CUTLER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2420)

DRAFT LICENSE APPLICATION

VOLUME I

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

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY
Salt Lake City, UT

NOVEMBER 2021

INITIAL STATEMENT

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

CUTLER HYDROELECTRIC PROJECT
FERC PROJECT NO. 2420

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, Room 210
Salt Lake City, Utah 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, Room 210
Salt Lake City, Utah 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 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	PRIORITY	FLOW/VOLUME
13-976 ID 29-1855 UT	1903	270 cfs
13-977 ID	1906	135 cfs

WATER RIGHT	PRIORITY	FLOW/VOLUME
29-2146 UT		
13-978 ID 29-2147 UT	1908	135 cfs
13-979 ID 29-2148 UT	1912	500 cfs
29-4364	2007	420 cfs

c. PacifiCorp will maintain its 1923 water right (29-1506) 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):

   Box Elder County
   1 South Main Street
   Brigham City, Utah 84302

   Cache County
   179 N Main Street & 199 N Main Street
   Logan, Utah 84321

   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 there are no federal facilities used by 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, Utah 84318
(435) 563-6507
cityoffice@hydeparkcity.org

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

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

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

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

Smithfield City
96 South Main
Smithfield, Utah 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
Voneene Jorgenson, General Manager
102 W Forrest Street
Brigham City, Utah 84302
voneenej@brwcd.com

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

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

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

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

Benson Bear Lake Irrigation Company
4705 West 3800 North
Benson, Utah 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
Chairperson Rupert Steele
HC 61 Box 6104
195 Tribal Center Road
Ibapah, Utah 84043
(435) 234-1138
rupert.steele@ctgr.us

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

Northwestern Band of Shoshone Nation
Chairperson Darren Parry
Brigham Tribal Office
707 North Main Street
Brigham City, Utah 84302
(435) 734-2286
dparrty@arrowpoint.us

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

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

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

Shoshone-Bannock Tribe
Chairman Nathan Small
P.O. Box 306
Fort Hall, Idaho 83203
208-478-3700
publicaffairs@sbtribes.com

Ute Indian Tribe
Chairman Luke Duncan
Uintah and Ouray Reservation
P.O. Box 190
Fort Duchesne, Utah 84026
(435) 722-5141
luked@utetribe.com

White Mesa Band of the Ute Mountain Ute
Council Representative Elayne Cantsee
Administration Division
P.O. Box 7096
White Mesa, Utah 84511
(970) 564-5602
ecantsee@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

[To be executed for Final License Application]

This Application for New License for the Cutler Hydroelectric Project, FERC Project No. 2420, is executed in the State of Oregon, County of Multnomah, by Beth Bendickson of PacifiCorp, 825 Multnomah Street, Suite 1800, Portland, Oregon, 97232, who, being duly sworn, deposes and says that the contents of this application are true to the best of their knowledge or belief and that they are authorized to execute this application on behalf of PacifiCorp. The undersigned has signed this application on this ____ day of ___________, 2022.

PACIFICORP OF OREGON

By: _____________________________________

Beth Bendickson
Senior Project Coordinator
PacifiCorp

VERIFICATION

Subscribed and sworn to before me, a Notary Public of the State of Oregon, this ____ day of ___________, 2022.

____
(Notary Public)

My Commission expires ______________________.

SEAL

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 9,191 acres of 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 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
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
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

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	Millions of 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
NO_2	Nitrite
NO_3	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

OCMP	Operations Compliance Management Plan
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

DRAFT LICENSE APPLICATION

EXHIBIT A

PROJECT DESCRIPTION

CUTLER HYDROELECTRIC PROJECT

(FERC NO. 2420)

Prepared for:

A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

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 Area includes approximately 9,191 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.

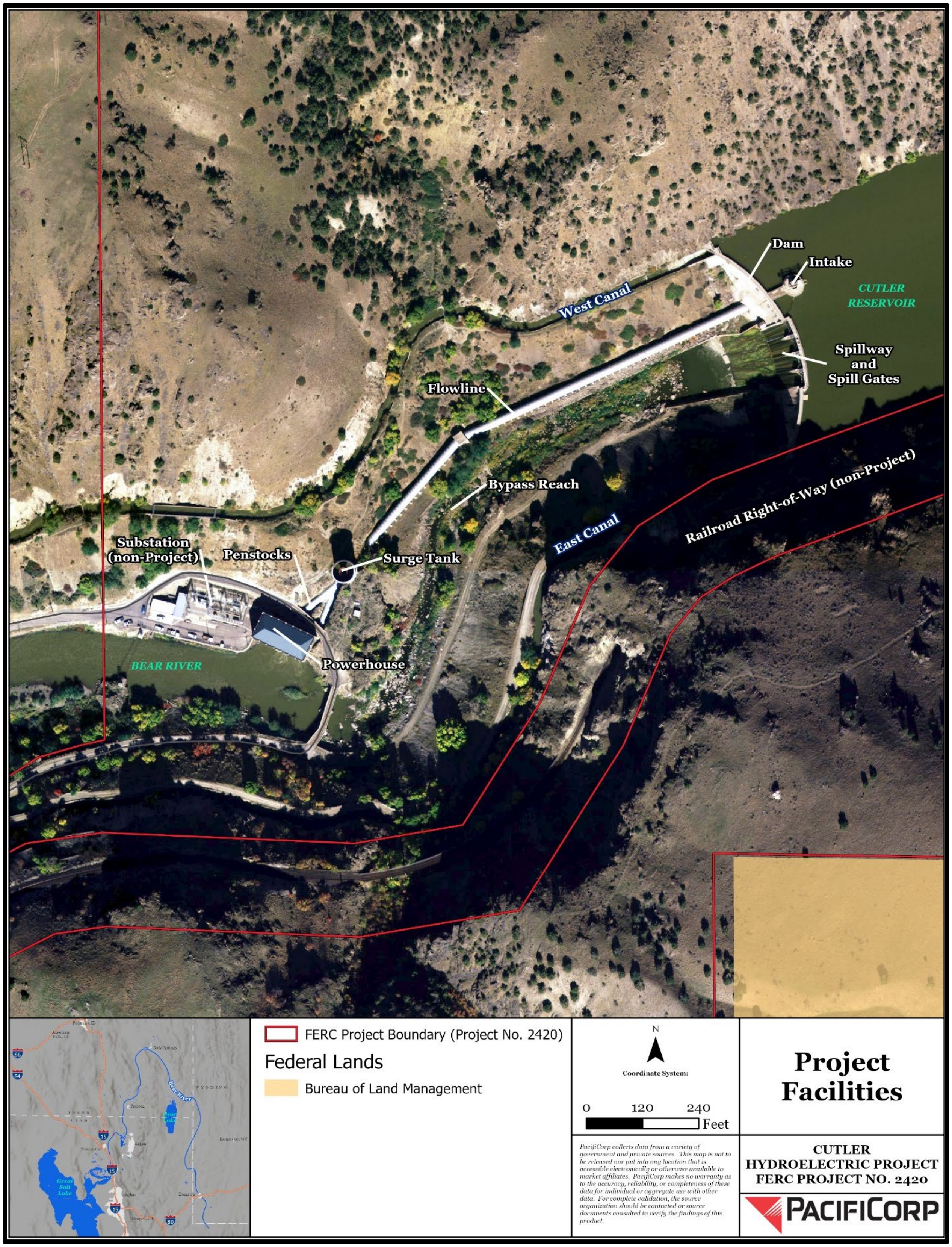
The Project consists of a reservoir, concrete gravity arch dam, gated-overflow spillway, low-level passage gate (non-operational), intake tower and cylinder gate, two irrigation canal intakes, a steel flowline, a surge tank, two steel penstocks, a powerhouse, two turbine-generator units, circuit breakers, 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 MWh of electric energy annually serving residential and commercial customers.

In addition to the 30-megawatt 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 (FERC 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 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 2,467 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 Draft 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 (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 2,467 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 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 5-⅜ 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) (Photo 2-3) and two on the east intake (Eastside or Hammond Canal). The flow capacity of the Eastside and Westside canals is 165 and 735 cfs, respectively. 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.

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 (Photo 2-4). 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 2-5).

PHOTO 2-4 CUTLER FLOWLINE INTAKE STRUCTURE

2.2.6 TRASH RACKS

The trash racks are ⅜-inch thick flat bar 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 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 below.

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 kVkV 50 MVA sstep-up ttransformer associated with transmission, but not part of the Project.
    - No. 2 is a 46 kV–7.2 kV 20 MVA sstep-up transformer that is part of the Project.

The primary purpose of the No. 1 step-up transformer is for transmission at the voltages from 138 kV to 46 kV. This transformer has an additional or third (tertiary 6.6 kV) winding that is used as a step-up for the No. 1 generator. This transformer would be part of the Cutler substation with or without 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 up, 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. Monthly and Annual Average Generation Data provided by PacifiCorp.

