light Company. In 1984, Pacific Power & Light Company changed its name to PacifiCorp. In 1989, it merged with the Utah Power and Light Company, a Utah corporation (initially incorporated in 1904 as a predecessor company, the Utah Light and Railway Company, see also Exhibit E, Section 3.3.8), in a transaction wherein both corporations merged into a newly formed Oregon corporation. The resulting Oregon corporation was re-named PacifiCorp, which is the operating entity today. As noted above, PacifiCorp delivers electricity to customers in Utah, Wyoming, and Idaho under the trade name Rocky Mountain Power and to customers in Oregon, Washington, and California under the trade name Pacific Power.

PacifiCorp and its antecedent business entities have furnished electric service within Utah for over 100 years. Since the development of the Cutler Hydroelectric Project in 1927 (which supplanted and submerged the earlier and smaller Wheelon Project, see also Exhibits C and E of this FLA), PacifiCorp has modified and upgraded Project facilities and control equipment to provide reliable, efficient electricity supply for their customers.

2.1 PLANS TO INCREASE CAPACITY OR GENERATION AT THE PROJECT

There are no new proposed facilities planned to increase the generator capacity of the Project. PacifiCorp proposes no changes to the existing transmission system of the Project. The transmission system is further described in Exhibit A.

2.2 PLANS TO COORDINATE THE OPERATION OF THE PROJECT WITH OTHER WATER RESOURCE PROJECTS

PacifiCorp's projects located within Utah are outlined in Table 2-1. In addition to the Cutler Project, PacifiCorp owns and operates four other hydroelectric developments on the Bear River; all of which are located further north and upstream in Idaho. These are the three Bear River

Project (FERC Project No. 20) developments, which include the 14.7-MW Soda development, the 33-MW Grace development, the 30-MW Oneida development, and the 1.7-MW Last Chance Project (FERC Project No. 4580), which is a single development, co-owned by PacifiCorp, and operated under its own license. In addition, there are seven other hydroelectric developments on the Logan River, Blacksmith Fork, Mink Creek, and Paris Creek, all Bear River tributaries. PacifiCorp owns the hydroelectric development on Paris Creek (currently proposed for decommissioning) but is not the owner or operator of the other six developments. In February 2022, PacifiCorp received a preliminary permit to conduct feasibility studies on a new pumped-storage generation facility, Dry Canyon, which would be located just north of Bear Lake, Idaho, utilizing a portion of Mud Lake as the bottom reservoir for the system. Mud Lake is the receiving water body for the Bear River, once it is diverted for storage into Bear Lake from the Bear River channel at Stewart Dam. The feasibility studies for this new potential generation development are currently proposed to be completed in 2026.

These projects provide clean, carbon-free, renewable energy to the electric system, displacing the operation of fossil-fueled power plants and thus reducing air pollution, greenhouse gases (which contribute to climate change), and the use of imported fuels. PacifiCorp is proposing to operate the Project essentially as it has been operated in the past, but with some additional operational flexibility as outlined in Exhibit B.

TABLE 2-1 UTAH HYDROELECTRIC PROJECTS OWNED BY PACIFICORP

PROJECT NAME	FERC PROJECT No.	FERC STATUS	NAME OF WATERWAY	TYPE OF OPERATION AND INTERDEPENDENCY STATUS
Granite	14293	Exempt	Big Cottonwood Creek	Conduit Exemption; Run-of-river; Independent
Santa Clara (Veyo, Sand Cove, Gunlock)	9281	Exempt	Santa Clara River	Conduit Exemption; Run-of-river; Independent
Cutler	2420	Licensed	Bear River	Run-of-river; Independent
Weber	1744	Licensed	Weber River	Run-of-river; Independent
Pioneer	2722	Licensed	Ogden River	Run-of-river; Independent
Stairs	597	Licensed	Big Cottonwood Creek	Run-of-river; Independent

Source: PacifiCorp 2021

2.2.1 COORDINATE THE OPERATION OF THE PROJECT WITH THE OTHER ELECTRICAL SYSTEMS

PacifiCorp operates and maintains the Project in accordance with the guidelines established by both the Western Electricity Coordinating Council (WECC) and the North American Reliability Council (NERC). The Project is located within PacifiCorp's East Balancing Authority Area.¹ As noted previously, Rocky Mountain Power is an operating utility system owned by its parent organization, PacifiCorp. The Project is part of Rocky Mountain Power's system operating in the state of Utah.

PacifiCorp and the California Independent System Operator (CAISO) launched the Energy Imbalance Market (EIM) on November 1, 2014. The EIM is a voluntary market and the first western energy market outside of California, including six states upon launch: California, Idaho, Oregon, Utah, Washington, and Wyoming. The EIM uses CAISO's advanced market systems that automatically balance supply and demand for electricity every 15 minutes, dispatching the least-cost resources every five minutes. Since the launch of the EIM, NV Energy joined the market December 1, 2015, adding Nevada to the EIM footprint. Puget Sound Energy and Arizona Public Service joined the EIM on October 1, 2016, Portland General Electric joined the EIM on October 1, 2017, and Idaho Power and Powerex both joined and began transactions on April 4, 2018.

Between 2019 and 2021, seven other participants joined the EIM: the Balancing Authority of Northern California (2019); the Salt River Project and Seattle City Light (both in 2020); and NorthWestern Energy, Los Angeles Department of Water and Power, Public Service Company of New Mexico, and Turlock Irrigation District (all in 2021). Additionally, other balancing authorities in the west, including Bonneville Power Administration and Avista, have indicated interest or are pursuing participation (WEIM 2021). PacifiCorp continues to work with the

¹ A balancing authority is defined by a set of resources and interchanging meters. Traditional balancing authority areas have dispatchable generation, load, and interchange. WECC identifies 38 balancing authorities by geographic location, including PacifiCorp East (PACE) and PacifiCorp West (PACW) (WECC n.d.).

CAISO, existing and prospective EIM entities, and stakeholders to enhance market functionality and support market growth with the addition of new EIM entities.

PacifiCorp is also exploring opportunities to coordinate with other western regional transmission operators. This effort is aimed at reducing costs for consumers, enhancing coordination and reliability of western electric networks, facilitating the integration of renewable resources, reducing emissions, and enhancing regional transmission planning and expansion.

The Cutler 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. Transmission from the Project leaves the Cutler substation by one 138-kV and three 46-kV transmission lines which are not part of the Project, although they do cross through the Cutler Project Boundary (see Exhibit A for more detail).