DRAFT LICENSE APPLICATION

EXHIBIT B

PROJECT OPERATION

CUTLER HYDROELECTRIC PROJECT

(FERC NO. 2420)

Prepared for:

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

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NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

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 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 (FERC 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 Draft License Application (DLA) 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%

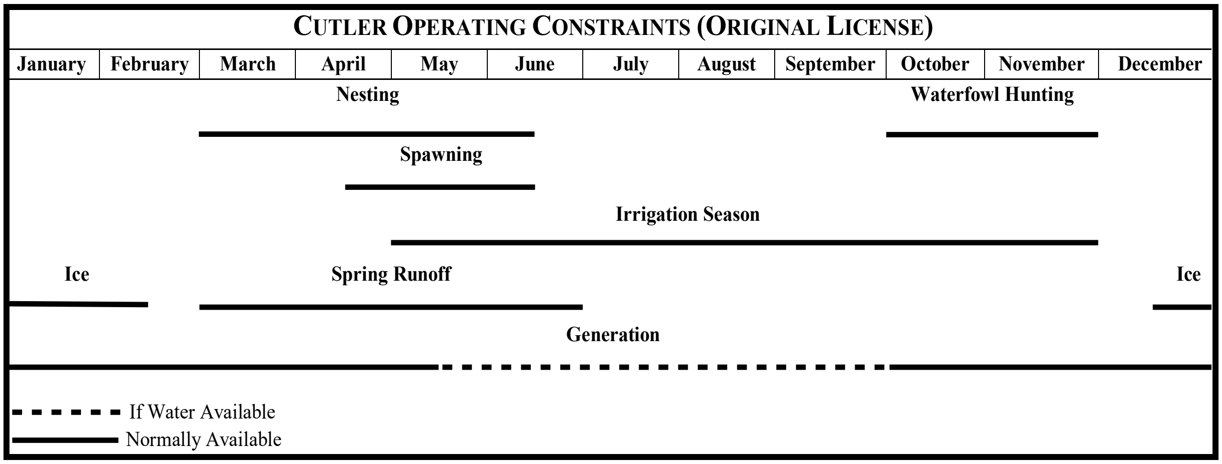
Source: FERC 2002

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 spawning[1] has

[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.

been removed from the constraints for proposed future operations, the remainder of the constraints remain relevant.



Source: PacifiCorp 2021

FIGURE 1-1 CUTLER OPERATING CONSTRAINTS IN 1994 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.

1.1.2 WINTER SEASON OPERATIONS

From late December to mid-February, ice can periodically form on the reservoir and in the river downstream of the Project. During this period, the reservoir is held as constant as possible to prevent ice breakup plugging the intakes and to prevent the sudden increases in flow that could cause ice breakups and jams downstream that may also exacerbate riverbank erosion 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 MWh. The monthly, five-year, and 30-year average generation for the two periods (1991-2020 and 2016-2020) is provided in Table 1-2. Generation data for the same five-year time period is presented in Table 1-3. Project inflow and outflow statistics will be updated for the Final License Application and will include data through the 2021 calendar year. Generation and discharge data by month for the most recent five-year period will also be updated for the Final License Application (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 MOST RECENT 5-YEAR PERIOD

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 elevation[2] 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 has 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 Preliminary 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 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 un-forecasted 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 (Table 1-4). These values (4407.5 to 4406.5 feet, at least 85 percent of the time, and 4407.5 to 4405.0 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 unforecasted changes to irrigation diversion flows) events, rather than due to licensee error.

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

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

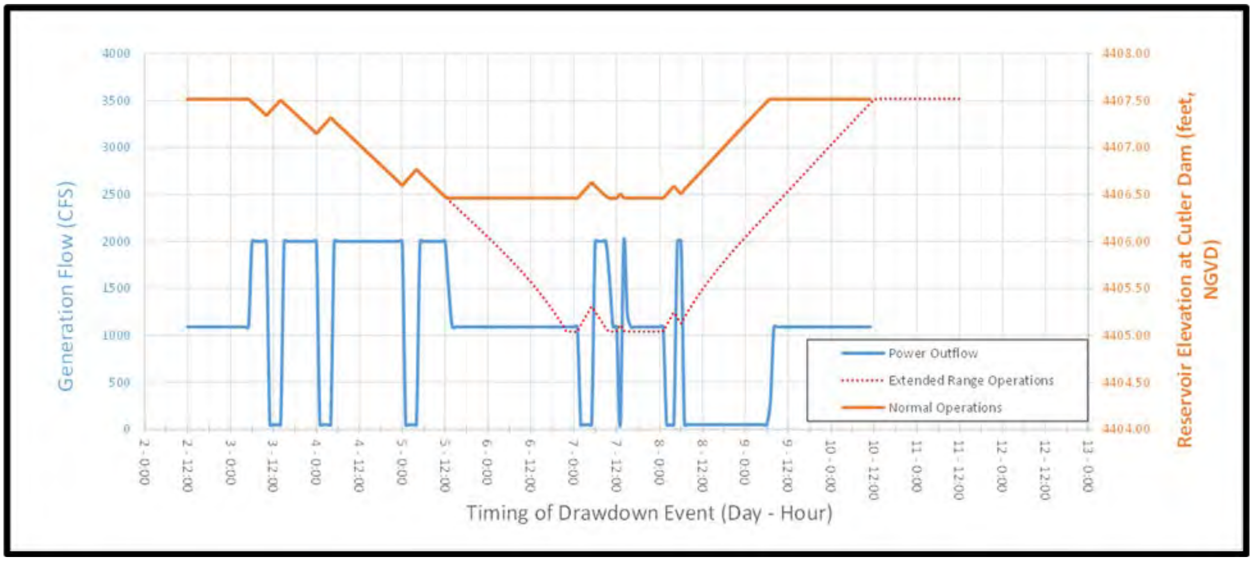
For the narrower 4406.5- to 4407.5-foot normal range (proposed for at least 85 percent of the time), a tolerance limit of +/-0.5 feet is proposed to avoid nuisance exceedances observed during the current license period. Generally, the Federal Energy Regulatory Commission (FERC) has allowed temporary 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 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 4405.0 feet) over approximately week-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 1-4would 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 4406.5 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 4406.5 feet, down to 4405.0 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 mid-December and end of January) when downstream ice-damming concerns are present.

The 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:

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

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 the most recent 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 the most recent 30-year record of flow (1991 to 2020) are outlined below in Table 2-1.

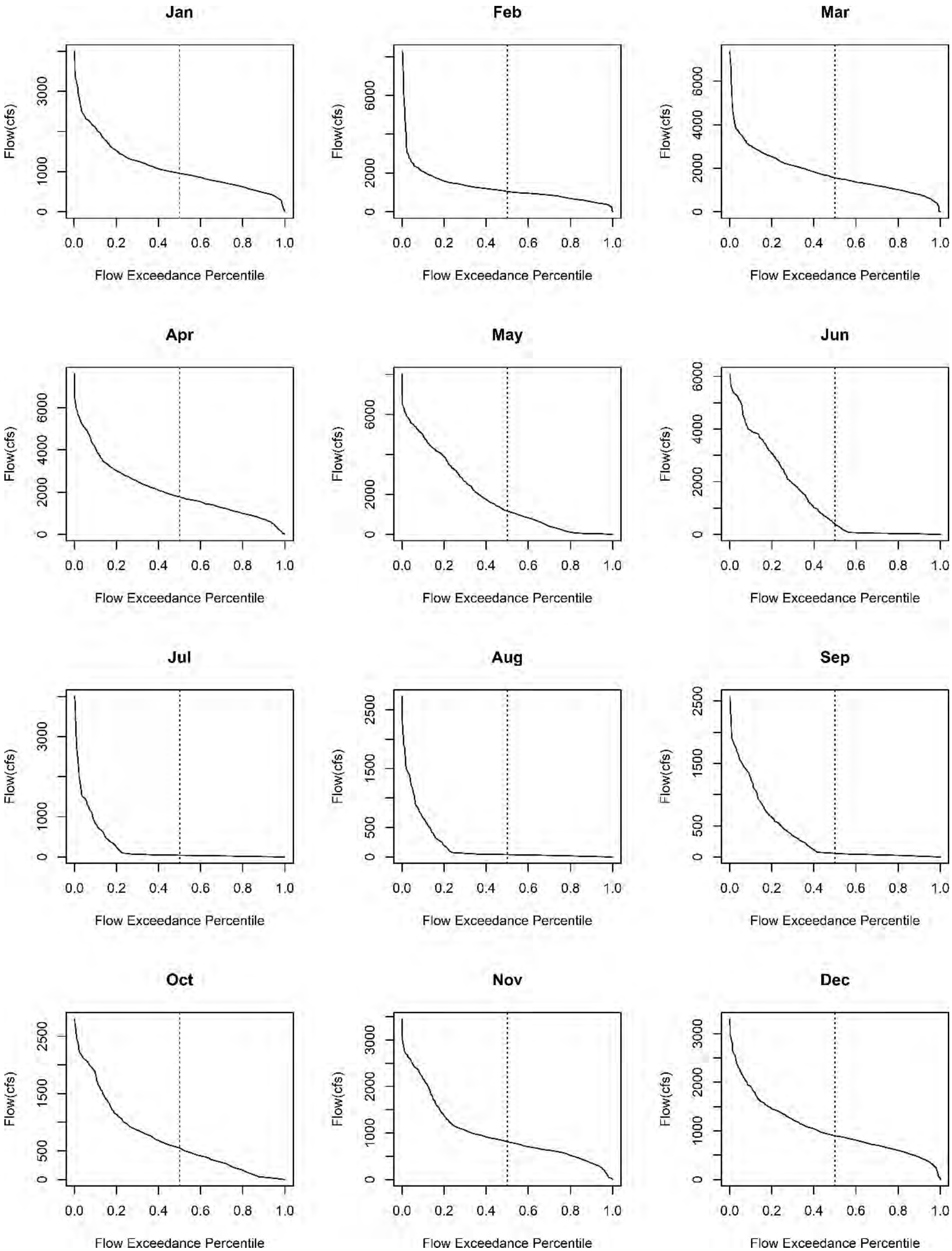
TABLE 2-1 FLOW (CFS) STATISTICS MEASURED AT COLLINSTON GAGE (1991-2020)

	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

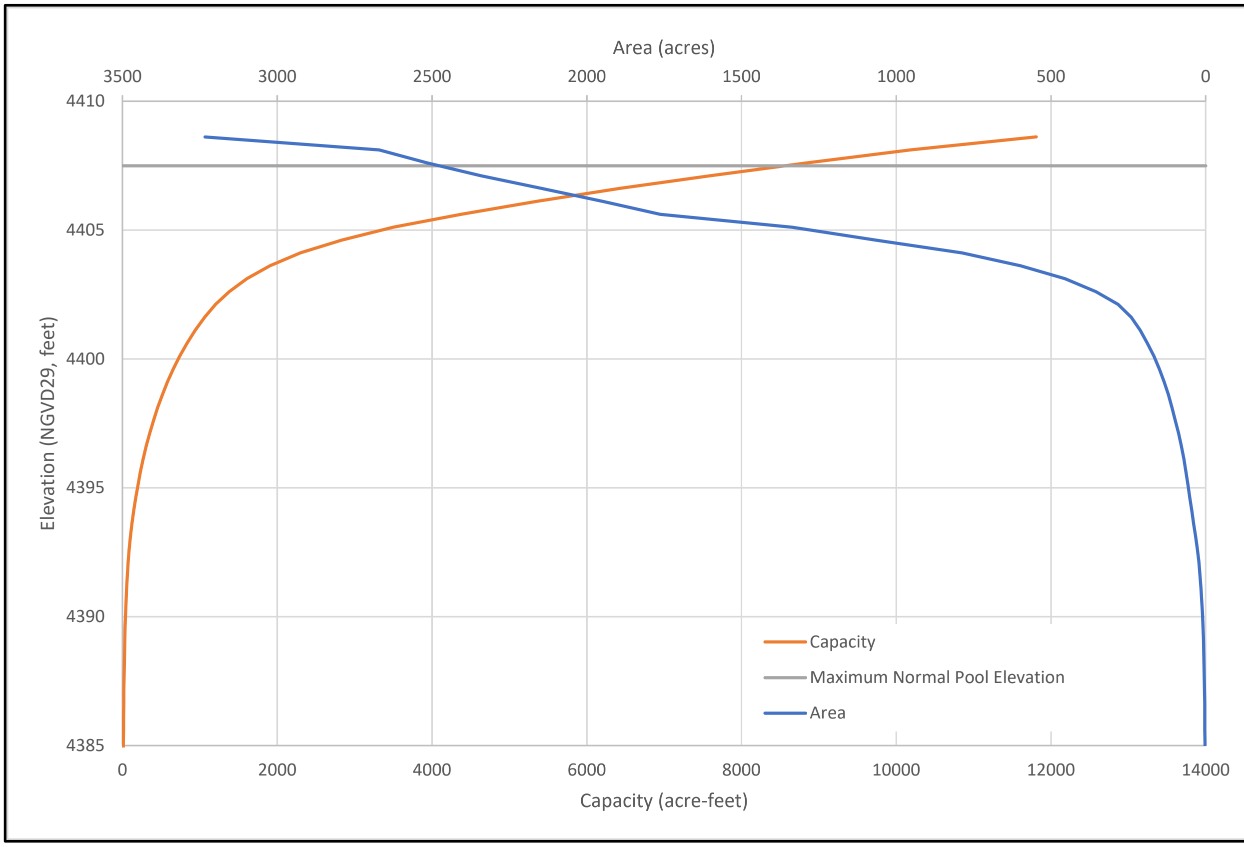
FIGURE 2-1 MONTHLY FLOW DURATION CURVES

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

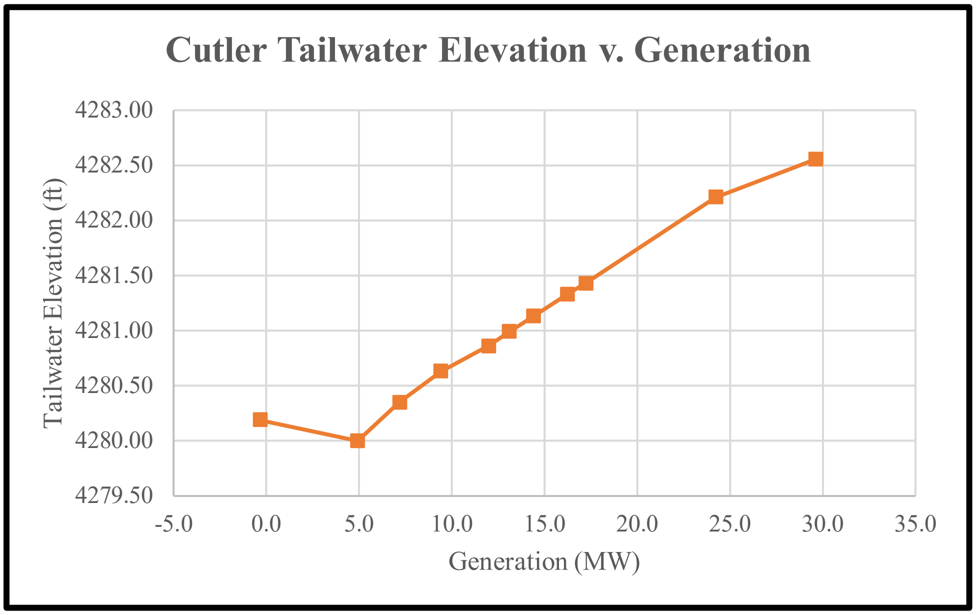
FIGURE 2-2 AREA-CAPACITY CURVES

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.

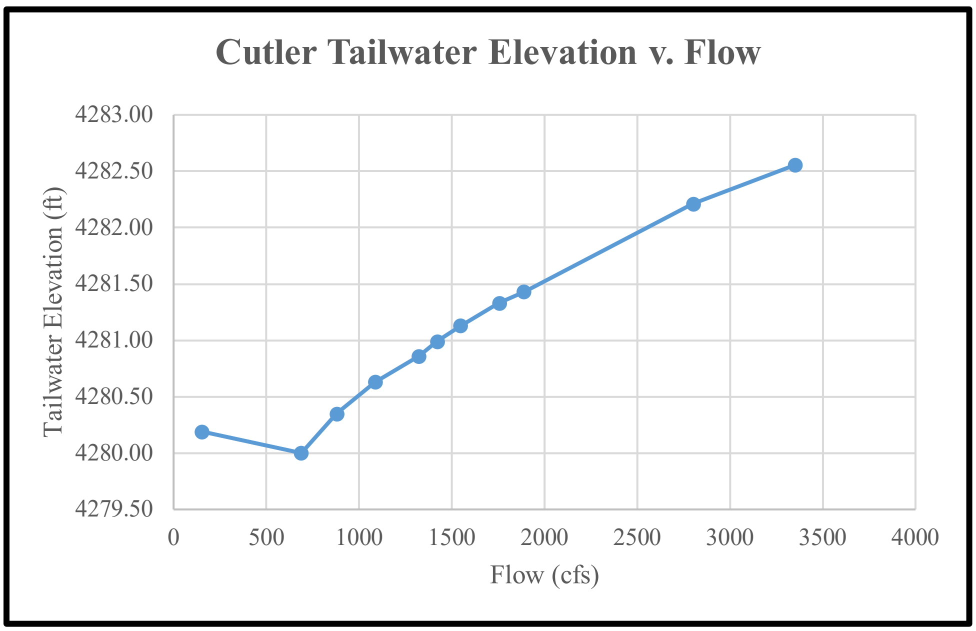
2.5 TAILWATER RATING CURVE

The normal tailwater elevation at the Project is 4280.0 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)	4386.2
Normal headwater (ft, NGVD29)	4407.5
Maximum headwater (ft, NGVD29)	4408.3
Normal tailwater (ft, NGVD29)	4280.0
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. PacifiCorp does plan 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 Project operations. Additionally, components may be installed to effect EIM capabilities where these EIM components may result in short-term changes in the 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.