2.3 SHORT- AND LONG-TERM NEED FOR PROJECT POWER

PacifiCorp serves 2 million retail customers, representing residential, commercial, and industrial sectors, including 1,233,000 in Utah, Idaho, and Wyoming as Rocky Mountain Power, and an additional 816,000 in Washington, Oregon, and California as Pacific Power. In 2020, the combined load requirements were approximately 60,000,000 megawatt hours (MWh).

PacifiCorp's operation of electrical systems, including the operation of the Project, is coordinated using guidelines prescribed by the region's Northwest Power and Conservation Council (NWPCC).² PacifiCorp is required to have resources available to continuously meet its customer needs. The percentage of PacifiCorp's energy supplied by energy source varies from year to year and is subject to numerous operational and economic factors such as planned and unplanned outages, fuel commodity prices, fuel transportation costs, weather, environmental considerations, transmission constraints, and wholesale market prices of electricity. PacifiCorp evaluates these factors continuously in order to facilitate economical dispatch of its generating facilities. When factors for one energy source are less favorable, PacifiCorp must place more

² The 1980 [Northwest Power Act](#) authorized Idaho, Montana, Oregon, and Washington to develop a regional power plan, and fish and wildlife program to balance the Northwest's environment and energy needs (NWPCC 2016).

reliance on other energy sources. For example, PacifiCorp can generate more electricity using its low cost hydroelectric and wind-powered /solar-powered generating facilities when factors associated with these facilities are favorable. When factors associated with hydroelectric and wind resources are less favorable, PacifiCorp increases its reliance on coal- and natural gas-fueled generation or purchased electricity.

In addition to meeting its customers' energy needs, PacifiCorp is required to maintain operating reserves on its system to mitigate the impacts of unplanned outages or other disruption in supply, and to meet intra-hour changes in load and resource balance. This operating reserve requirement is dispersed across PacifiCorp's generation portfolio on a least-cost basis based on the operating characteristics of the portfolio. Operating reserves may be held on hydroelectric, coal-fueled or natural gas-fueled resources. PacifiCorp manages certain risks relating to its supply of electricity and fuel requirements by entering into various contracts, which may be accounted for as derivatives and may include forward contracts, options, swaps, and other agreements.

As outlined in Exhibit A, Project's 30-year average annual generation of 75,052 MWhs (1991-2020) helps to lower system deficits, reduces costs to ratepayers, and reduces emission of noxious byproducts caused by the combustion of fossil fuels. All the power produced by the Project is taken into PacifiCorp's electric system for consumption by the utility's customers. The Project's estimated historical annual cost to produce power is based on the Bus-bar³ cost of the Project. Bus-bar costs include annual depreciation, capital project financing based on the weighted average cost of capital, income and real estate taxes, and annual operations and maintenance costs. The average historical annual cost of power produced by the Project has been approximately \$5.99 million, or approximately \$68.78 per MWh, for the 5-year period between 2016 to 2020. Based on an average annual consumption of 9,600 kilowatt hours (kWh) per household, the average power production from the Project is enough to satisfy the needs of approximately 9,170 homes. Therefore, the Cutler Project provides a necessary source of power for PacifiCorp.

³ The power plant bus or bus-bar is that point beyond the generator but prior to voltage transformation point in the plant switchyard.

2.3.1 COSTS AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER

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. PacifiCorp has also engaged in progressive conservation efforts to encourage its customers to be as efficient as possible with their electric consumption. If load growth cannot be met through cost-effective conservation, then new resource acquisitions, wholesale market purchases, or power supply contracts must be sought. If a new license is not granted for the Project, PacifiCorp would purchase an equivalent amount of replacement power from the wholesale power market.

2.3.2 COST INCREASES FOR ALTERNATIVE POWER IF LICENSE DENIED

In the event a new license is not granted for the Project, PacifiCorp would purchase an equivalent amount of replacement power from the wholesale power market. At a discount rate of 6.82 percent and based on the 2021 Integrated Resource Planning locational price for northern Utah, ⁴ the net present value of replacement power from January 2025 through December 2064 is \$58.5 million. The January 2022 present value of spinning reserves from January 2025 through December 2064 is \$4.3 million. In addition, the January 2022 present value of capacity from January 2025 through December 2064 is \$13.2 million. Replacing the Project's generation exposes PacifiCorp to increased cost and supply risks.

2.3.3 EFFECTS OF ALTERNATIVE SOURCES OF POWER ON CUSTOMERS

In the unlikely event that the Project were unable to be relicensed, the regional power supply would no longer include the benefit of the 88,038 MWh that Cutler has generated on average over the five-year period between 2016 and 2020. This would result in reallocation of the necessary generation load to other PacifiCorp generation sources. Any viable new generating resource equal in output and comparable in operating characteristics to the Project would likely be more expensive in the long-term than continued operation of the existing Project. Therefore, under current regulations, replacing the Project with a different generating resource and

⁴ The last year of the 2021 Integrated Resource Planning locational price is 2040. Projected costs for years beyond 2040 were inflated based on a 2.155 percent inflation rate.

decommissioning the Project could increase the retail power costs in PacifiCorp's service territory (see also Section 2.4).

In the unlikely event the license was transferred to a different licensee, the Project's operating costs and power benefits would be transferred to the new licensee. This would result in a reallocation of the Project's net benefits from PacifiCorp's customers to the customers of the new licensee. However, there is no proposal from another potential licensee to license the Project.

2.3.4 EFFECTS OF ALTERNATIVE SOURCES OF POWER ON OPERATING AND LOAD CHARACTERISTICS

Because the Project is a significant contributor to PacifiCorp's overall power supply portfolio, eliminating Project generation would result in a meaningful impact to the region's overall load characteristics. The loss of any base load generation, such as the Project, could increase the number of transmission curtailments PacifiCorp may expect under certain system conditions, and result in the loss of the low-cost and non-carbon emission renewable power to PacifiCorp's customers that the Project has historically generated.