Western Energy Imbalance Market (WEIM) 2021. About. Available online: https://www.westerneim.com/Pages/About/default.aspx. Accessed September 27, 2021.

DRAFT LICENSE APPLICATION

EXHIBIT C

CONSTRUCTION HISTORY

CUTLER HYDROELECTRIC PROJECT

(FERC NO. 2420)

Prepared for:

PACIFICORP

A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

CERTUS Environmental Solutions, LLC

Kleinschmidt

NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

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 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 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. 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 (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

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 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 also 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 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 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 improve EIM capabilities.

TABLE 2-1 PROPOSED CAPITAL IMPROVEMENTS PROJECT AND PROPOSED SCHEDULE

PROPOSED SCHEDULE	PROPOSED CAPITAL IMPROVEMENT PROJECT
	Spillway gates like-for-like replacement
Proposed schedule to be provided in the Final License Application.	Flowline supports
	Seismic upgrades to the surge tank including new foundation anchors and exterior shell
	New river-right retaining wall
	Dedicated lifting hoists

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

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.

______. 1925a. “Brigham Men Visit Damsite.” April 7, Brigham City.

______. 1925b. “What Has Been Done First Six Months on Cutler Development.” September 29, Brigham City,

National Park Service (NPS). 1989. Cutler Hydroelectric Power Plant Historic District National Register of Historic Places Registration Form 10-900. March 8, 1989. Available at: https://npgallery.nps.gov/GetAsset/4524b3a0-3547-43bd-8ba9-426844279786.

Salt Lake Telegram. 1942. “Power Crews Patrol Lines.” December 21, Salt Lake City.

SWCA Environmental Consultants (SWCA). 2020. Cultural Resources Study Report (Privileged and Confidential). Selective Reconnaissance-Level Architectural Survey for the Cutler Hydroelectric Project Licensing, Box Elder and Cache Counties, Utah. December 2020.

Utah State University (USU). 2007. Utah State University, Merrill-Cazier Library, Special Collections and Archives, Historical Photoboards Collection A-4673d. Available at: https://digital.lib.usu.edu/digital/collection/Bear/id/11912. Accessed June 9, 2021.