PacifiCorp has provided a comprehensive set of Demand Side Management (DSM) programs to its customers since the 1970s. The programs are designed to reduce energy consumption and more effectively manage when energy is used, including management of seasonal peak loads. PacifiCorp offers services to customers such as energy engineering audits and information on how to improve the efficiency of their homes and businesses. To assist customers in investing in energy efficiency, PacifiCorp offers rebates or incentives encouraging the purchase and installation of high-efficiency equipment such as lighting, heating and cooling equipment, weatherization, motors, process equipment and systems, as well as incentives for energy project management, efficient building operations and efficient construction. Incentives are also paid to solicit participation in load management programs by residential, business, and agricultural customers through programs such as PacifiCorp's residential and small commercial air conditioner load control program and irrigation equipment load control programs. Although subject to prudence reviews, state regulations allow for contemporaneous recovery of costs

incurred for the DSM programs through state-specific energy efficiency surcharges to retail customers or for recovery of costs through rates.

In 2019 and 2020, PacifiCorp spent \$183.5 million on these DSM programs, which resulted in an estimated 894,964 MWh of first-year energy savings and an estimated 83,326 MW of peak load management. In addition to these DSM programs, PacifiCorp has load curtailment contracts with several large industrial customers that deliver up to 300 MW of load reduction when needed, depending on the customers' actual loads (PacifiCorp 2019). Recovery of the costs associated with the large industrial load management program are captured in the retail rate agreements with those customers approved by their respective state commissions or through PacifiCorp's general rate case process.

Without the above DSM programs and alternatives provided by PacifiCorp to its customers, costs to consumers would likely be significantly higher and lack of conservation measures would put greater demand on the power resources thus causing the need for new generation development to make up for the higher demand.

2.3.5 EFFECTS OF ALTERNATIVE SOURCES OF POWER ON COMMUNITIES SERVED OR TO BE SERVED

Any viable new generating resource equal in output and comparable in operating characteristics to the Project would likely be more expensive in the long term than continued operation of the existing Project. Therefore, under current regulations, replacing the Project with a different generating resource and decommissioning the Project could increase the retail power costs in PacifiCorp's service territory.

2.4 NEED, COST, AND AVAILABILITY OF ALTERNATIVE SOURCES OF POWER

As PacifiCorp experiences the need for new generating resources, it will need to determine whether it is better to own a resource or purchase power from another party; this process is detailed in the biennial 2021 Integrated Resource Plan (PacifiCorp 2021). While the ultimate decision will be made at the time resources are acquired, and will primarily be based on cost, there are other considerations that may be relevant. With owned resources, PacifiCorp is in a better position to control costs, make life extension improvements, use the site for additional resources in the future, change fueling strategies or sources, efficiently address plant

modifications that may be required as a result of changes in environmental or other laws and regulations, and utilize the plant at cost as long as it remains economic. In addition, by owning a generation project, PacifiCorp can hedge itself from the uncertainty of the ability to perform consistent with the terms and conditions outlined in a power purchase agreement over time.

Depending on contract terms, purchasing power from a third party in a long-term contract may help mitigate and may avoid liabilities associated with closure of a plant. A long-term power purchase agreement relinquishes control of construction cost, schedule, ongoing costs, and compliance to a third party, and exposes the buyer to default events and contract remedies that would not likely cover the potential negative impacts. Finally, credit rating agencies impute debt associated with long-term resource contracts that may result from a competitive procurement process, and such imputation may affect PacifiCorp's credit ratios and credit rating.

PacifiCorp's biennial integrated resource planning considers an integrated portfolio analysis to value new resources. If an alternative to the Project's power and capacity is required, no single replacement resource would be assumed. Instead, integrated portfolio planning implies that all existing resources and loads would be evaluated together to find the best mix of resources based on least cost and lowest risk. To match the Project's average annual generation and capacity, the alternative cost estimate is based on the Project's projected annual output as if wholesale market purchases were utilized to replace Project MWhs.

2.5 EFFECT OF LOSING POWER ON INDUSTRIAL FACILITIES

This section discusses the effect on an applicant which uses power for its own industrial facility and related operations, pursuant to 18 CFR § 5.18 (c)(1)(i)(D).

This section is not applicable as all power generated by the Cutler Project, except for some minimal station service load (averaging less than 25 MWh/month, or less than 0.03 percent of the average annual generation of the Project), moves via the Project's transmission lines to the adjacent non-Project substation and subsequently to the grid.

2.6 STATEMENT ON TRIBES NEED FOR POWER

Pursuant to 18 CFR § 5.18 (c)(1)(i)(E), this section is required if an applicant is an Indian tribe applying for a license for a project located on the tribal reservation.

This section is not applicable as PacifiCorp is not an Indian tribe, nor is the Project located on a tribal reservation.

2.7 COMPARISON OF IMPACT ON TRANSMISSION SYSTEM OF RECEIVING/NOT RECEIVING LICENSE

This section provides a comparison of the impact on the operations and planning of PacifiCorp's transmission system of receiving or not receiving the Project license, pursuant to 18 CFR § 5.18 (c)(1)(i)(F).

The Cutler substation (within the Project Boundary, but not part of the Project), is the point of interconnection from the Project powerhouse to the electrical grid system (see Exhibit A for additional detail). Generators No. 1 and No. 2 are connected to the station step-up transformers by two high voltage 3-phase underground cables that are approximately 300 feet long. 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.

Reducing generation levels at the Project would remove the power flow into the local transmission grid, affecting customer's costs, but would not affect PacifiCorp's ability to serve its customer load in the vicinity.

2.7.1 DETAILED SINGLE-LINE DIAGRAMS

A single-line (one-line) diagram has been provided with Exhibit F under CEII cover.

2.8 PLANS FOR MODIFICATIONS TO EXISTING PROJECT FACILITIES OR OPERATIONS

If an applicant has plans to modify existing project facilities or operations, 18 CFR § 5.18 (c)(1)(i)(G) requires that the applicant provide a statement of the need for, or usefulness of, the modifications, including at least a reconnaissance-level study of the effect and project costs of the proposed plans and any alternate plans, which in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in Section 10(a)(1) of the Federal Power Act (FPA).

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. PacifiCorp desires to re-position the Project's hydropower generation to help with this integration. The overall approach is not intended to result in changes to Project capacity, but rather to provide additional operational flexibility. PacifiCorp has proposed an operational plan for the new license that will enable the Project to participate in the Western Energy Imbalance Market, and to better coordinate projects upstream of the Cutler Project. 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 an expansion to the range of the lower operating limit to elevation 4,405.0, from the current lower reservoir elevation range of 4,406.5 to 4,406.0. The potential costs and benefits of the proposed future operating plan are included in this FLA.

There are no new proposed facilities planned to increase the generator capacity of the Cutler Project. PacifiCorp has 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. These capital improvements will not result in changes in the Project operation.