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

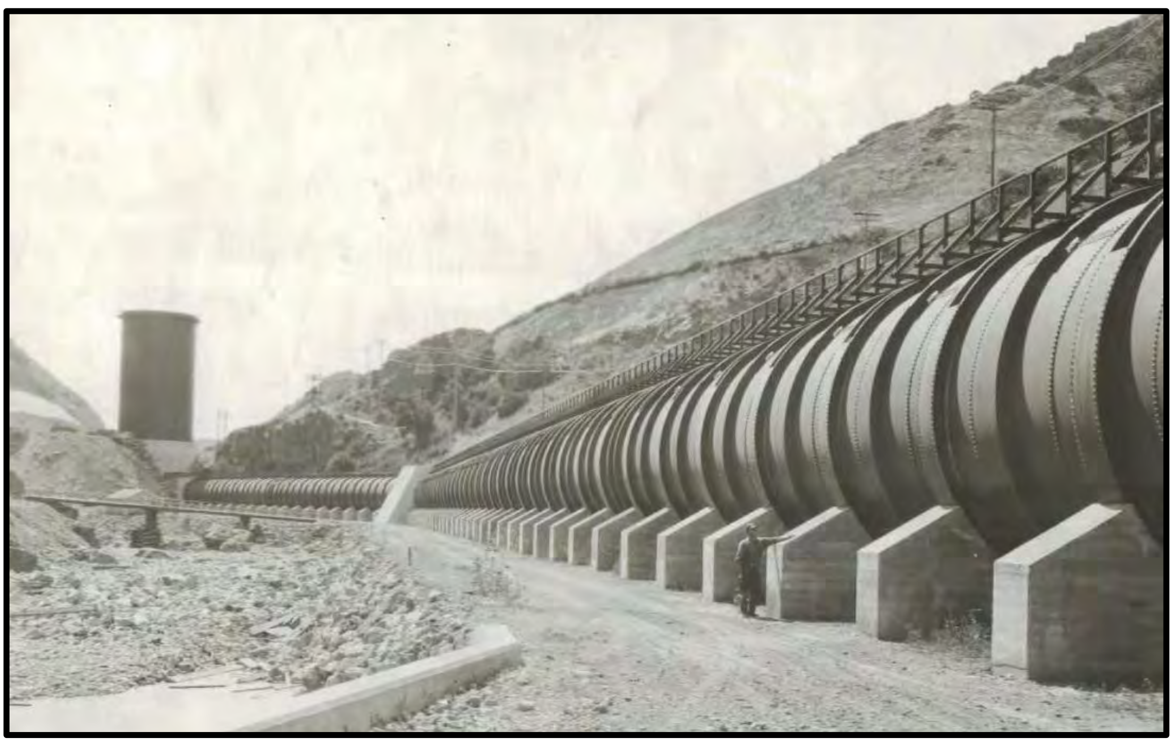


PHOTO 3-2 FLOWLINE CONSTRUCTION IN BEAR RIVER CANYON, UTAH, 1925-1927

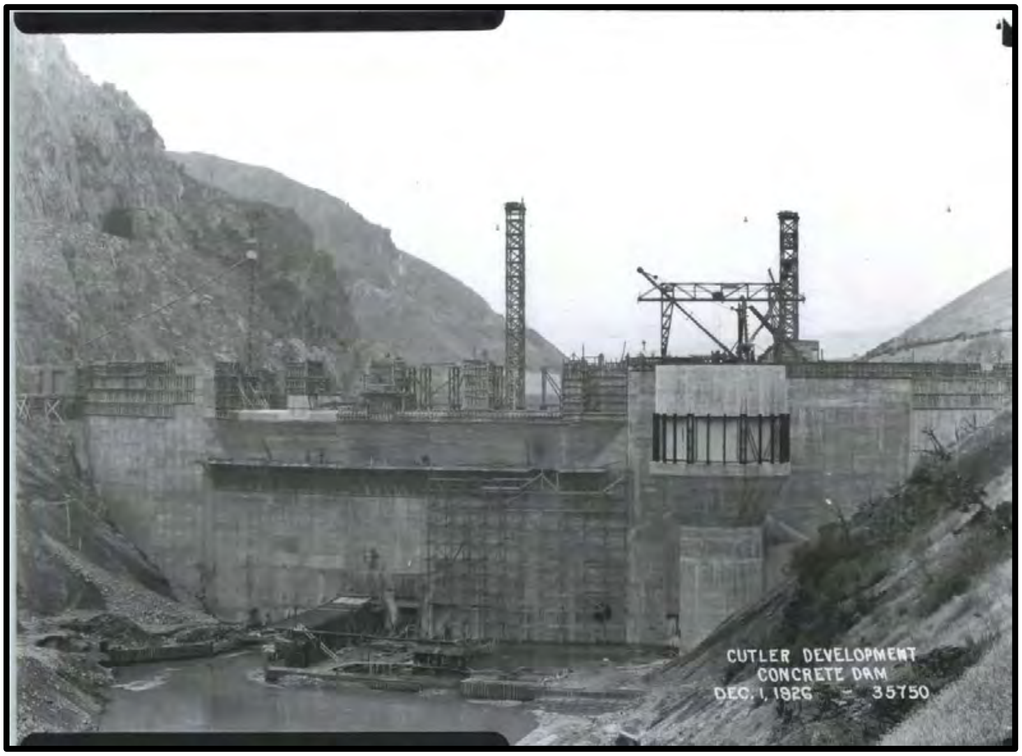


PHOTO 3-3 CUTLER DAM UNDER CONSTRUCTION DEC. 1, 1926

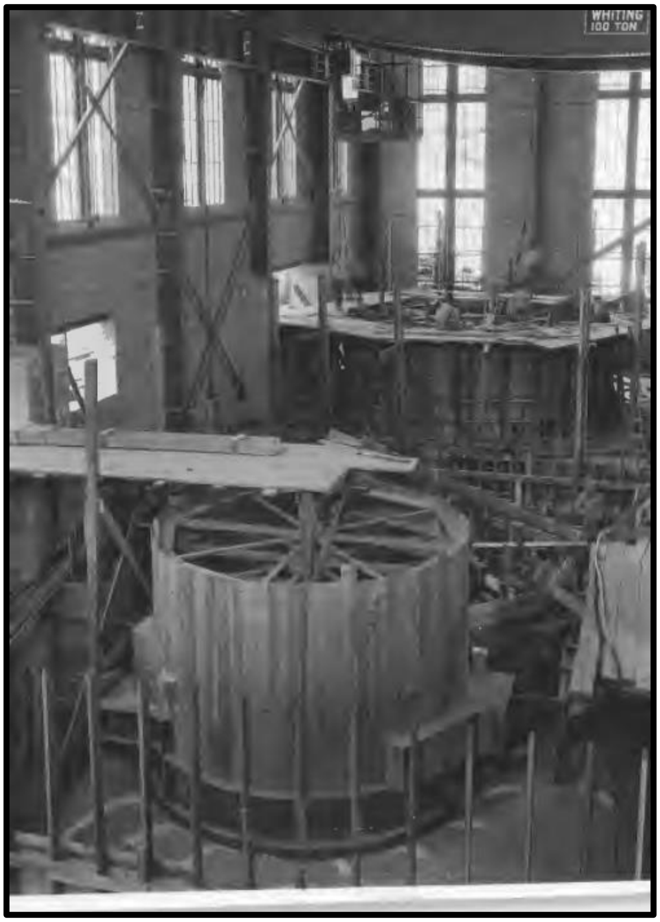


PHOTO 3-4 CUTLER POWERHOUSE UNDER CONSTRUCTION

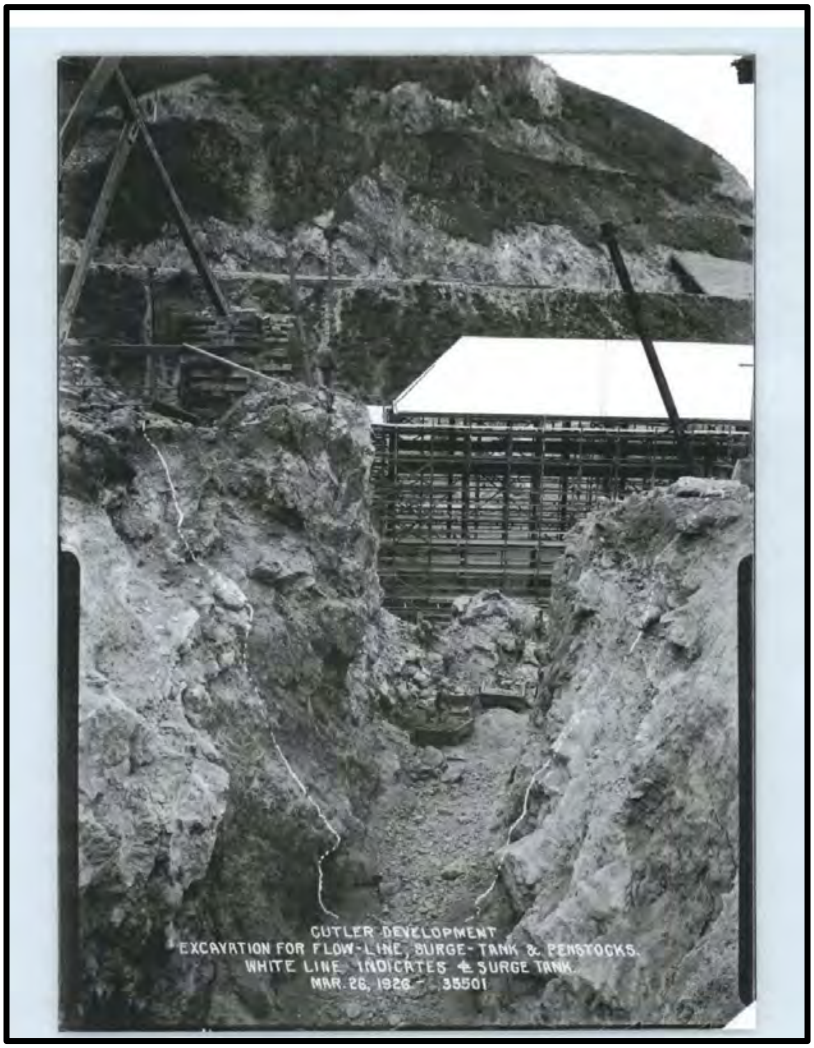
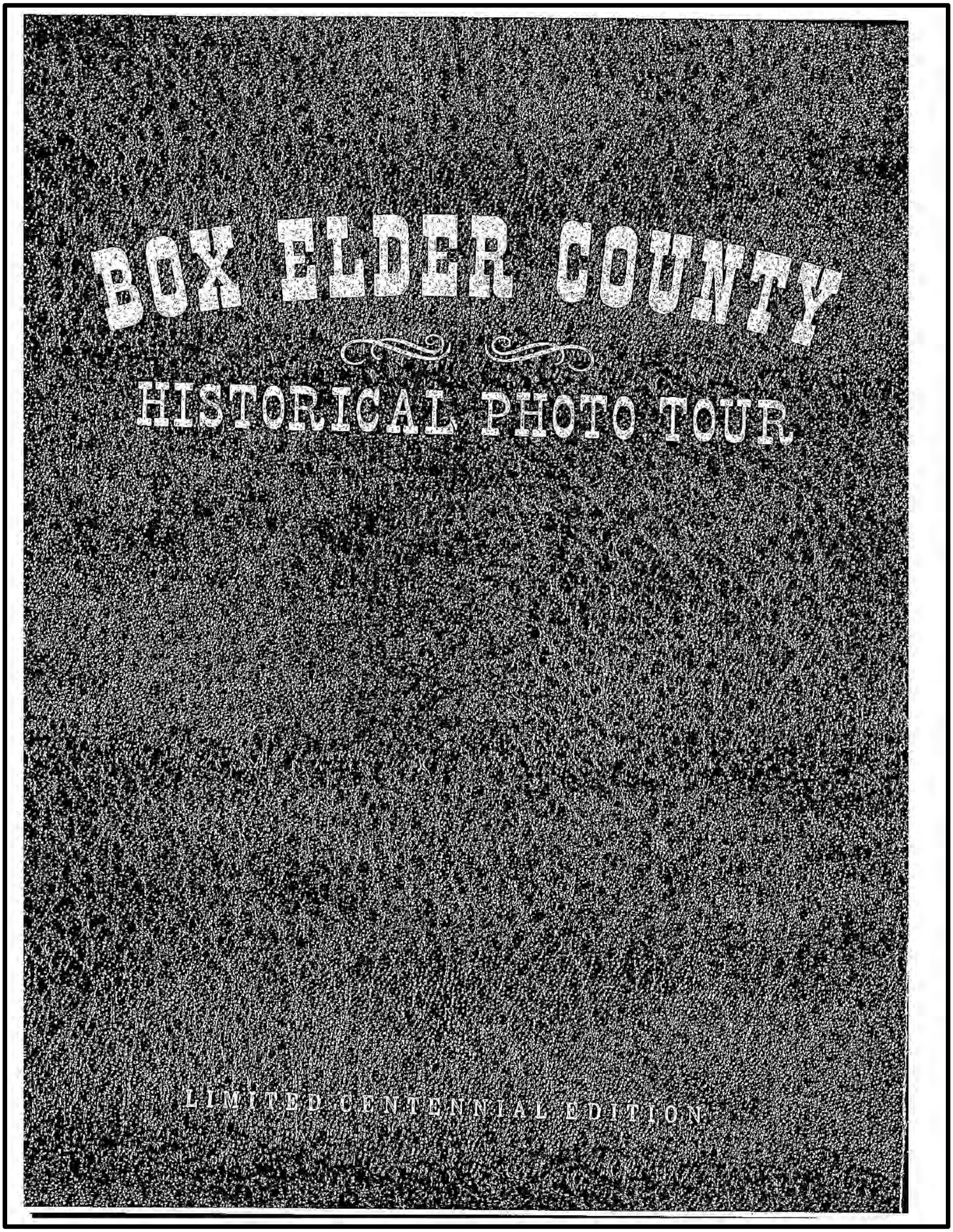


PHOTO 3-5 CUTLER EXCAVATION FOR PENSTOCK, MARCH 26, 1926


BOX ELDER COUNTY
HISTORICAL PHOTO TOUR
LIMITED CENTENNIAL EDITION

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.

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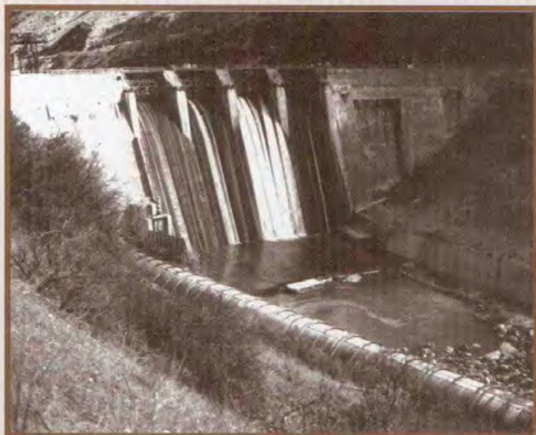
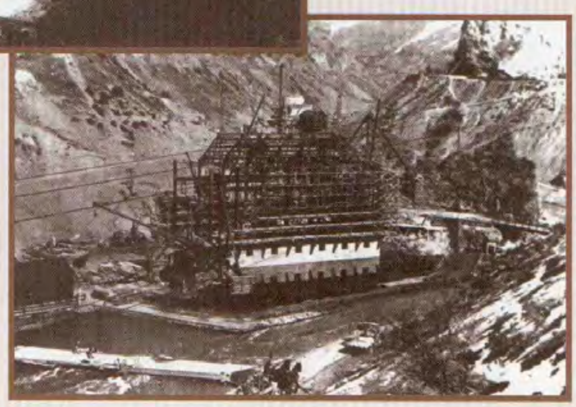
CUTLER POWER PLANT



Scene of Cutler Dam.