2.9 NO PLANS FOR MODIFICATION TO EXISTING PROJECT FACILITIES OR OPERATIONS

If the applicant has no plans to modify existing Project facilities or operations, 18 CFR § 5.18 (c)(1)(i)(H) requires that the applicant perform at least a reconnaissance-level study to show that the Project facilities or operations in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in Section 10(a)(1) of the FPA.

As noted previously, the Project proposes modest changes to Project operations, and no changes to Project generator capacity. Section 10(a)(2) of the FPA requires FERC to consider the extent to which a project is consistent with Commission-approved federal and state comprehensive plans for improving, developing, and conserving waterways affected by the Project. In accordance with this regulation, the list of Commission-approved federal and state comprehensive plans was reviewed to determine applicability to the Project. FERC currently lists

14 comprehensive plans for the State of Utah; two were found to be relevant to the Project, and no inconsistencies between the plans and the Proposed Action were found (see Exhibit E).

2.10 FINANCIAL & PERSONNEL RESOURCES

Pursuant to 18 CFR § 5.18 (c)(1)(i)(I), this section provides a statement describing PacifiCorp's financial and personnel resources to meet its obligations under a new license, including specific information to demonstrate that the applicant's personnel are adequate in number and training to operate and maintain the project in accordance with the provisions of the license.

PacifiCorp has adequate financial resources to meet its obligations under a new license for the Project. PacifiCorp's financial information is available in the annual Securities and Exchange Commission Form 10-K report which can be accessed online at: <https://last10k.com/sec-filings/ppwlm>.

As of December 31, 2020, PacifiCorp had approximately 6,500 employees, of which approximately 3,300 were covered by union contracts, principally with the International Brotherhood of Electrical Workers, the Utility Workers Union of America, and the International Brotherhood of Boilermakers.

Currently PacifiCorp has three full-time operations employees that provide 24/7 coverage along with the Hydro Control Center (HCC) located in Ariel, Washington and another two seasonal positions. Another five full-time maintenance employees switch duties between this Project and other PacifiCorp Utah and Idaho hydroelectric projects, including Lifton, Soda, Grace, and Oneida (together known as the Bear River Project) in Idaho; as well as at Pioneer, Weber, Granite, Stairs, and Santa Clara in Utah. In addition, there are seven PacifiCorp Hydro Resource staff and management (based in Salt Lake City) and contractors that support the Bear River Project and other company hydroelectric projects with engineering and environmental compliance; additional support services and personnel are located in Portland, Oregon. The local employees are adequate in number and have the appropriate training to operate the Project in accordance with the provisions of the license.

2.11 NOTIFICATION BY CERTIFICATION OF LAND OWNERS

If an applicant proposes to expand the Project to encompass additional lands, 18 CFR § 5.18(c)(1)(i)(J) requires the applicant provide a statement that the applicant has notified, by certified mail, property owners on the additional lands to be encompassed by the Project and governmental agencies and subdivisions likely to be interested in or affected by the Proposed Action.

PacifiCorp does not propose to expand the Project to encompass additional lands of others. Therefore, notification of adjacent landowners will not be made beyond every property owner of record of any interest in the property within the bounds of the Project per 18 CFR § 4.32(a)

2.12 ELECTRICITY CONSUMPTION IMPROVEMENT PLAN

As required by 18 CFR § 5.18(c)(1)(i)(K), this section describes the PacifiCorp electricity consumption efficiency improvement program, as defined under Section 10(a)(2)(C) of the FPA, including a statement of the applicant’s record of encouraging or assisting its customers to conserve electricity, a description of its plans and capabilities for promoting electricity conservation by its customers, and a statement describing the compliance of the applicant’s energy conservation programs with any applicable regulatory requirements.

2.12.1 RECORD OF APPLICANT’S CUSTOMER ENERGY EFFICIENCY PROGRAM

PacifiCorp’s “Conservation Potential Assessment For 2019-2038” details company and customer energy efficiency programs and plans to inform the Integrated Resource Planning (IRP) process (PacifiCorp 2019; PacifiCorp 2021). For example, customer conservation is encouraged through PacifiCorp’s energy efficiency “Wattsmart” Home Energy Savings and similar programs, which include cash incentives for home energy upgrades. Programs includes tools and information to help customers save energy and money through the following methods, available online at: <https://www.rockymountainpower.net/savings-energy-choices/home.html>:

- Free “Wattsmart” kit which includes high efficiency LED light bulbs
- Incentives and rebates to reduce energy use and upgrade to more efficient appliances
- Blue Sky or Subscriber Solar programs to support local renewable energy projects
- Home Energy Reports to help customers understand energy usage and pinpoint ways to save
- Cool Keeper rebate program to help ease demand during select, high-demand periods

- Stand-alone incentive offering for ductless heat pumps installed in new homes

Additionally, PacifiCorp's webpage includes information about electric vehicles and solar panel power generation, as well as zero-net energy infographics for single and multifamily homes.

2.12.2 COMPLIANCE OF APPLICANT'S ENERGY CONSERVATION PROGRAMS

In addition to the requirements of the biennial IRP noted previously, which details energy conservation programs and applicable regulatory requirements, PacifiCorp has developed a new program in Utah to modernize the grid through innovative development and support of the electric vehicle grid. In March 2016, Utah enacted the Sustainable Transportation and Energy Plan Act ("STEP Act"), now codified at Utah Code Ann. §§ 54-7-12.8, 54-20-101. PacifiCorp, through Rocky Mountain Power, submits an annual STEP Act status report to inform stakeholders of the STEP program's progress and funding. The 2020 report was submitted to the Utah Public Service Commission on April 29, 2021 and includes monthly accounting details for the STEP programs implemented by Rocky Mountain Power.

2.13 INDIAN TRIBE NAMES & MAILING ADDRESSES

18 CFR § 5.18(c)(1)(i)(L) requires that PacifiCorp include the names and mailing addresses of every Indian tribe with land on which any part of the proposed Project would be located or which the applicant reasonably believes would otherwise be affected by the proposed project.

The existing and proposed Project is not located on or otherwise affecting the land of any Indian tribes. However, it is possible 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 (see Exhibit E for more detail regarding Tribal interests). Pending Tribal consultation (note that all tribes with current or former association with lands in Utah have been contacted as part of the consultation process; to date none have provided PacifiCorp with information regarding traditional or religious cultural properties), no Indian traditional or religious cultural properties are known in or near the Project Boundary (PacifiCorp 2019).

The names and addresses of these tribes are listed below.

Northwestern Band of Shoshone Nation
Chairperson Dennis Alex
Ogden Tribal Office
2575 Commerce Way
Ogden, UT 84401
(435) 734-2286
Banner02@gmail.com

Shoshone-Bannock Tribe
Chairman Devon Boyer
P.O. Box 306
Fort Hall, Idaho 83203
208-478-3700
dboyer@sbtribes.com

3.0 INFORMATION TO BE PROVIDED BY APPLICANT WHO IS AN EXISTING LICENSEE

3.1 STATEMENT OF MEASURES BY LICENSEE TO ENSURE SAFE MANAGEMENT, OPERATION & MAINTENANCE

Pursuant to 18 CFR § 5.18(c)(ii)(B), this section describes a statement of measures taken or planned by PacifiCorp to ensure safe management, operation, and maintenance of the Project, including a description of existing and planned operation of the Project during flood conditions; a discussion of any warning devices used to ensure downstream public safety; a discussion of any proposed changes to the operation of the Project or downstream development that might affect the existing Emergency Action Plan; a description of existing and planned monitoring devices to detect structural movement or stress, seepage, uplift, equipment failure, or water conduit failure, including a description of the maintenance and monitoring programs used or planned in conjunction with the devices; and a discussion of the Project's employee safety and public safety record, including the number of lost-time accidents involving employees and the record of injury or death to the public within the Project boundary.

The Cutler 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 HCC in Ariel, Washington. The HCC controls the load on the generators to follow a generation schedule, while staying within the predetermined reservoir level operating limits and other operating constraints as discussed below. A protective relay scheme automatically shuts the units down should a problem develop.

The current license requirements include facilities and measures to assure public safety, including the development of an Emergency Action Plan (EAP) (18 CFR Part 12, subpart C) and a dam safety inspection by independent consultant (18 CFR Part 12, subpart D). An applicant or licensee must conduct a comprehensive review of the adequacy of the EAP at least once per year. In keeping with this requirement, PacifiCorp filed its 2020 Annual Emergency Action Plan Status Report on December 30, 2020.

More recently, on May 28, 2021, PacifiCorp submitted its 2020 Dam Safety Surveillance and Monitoring Report for the Cutler Hydroelectric Project for the period of April 2020 through

March 2021. Further, in August 2021, PacifiCorp submitted the most recent Supporting Technical Information Document (STID), included as part of the CEII-Protected Exhibit F of this FLA.

3.1.1 PROJECT OPERATION DURING FLOOD

Spring runoff can occur at the Project from mid-February through the end of June. It generally happens in two phases: when low elevation snow melts, and later when the high tributary snowpack melts. High flows can also occur when during flood-control operations there are water releases pumped from Bear Lake concurrent with natural runoff upstream or high inflows from other tributaries from the south portion of the Project. The highest recorded flows have most commonly occurred from rapid low-elevation snowmelts associated with heavy rain-on-snow events. During the spring, as much as 70 percent of the inflow into the Project can come 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 cubic feet per second), 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 (which is the compliance point for reservoir elevations), 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 released at the Project pass through the lower Bear River in Box Elder County and to the Great Salt Lake, the terminal point of all Bear River flows.

3.1.2 EXISTENCE OF WARNING DEVICES FOR DOWNSTREAM SAFETY

To ensure public safety at Cutler Reservoir, emergency evacuation sirens have been installed at Cutler Dam and near the Camp Fife Boy Scout Camp, located approximately 1.2 miles downstream of the dam. 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 downstream of 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 (Section 3.1.5).

3.1.3 DISCUSSION OF ANY CHANGES THAT MAY AFFECT EXISTING EMERGENCY ACTION PLAN

No changes are proposed to the Project which would affect the existing EAP. As discussed above, PacifiCorp filed its 2020 Annual EAP Status Report on December 30, 2020.

3.1.4 EXISTING OR PLANNED STRUCTURAL MONITORING DEVICES

The STID (Exhibit F) provides a complete description of existing monitoring devices at the Project. Exhibit F is CEII-Protected and can only be viewed through a request to FERC's CEII Coordinator.

3.1.5 EMPLOYEE & PUBLIC SAFETY RECORD

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 downstream of 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, updated periodically, for all developed recreation sites for the Project. An updated Public Safety Plan for the Project was filed on December 28, 2021. Additional information regarding the Project EAP and license-required safety measures are discussed above. There have been no employee lost-time incidents at the Project in the last five years; similarly, over the same time period there have been no public safety incidents resulting in a fatality at the Cutler Project.

3.2 CURRENT PROJECT OPERATION & CONSTRAINTS

18 CFR § 5.18(c)(ii)(C) requires that the current operation of the Project, including any constraints that might affect the manner in which the Project is operated. A thorough description

of how the Project operates under normal circumstances, and under various seasonal constraints, as well as under future proposed Project operations, is detailed in Exhibit B.

3.3 HISTORY OF PROJECT OPERATION & MAINTENANCE

The Project has been in operation since 1927, although an earlier predecessor dam, the Wheelon Dam, created a smaller reservoir beginning around the late 1880s. Excavation for the Cutler 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. The Wheelon Dam was then inundated by the construction and operation of the larger Cutler Dam in 1927 and remains submerged in place approximately one mile upstream of the Project dam.

PacifiCorp staff implements a thorough maintenance and monitoring program, as necessary by both internal requirements and a variety of state and federal regulations. A detailed description of the Project's construction history as well as a summary of major Project maintenance activities and upgrades, can be found in Exhibit C of this FLA.

3.4 DISCUSSION OF POWER LOSSES

Pursuant to 18 CFR § 5.18(c)(ii)(E), this section summarizes all generation lost at the Project over the last five years because of unscheduled outages, including the cause, duration, and corrective action taken.

As noted throughout the FLA, once runoff season is over, and during the remainder of the irrigation season typically all Project inflow is diverted into the irrigation canals, and the reservoir must maintain the required elevation range. Accordingly, generation at the powerhouse is virtually nonexistent from approximately mid-May or June to at least mid-September, unless water is available in higher flow years.

Table 3-1 details unscheduled outages resulting in lost generation at the Project; note that losses during the irrigation season are not possible as the Project does not generate during the irrigation season.