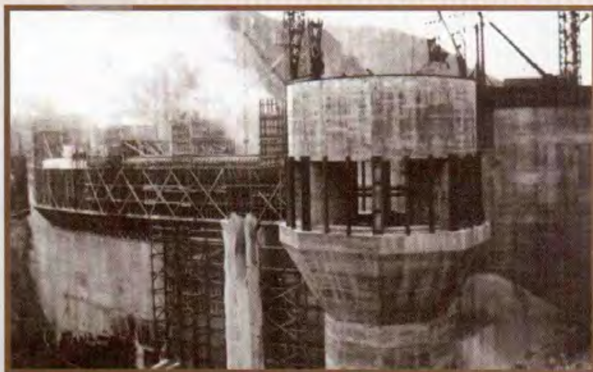
Taken in 1991. Exposed the old earth filled dam and Wheelons Collapsible Dam.

Cutler Power Plant.

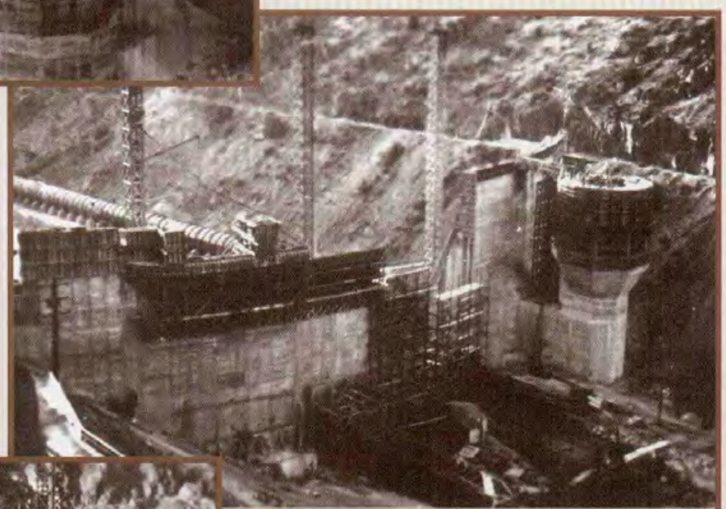


Frame work of the Cutler Power Plant, temporary bridge is at lower left.

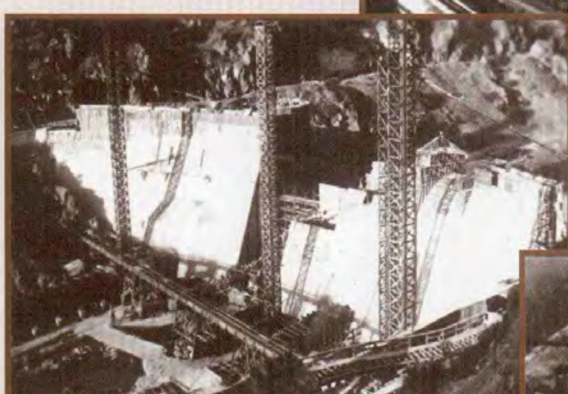
CUTLER POWER PLANT



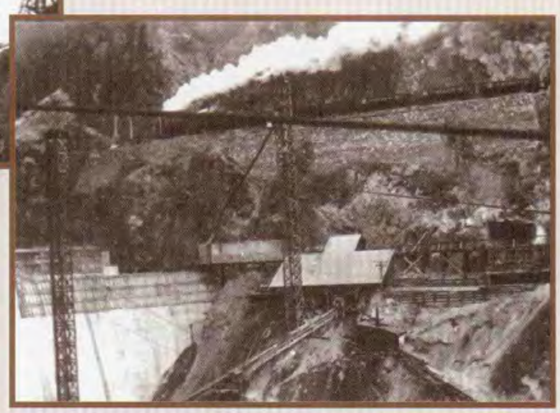
Upstream side of dam starting to close in the center. Water intake for the power plant at right



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.

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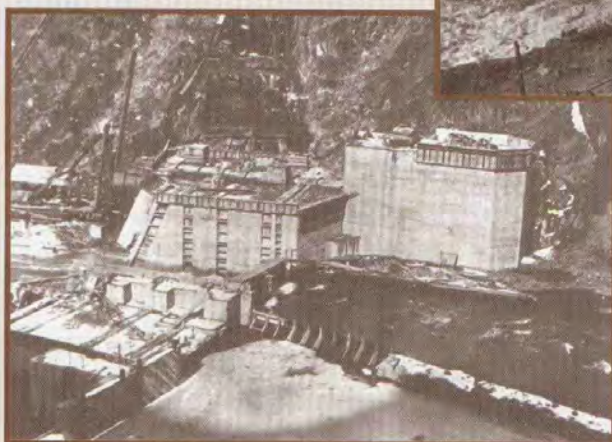
CUTLER POWER PLANT

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.

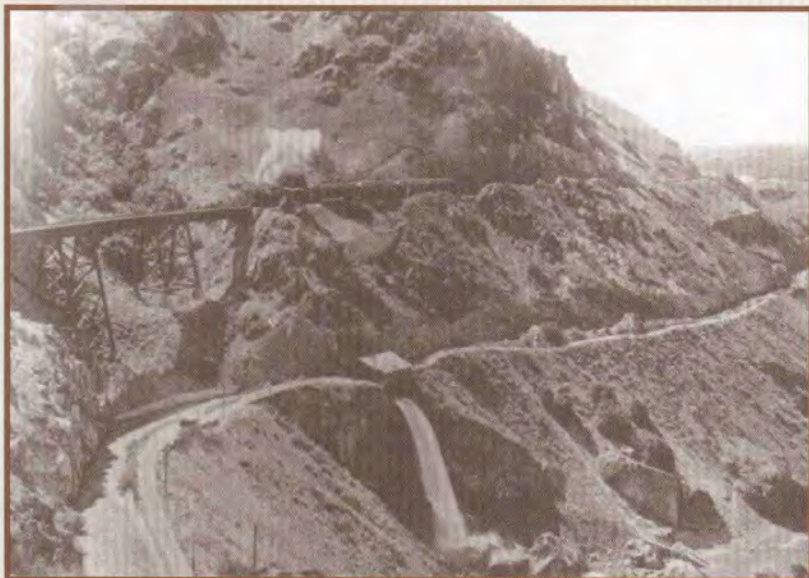


Top of picture shows the cavity that was blasted in the north wall of the canyon to key the dam to the mountain. The river is being flumed through the dam.

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.

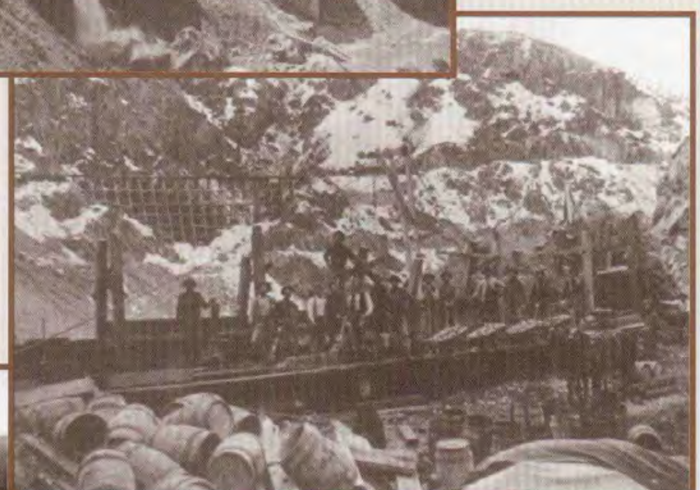
View showing the water line coming from the east side canal.