TABLE 3-1 PROJECT LOST GENERATION RESULTING FROM UNSCHEDULED OUTAGES OVER THE 5-YEAR PERIOD BETWEEN 2016 AND 2020

OUTAGE DATE	DURATION OF OUTAGE (HOURS)	UNIT AFFECTED	POTENTIAL LOST GENERATION (MWHRS)	REASON FOR OUTAGE/WORK COMPLETED
03/29/2016	0.9	Cutler 2	14	System disturbance.
03/30/2016	0.2	Cutler 2	3	System disturbance.
07/10/2016	2.6	Cutler 2	38.5	Low oil level triggered immediate forced outage.
07/10/2016	2.3	Cutler 1	34	Low oil level triggered immediate forced outage.
09/30/2016	0.9	Cutler 2	13.8	Maintenance to restore proper oil levels.
02/12/2017	3.7	Cutler 2	56	Low oil level triggered immediate forced outage.
02/12/2017	20.2	Cutler 2	304	Low oil level triggered immediate forced outage.
02/23/2017	1.1	Cutler 2	15.8	High oil level triggered immediate forced outage.
03/09/2017	5.8	Cutler 2	87.3	Troubleshooting outage cause.
03/09/2017	1.2	Cutler 1	17.3	Troubleshooting outage cause.
08/28/2017	72.5	Cutler 2	1087	Electrical issue triggered immediate forced outage. Faulty electrical equipment replaced.
02/23/2018	3	Cutler 2	44.5	Communications outage.
02/23/2018	3	Cutler 1	44.5	Communications outage.
02/27/2018	1	Cutler 2	15	Electrical equipment replacement.
02/27/2018	1.4	Cutler 1	20.8	Electrical equipment replacement.
06/06/2018	111	Cutler 2	1665	Maintenance to restore proper oil levels.
03/08/2019	1.5	Cutler 1	22.5	Unit trip caused immediate forced outage.
03/15/2019	1.7	Cutler 1	25.8	Electrical equipment failure.
03/26/2019	0.9	Cutler 1	13.3	Plant trip caused immediate forced outage.
03/26/2019	0.6	Cutler 2	9.5	Plant trip caused immediate forced outage.
04/03/2019	1	Cutler 1	15	Electrical equipment inspection and testing.
06/20/2019	8.6	Cutler 2	129	Electrical equipment failure.
10/23/2019	4.75	Cutler 2	71.3	Electrical equipment testing.
10/24/2019	29.25	Cutler 2	439	Electrical equipment testing.
11/22/2019	5.9	Cutler 2	89	Electrical equipment testing.
12/09/2019	31.3	Cutler 2	469	Electrical equipment testing.

OUTAGE DATE	DURATION OF OUTAGE (HOURS)	UNIT AFFECTED	POTENTIAL LOST GENERATION (MWHrs)	REASON FOR OUTAGE/WORK COMPLETED
11/16/2020	12.2	Cutler 2	183	Equipment maintenance.

Source: PacifiCorp 2021

3.5 COMPLIANCE RECORD

In accordance with 18 CFR § 5.18(c)(ii)(F), this section discusses PacifiCorp’s record of compliance with the terms and conditions of the existing license, including a list of all incidents of unscheduled, non-compliance, their disposition, and any documentation relating to each incident.

PacifiCorp maintains a good record of compliance and has participated in periodic compliance inspections by both FERC and the state of Utah over the current license period. As outlined in Exhibit B, the current operational regime for reservoir fluctuations has led to some operational deviations, which are outlined below in Table 3-2, although none have resulted in a notice of non-compliance or violation for the Project.

TABLE 3-2 PACIFICORP LICENSE DEVIATIONS SINCE 2002

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
09/30/2021	Article 401	Reservoir elevation deviations resulted from a rain event in which over two inches of rain fell from a broad storm over the watershed above Cutler Reservoir.	<p>Occurred 08/18/2021 – 08/22/2021.</p> <p>As described in letter to FERC dated 09/30/2021, record low runoff and spring/summer baseflow, followed by intense rain events, caused reservoir elevations to temporarily rise above the tolerance range.</p> <p>Response from FERC received on 03/22/2022 concluding that the reported deviations do not constitute license violations.</p>
09/30/2021	Article 401	Reservoir elevation deviations during this period	Occurred 07/06/2021 – 07/10/2021

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
		occurred due to patchy, but intense, rainfall events over the watershed above Cutler Reservoir.	As described in letter to FERC dated 09/30/2021, record low runoff and spring/summer baseflow, followed by intense rain events, caused reservoir elevations to temporarily rise above the tolerance range. Response from FERC received on 03/22/2022 concluding that the reported deviations do not constitute license violations.
04/24/2019	Article 401	Reservoir elevation deviation resulting from extremely high spring runoff flows. Similar to the 2017 event, due to reservoir slope, elevations at Cutler Dam were below the tolerance range.	Occurred April 17, 2019 Reservoir ‘slope’ occurs because elevation at the dam, which is the compliance point, is frequently low in high flow events, in an attempt to help draw water from the southern portions of the reservoir to relieve local flooding concerns. Per 06/27/2019 FERC response, the deviation was not considered a violation of the Operational Plan per Article 401.
05/09/2017	Article 401	Reservoir elevation deviation resulting from extremely high spring runoff flows. Due to reservoir slope, elevations at the dam are frequently (as in this event) lower than the tolerance range during high flow periods.	Occurred on 4/10-13, 4/15, 4/24, and 4/25/2017 Reservoir ‘slope’ occurs because elevation at the dam, which is the compliance point, is frequently low in high flow events, in an attempt to help draw water from the southern portions of the reservoir to relieve local flooding concerns. Per 08/08/2017 FERC response, the deviations were not considered violations of the

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
			Operational Plan per Article 401.
09/22/2014	Article 401	Reservoir elevation deviation occurred during irrigation season following an unexpected large rainstorm increased the natural flow into project. Significant rainfall also occurred days preceding the deviation between August 21 and August 27.	Occurred 08/24/2014 Per 11/18/2014 FERC response, the deviation was not considered a violation of the Operational Plan per Article 401.
07/14/2009	Article 401	Reservoir elevation deviation occurred due to an extended period of abnormally high rainfall, which produced locally high water tables and standing water on project lands and private lands surrounding Cutler Reservoir. Reservoir levels were lowered to slightly below the lower tolerance in an attempt to ameliorate local conditions.	Occurred on 06/16/2009 Per 08/03/2009 FERC response, the deviation was not considered a violation of the Operational Plan per Article 401.
11/15/2006	Article 401	Reservoir elevation deviations occurred due to record-high snowpack accumulation in the mountainous regions of watershed. During the 2005-2006 summer season, reservoir level was maintained at levels below the lower tolerance range to manage high runoff risk and snowpack accumulation.	Occurred 04/15/2006-05/27/2006 Based on 05/18/2006 phone conversation, FERC requested a description of the summer season events in the annual monitoring report.
12/08/2005	Article 401	Reservoir elevation deviation occurred due to measurement error. The tape on the reservoir elevation sensor located at dam had slipped, causing an underestimation	Occurred 11/25/2005-11/29/2005 No response from FERC has been received to date.