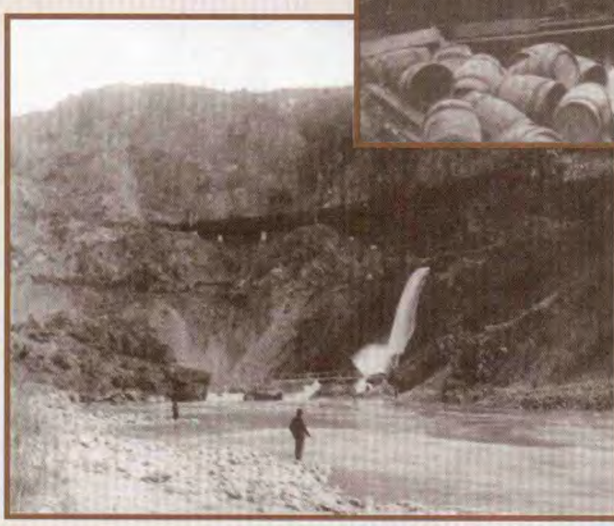
CUTLER POWER PLANT



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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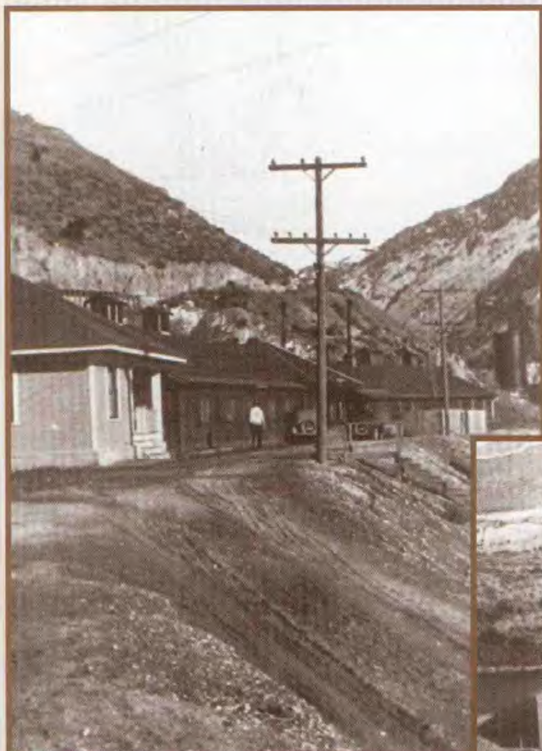
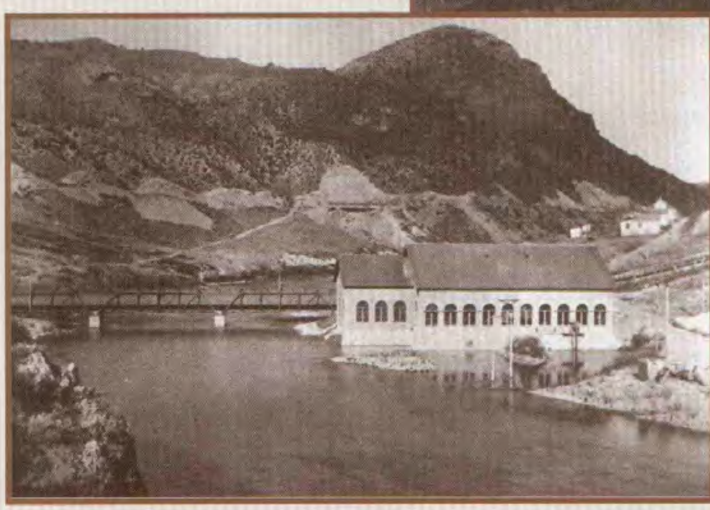
CUTLER/WHEELON DAM



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 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

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

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	
x private	___ building(s)			
___ public-local	x district	9	___	buildings
___ public-State	___ site	___	___	sites
___ public-Federal	___ structure	10	___	structures
	___ object	___	___	objects
		19	___	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 J. Evans — 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)
Industry/Processing/Extraction: energy facility	Industry/Processing/Extraction: energy facility

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)
	foundation concrete
Art Deco (powerhouse & shop)	walls brick, asbestos
Bungalow & Craftsman (residences)	
	roof copper
	other n/a

Describe present and historic physical appearance.

(see continuation sheet)

x See continuation sheet

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 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.

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 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, 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 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 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.

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 overhanding 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-ingroove 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 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, 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 were 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
n/a

Architect/Builder
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

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 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 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 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 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

Clogher, A.C. "Cutler Brings in More Bear River Power for Slat Lake Basin." Electirical West 59 (1 November 1927): 255-258.

"Cutler Station". The Circuit (March 1958): 8-9.

Previous documentation on file (NPS):

x 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:

- x State Historic preservation office
- ____Other State agency
- ____Federal agency
- ____Local government
- ____University
- x Other

Specify repository: Utah Power and Light Company

10. Geographical Data

Acreage of property 33.5 acres

UTM References

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

x See continuation sheet

Verbal Boundary Description

x See continuation sheet

Boundary Justification

x 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

"Hydro and Steam Developments Will Set New Records During 1928." Electrical West 60 (1 February 1928): 83-85.

"In a Utah Plant." Electrical West 61 (1 December 1928): 329.

McCormick, John S. A Legacy of Service: The History of Utah Power and Light Company. Salt Lake City: Utah Power and Light Company, 1987. (Unpublished proof copy on file in UP&L's Public Relations Department.)

"Much Local Material In New Power Plant." The Utah Payroll Builder 15 (October 1926): 9-10.

Utah Power and Light Company. "Reclassification of Electric Plant, Statements 'A' to 'I' Inclusive." Report prepared for the Federal Power Commission in compliance with Electric Plant Instruction 2D -- Uniform System of Accounts, and Order dated May 11, 1937.

Utah Power and Light Company. "Utah Power and Light Company, History of Origin and Development." Unpublished report prepared in connection with Federal Power Commission Request Order dated May 11, 1937.

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

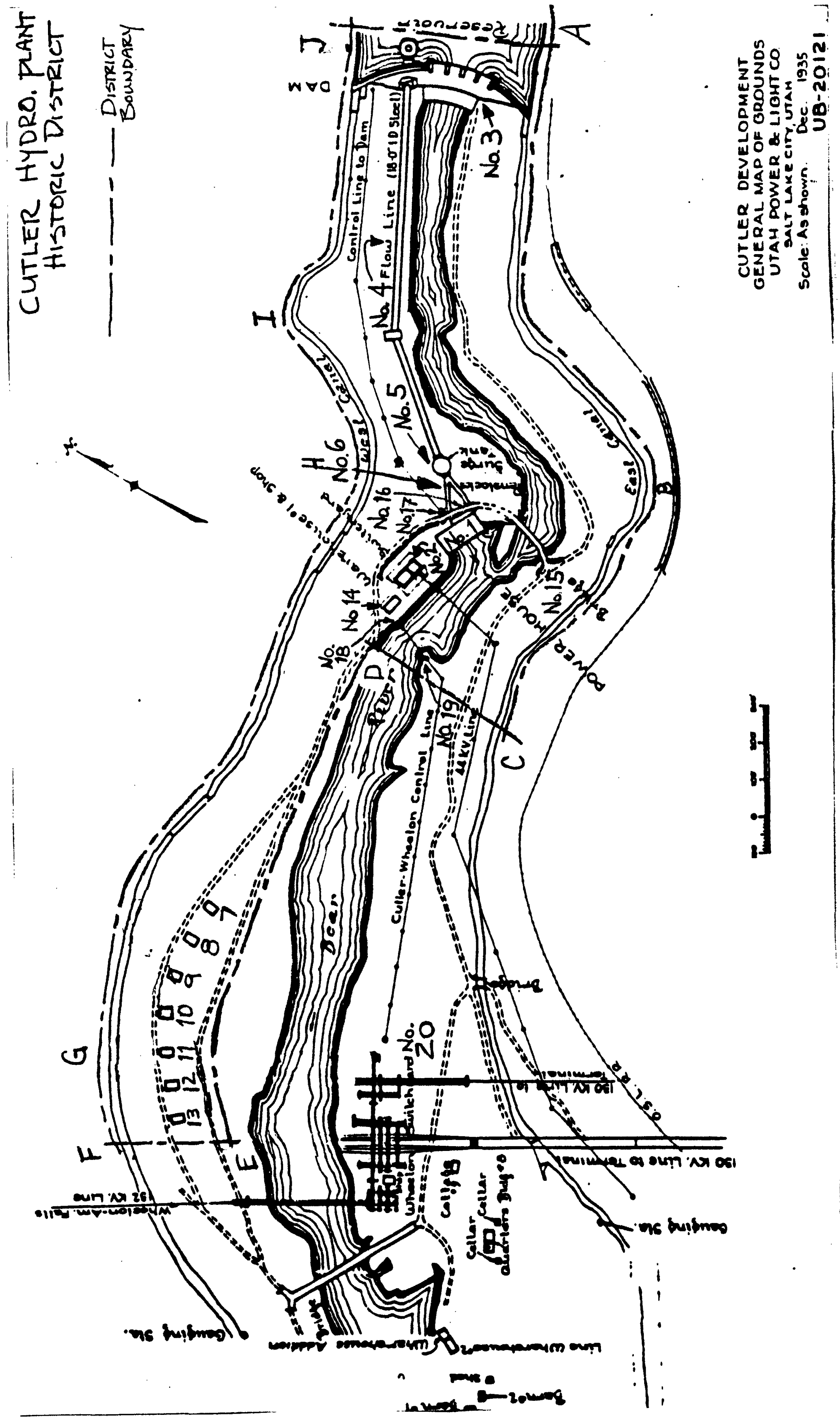
Verbal Boundary Description:

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.

Document #0179o


CUTLER HYDRO. PLANT
HISTORIC DISTRICT
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 manger 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 190? 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' us.

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 continuit 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 justifica tion 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 subjacent 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 Coompany,) 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 58,000 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 128 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 therefor 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 commision, 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 turbins 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 alley, 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 thru the turbines under a head of 128 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 128 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 devoloped 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, jogging 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, suffi- the 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 water 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

Utah Power & Light Co. Is Granted Permit

The Public Utilities Commission of Utah made an order on Wednesday, January 7, 1925, issuing a certificate of convenience and necessity to the Utah Power and Light Company which authorized that company to construct, maintain and operate a hydro-electric generating station in Box Elder and Cache Counties, in this state, which is to be known as the "Cutler Development." The company was directed to construct the plant in conformity to the rules and regulations issued by the commission governing construction of that type.