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
		error of approximately 6 inches. The reservoir elevation exceeded the upper tolerance by 2.76 inches, a small exceedance.	
06/03/2005	Article 401	Reservoir elevation deviation resulting from a 100 year 24-hour storm event occurred between April 27 and April 28 that resulted in high water elevations at the upper portion of Cutler Reservoir (Benson Marina gauge) while the elevation at the dam remained low. Reservoir levels were lowered in anticipation of another forecasted rainfall and snowmelt event.	Occurred 05/06/2005-05/08/2005; 05/17/2005-05/22/2005 Per 06/22/2005 FERC response, the reported deviation was not considered a violation of the Operational Plan per Article 401.
09/20/2004	Article 401	Reservoir elevation deviation occurred due to intense rainfall on August 21 upstream of Cutler Reservoir, which produced an unusually large inflow to Cutler Reservoir on August 22 and 23. Additional rainfall between August 27 and August 28 increased the reservoir level above the tolerance level.	Occurred 08/28/2004 – 09/03/2004 Per 10/20/2004 FERC response, the deviations were not considered a violation of the Operational Plan per Article 401.
06/04/2004	Article 401	Reservoir elevation deviation. An early, dry spring produced flow conditions similar to early summer, prompting early releases of storage water from Cutler Reservoir and other upstream reservoirs, beginning on May 20 and arriving at Cutler Reservoir by May 24. In the interim of these upstream reservoir	Occurred 05/26/2004 – 05/27/2004 Per 07/21/2004 FERC response, the deviation was not considered a violation of the Operational Plan per Article 401.

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
		releases, a 0.8” rainfall event occurred on May 22 and 23, which raised the reservoir level by 0.72 inches.	
10/09/2003	Article 401	Minor reservoir elevation deviation (.03’) due to upstream releases from Bear Lake, followed by a moderate storm event on September 10 which lessened irrigation demands, contributed to reservoir deviations. An additional factor which contributed to the rise in reservoir level was a planned upstream construction project above the Cutler Powerhouse tailrace.	Occurred 09/05/2003; 09/13/2003; and 09/21/2003 – 09/24/2003 Per 12/09/2003 FERC response, the September deviations were not considered a violation of the Operational Plan per Article 401.
07/29/2003	Article 401	Reservoir elevation deviation in an attempt to capture storm event runoff and irrigation flows from Bear Lake.	Occurred 06/28/2003 – 07/08/2003 Per 12/09/2003 FERC response, the June-July deviations were not considered a violation of the Operational Plan per Article 401.
12/27/2002	Article 401	Reservoir elevation deviation occurred due to maintenance work on the east canal irrigation gate on Cutler Dam.	Occurred 12/03/2002 Per 03/11/2003 FERC response, the deviation was not considered a violation of the Operational Plan per Article 401. FERC requested approval on future scheduled maintenance activities that may require deviations.

Note: Cutler Reservoir elevations were maintained within the approved reservoir elevation operating tolerance ranges 100 percent of the time in Water Years 2020, 2018, 2016, 2015, 2013, 2012, 2011, 2010, 2008, 2007, and 2002.

3.6 ACTIONS THAT MAY AFFECT THE PUBLIC

Pursuant to 18 CFR § 5.18(c)(ii)(G), this section discusses any actions taken by PacifiCorp related to the Project which affect the public.

PacifiCorp generally allows public recreation access to the Cutler reservoir and the surrounding Project lands. However, as necessary, PacifiCorp restricts public access to specific areas that pose a threat to public, employee, or Project safety. Generally, restrictions to public recreation access occur only in the vicinity of the Project dam, powerhouse, canal intakes, and appurtenant structures; a map series (online and potentially posted at relevant access points) specifying these closure areas is included as a proposed recreation resource mitigation measure. Per the 2020 online recreation visitor use survey, the three most popular activities at the Project are bird and wildlife viewing, non-motorized boating, and hiking or walking. Fishing, motorized boating, and hunting (waterfowl and upland game) are also very popular recreation uses at the Project. PacifiCorp has developed and maintains 13 recreation facilities within the Project Boundary. A full description of the recreation sites and facilities provided by PacifiCorp for the Project are described in Exhibit E of this application.

Generation at hydropower facilities generally offsets the need for increased operation at existing baseload facilities, such as oil or coal-fueled generation plants. Fossil-fueled plants produce atmospheric pollution that must be controlled at significant costs. The avoided cost of air pollution, therefore, is a public benefit of hydroelectric generation. The Cutler Project is a carbon-free generation source, and therefore does not contribute to the process of climate change – another significant public benefit.

The Cutler Project also contributes to significant regional socioeconomic benefits through the operation and maintenance of the Hammond (Eastside) and Westside Canal irrigation diversions (comprising the largest and oldest water rights in the Bear River system) that support a significant portion of the irrigated agricultural land in Box Elder County; similarly, other irrigation diversion pumps, located upstream of Cutler Dam on Cutler reservoir or on the Bear River within the FERC Project Boundary support irrigated agricultural lands and products in Cache County.

PacifiCorp's regard for public safety is demonstrated by its active program of installing warning signs and safety devices at the Project, described in Section 3.1.2 and Section 3.1.5 above, as well as the frequent updates to the Cutler Public Safety Plan.

3.7 EXPENSES REDUCED IF PROJECT TRANSFERRED

As required by 18 CFR § 5.18(c)(ii)(H), this section summarizes the ownership and operating expenses that would be reduced if the Project license were transferred from PacifiCorp.

PacifiCorp is applying for a long-term license to continue to maintain and operate the Project. There is no competing application to take over the Project. Because there is no proposal to transfer the Project license, this section is not applicable to the Project.

3.8 ANNUAL FEES PAID UNDER FPA

This section provides a statement of annual fees paid under Part I of the Federal Power Act for the use of any Federal or Indian lands included within the Project Boundary, and other land use fees, in accordance with 18 CFR § 5.18(c)(ii)(I). There are no Federal or Indian lands within the Project Boundary; the Project paid \$141,730.30 in annual FERC land use fees for 2020.

4.0 REFERENCES

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APPENDIX A

CONSULTATION RECORD

DATE	TITLE	METHOD	REQUIRED OR VOLUNTARY	BRIEF DESCRIPTION	LINKS TO DOCUMENTS
02/13/2019	Cutler Relicensing Public Workshop	Website, e-mail	<i>Voluntary</i>	Project introduction and Relicensing overview	Agenda Presentation Posters
03/29/2019	NOI and PAD submittal	eFiled	Required per 18 CFR § 5.5 and 5.6	PacifiCorp submits NOI to file an application for a new license, and a PAD for the Cutler Hydroelectric Project	FERC Filing
06/25/2019	Cutler Stakeholder Scoping Meeting	In-Person	<i>Voluntary</i>	Stakeholder Kick-Off Meeting	Announcement Agenda Presentation Survey Summary Posters Meeting Summary
06/26/2019	FERC Cutler Relicensing Site Visit	Newspaper announcement, eFiled	Required per 18 CFR § 5.8(d)	Notification that FERC will host a site visit to the Cutler Project	Announcement
06/27/2019	FERC Cutler Relicensing Public Scoping Meeting	Newspaper announcement, eFiled	Required per 18 CFR § 5.8(d)	Notification that FERC will host a public scoping meeting for the Cutler Project	Announcement A.M. Transcript P.M. Transcript
09/11/2019	Cutler Proposed Technical Study Plan	eFiled	Required per 18 CFR § 5.11(a)	Filing of PacifiCorp's Proposed Study Plan for the Cutler Project	FERC Filing
10/08/2019	Cutler Relicensing Study Plan Meeting	eFiled, In-Person	Required per 18 CFR § 5.8(c)	Review Study Plan process and Scoping Document 1	Agenda Presentation Posters Meeting Summary
01/10/2020	Cutler Revised Technical Study Plan	eFiled	Required per 18 CFR § 5.13(a)	Filing of PacifiCorp's Revised Study Plan for the Cutler Project	FERC Filing

DATE	TITLE	METHOD	REQUIRED OR VOLUNTARY	BRIEF DESCRIPTION	LINKS TO DOCUMENTS
01/30/2020	Clarifications to Revised Study Plan Comments	eFiled	Required per 18 CFR § 5.12	Notification that PacifiCorp has submitted clarifications to FERC in response to stakeholder comments on its Revised Study Plan	FERC Filing
02/23/2020	Initial Study Report Meeting	eFiled, In-person	Required per 18 CFR § 5.15(c)	Present study results in the Initial Study Report	Agenda Presentation Meeting Summary
04/23/2020	Section 106 Consultation	Phone	N/A	Communication to Cache CLG, Box Elder CLG, Ute Tribe, SV Goshute, NW Band, SB Tribes. No response or no comment.	N/A
05/05/2020	Notification of Initial Study Report Response to Comments	eFiled	Required per 18 CFR § 5.13(a)	Notification that PacifiCorp's response to comments on its Initial Study Report is now complete and was filed with FERC on 5/5/2021.	FERC Filing
06/07/2020	Section 106 Consultation	Phone	N/A	Communication to Cache CLG, Box Elder CLG, Ute Tribe, SV Goshute, NW Band, SB Tribes. No response or no comment.	N/A
07/30/2020	First Season Progress Report	eFiled	Required per 18 CFR § 5.15(b)	Filing of progress update report on first study season	FERC Filing Visitor Survey
09/22/2020	Section 106 Consultation	Phone	N/A	Communication to Cache CLG, Box Elder CLG, Ute Tribe, SV Goshute, NW Band, SB Tribes. No response or no comment.	N/A
06/17/2021	Section 106 Consultation	Phone	N/A	Communication to Ute Tribe, SV Goshute, and NW Band. No response or no comment.	N/A

DATE	TITLE	METHOD	REQUIRED OR VOLUNTARY	BRIEF DESCRIPTION	LINKS TO DOCUMENTS
08/17/2021	Updated Study Report and NOI to file DLA	eFiled	Required per 18 CFR § 5.15(f)	PacifiCorp submits Updated Study Report package and NOI to file Draft License Application (DLA).	FERC Filing
08/18/2021	Request to Expedited USR Process	eFiled	<i>Voluntary</i>	PacifiCorp requests to expedite the USR Process for the Cutler Project	FERC Filing Approval
08/31/2021	USR Meeting	In-Person	Required per 18 CFR § 5.15(f)	PacifiCorp hosts USR stakeholder meeting	Agenda Presentation Meeting Summary
08/31/2021	DLA PM&E Meeting	In-Person	<i>Voluntary</i>	PacifiCorp voluntary hosts a PM&E Workshop with stakeholders.	Posters
10/29/2021	DLA Submittal	eFiled	Required per 18 CFR § 5.16-5.17	PacifiCorp submits DLA.	Confidential Notice Cover Letter Volume I (Public)
10/29/2021	90-Day Comment Window on DLA Opend	N/A	Required by 18 CFR § 5.16(e)	N/A	Response to Comments on DLA can be found in Exhibit E
11/15/2021	Response to Stakeholder USR Comments	N/A	<i>Voluntary</i>	PacifiCorp submits response to Bridgerland Audubon Society on USR Comments.	Comment-Response Letter
12/13/2021 – 01/12/2022	HPMP Review Period	N/A			
01/25/2022	FERC Telephone Memo on Record	N/A	N/A	FERC submits telephone memo on communication between PacifiCorp and Bridgerland Audubon Society.	FERC Telephone Memo

DATE	TITLE	METHOD	REQUIRED OR VOLUNTARY	BRIEF DESCRIPTION	LINKS TO DOCUMENTS
01/26/2022	Conference with Stakeholders	N/A	<i>Voluntary</i>	PacifiCorp hosts conference call with Bridgerland Audubon Society to discuss comments on DLA.	N/A
01/31/2022	90-Day Comment Window on DLA Closed	N/A	Required by 18 CFR § 5.16(e)	N/A	Response to Comments on DLA can be found in Exhibit E