This means that the Utah Power & Light Company now has authority to go ahead with the construction work of the big dam and hydro-electric plant in Bear River Canyon. Construction work will likely commence as soon as the weather breaks.

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 that 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 proprietory 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 directily 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 Lifton. 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 secitons 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.)

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CUTLER DEVELOPMENT RPOJECT 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 is 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 128 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 6600 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 80 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 breakup 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 unitedly 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

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 3-12 FIGURES GIVEN ON BIG DAM AT CLUB MEETING – APR. 24, 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 3-13 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 indus trial 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 3-14 CACHE VALLEY CLARION: CIVIC CLUBS ENDORSE DAM PROJECTS – MAY 29, 1941

NORTH CACHE NEWS ARTICLES:

CACHE COUNTY URGED FOR STORAGE POND

Civic Group at Soda Springs Interested in Cutler Dam Project to Help Irrigators.

SODA SPRINGS, Idaho — Industrial development of southeastern Idaho—"potentially the ichest aea in the intermountain west" contigent upon construction of water storage facilities and power plants.

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.

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.

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 ecoded—and definately foretells a new area of cooperative development of the Intermountain west and southeastern, Idaho.

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.

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.

"The phosphate beds of southeastern Idaho and northeastern Utah make the areas potentially the richest in the intermountain west," said Dr. Peterson.

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.

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 sourist 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."

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.

John Noris 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.

Ben B. Johnson of Preston, association president, was toastmaster at the banquet.

Committee reports, all showing progress, included those by Max D. Cone of Arimo, roads; Rulon R. Bartchi 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.

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, Magdalina 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.

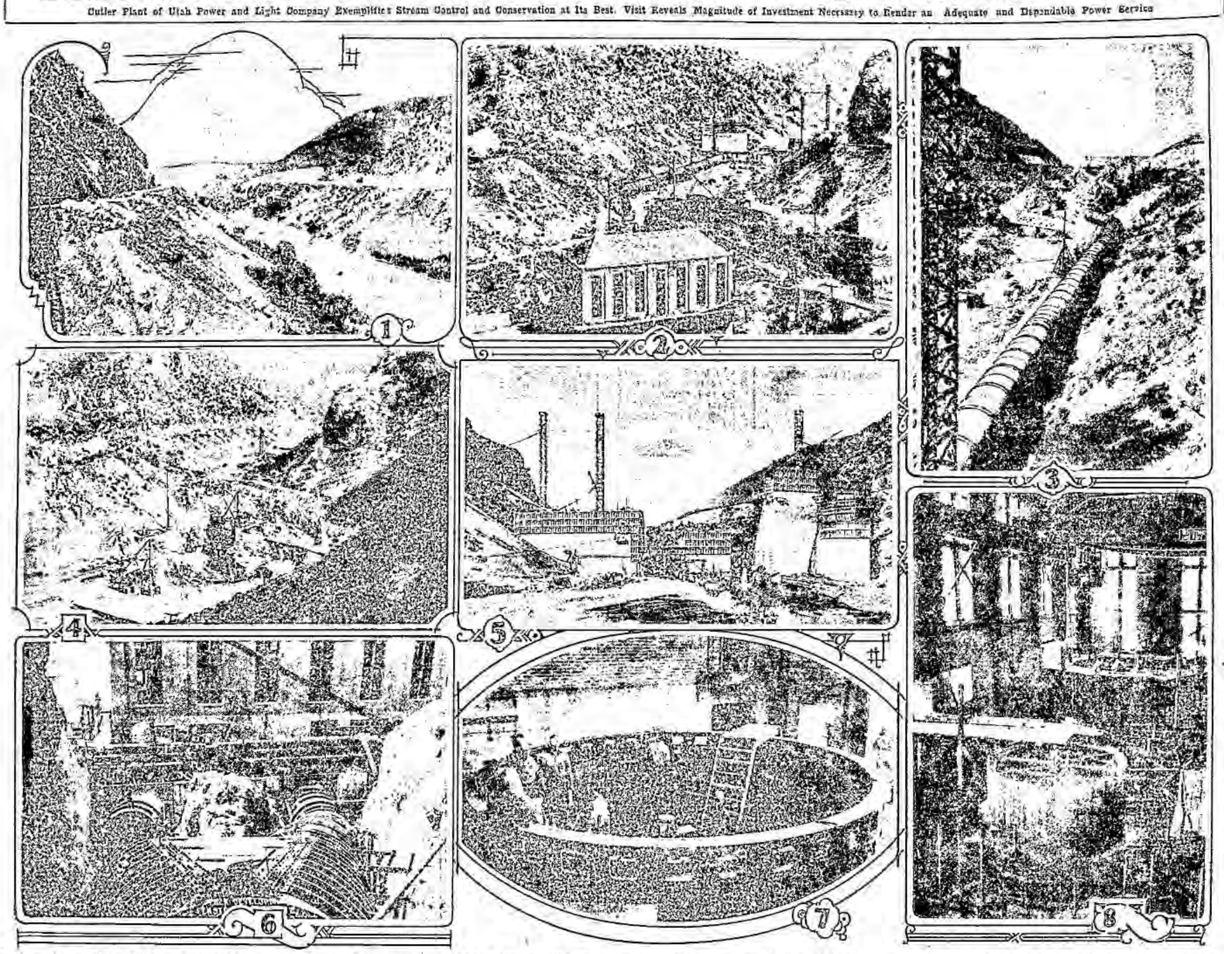
NEWEL G. DAINES, Attorney for Plaintiff.
Post Office Address
211 Cache Valley Bank Bldg.
Logan, Utah.

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

OGDEN STANDARD EXAMINER ARTICLES:

ELECTRICAL POWER DEVELOPMENT AND CONSERVATION

Cutler Plant of Utah Power and Light Company Exemplifies Stream Control and Conservation at Its Best. Visit Reveals Magnitude of Investment Necessary to Render an Adequate and Dependable Power Service



1—General view of the Cutler powersite before operations were begun. 2—General view of dam, pipeline and power house, taken recently. 3—This 18-foot flowline is 1320 feet long, built of riveted steel plates. 4—The powersite as it appeared about one month ago. 5—The arch-type concrete dam as it appeared on September 1. 6—The flowline dividing into two V-shaped branches and the penstocks at the plant. 7—One of the huge stators being wound for one of the 15,000 kilowatt generators. 8—Construction work progressing in the powerhouse.

Water conservation, with the useful employment thereof, is strikingly exemplified by the new hydro-electric generating station under construction by the Utah Power and Light company on the lower Bear river.

Another impressive fact is that the creation of a plant of this sort requires the highest type of engineering and construction, together with the investment of a vast amount of money—though when the plant is completed and in operation this will not be apparent to the passerby, nor even to those who may visit and inspect the dam and buildings.

In all of these, as the pictures on this page partly reveal, great capital investments have been made—largely by residents of the territory served by the company through the purchase of its securities. This money is remaining at home in the shape of the Cutler development, as this plant is known, in the purchase of materials entering into its construction, in local labor that is employed during the building period, in locally purchased materials, including locally raised foodstuffs, in the dividends paid to the local stockholders of the company, and furthermore in creating new taxable property.

Utilizing Waste Water

The Cutler plant is situated on the lower Bear river just above the company's Wheelon plant in the narrows of the Bear river canyon. The expansive Cache valley every spring has a large run off, flood waters that find their way into Bear river. This water every year does no valuable service to the farm lands, but on the other hand, cuts stream banks and washes down much of the humus that is the chief productive value in the soil of the county. For years this water has done more harm than good.

It is this water which will fill the reservoir at the Cutler plant and not only be used in the generating of energy at the plant, but will be under absolute control throughout the year and be available for the farm lands below the plant during seasons when otherwise there would be complete drought in dry years. The reservoir at the Cutler plant, while sizeable, is not actually a storage reservoir, but rather a regulating reservoir. The dam and the canyon walls will hem it in and the lake formed will extend a considerable distance into the back country. The dam will provide a gross head of 127 feet, with an effective head of 123 feet. At high water, the area of the reservoir will be 2650 acres. A five-foot drawdown will provide a capacity of 17,000 acre feet. With the plant operating at full capacity, the storage water alone will furnish 30,000 kilowatts or 40,000 horsepower, for a period of 60 hours, or two and one-half days.

Facts About the Plant.

Actual construction work at the Cutler powersite began in June of last year. At first about 150 men were employed, but soon this force grew to 650 and this number is still at work. An army of carpenters alone was required to construct the almost countless forms for the concrete work. About 30 per cent of the labor employed came from the near vicinity of operations. The monthly payroll has averaged around $59,000. In food supplies alone, by the time the work is completed, there will have been consumed about $78,000 worth of locally grown products. About 20 teams from the vicinity of the plant have been at work from the start. Among the building materials produced locally, there have been used over 300 carloads of cement, 2000 cars of sand and gravel, 150,000 pounds of reinforcing steel, 400,000 bricks and many minor items. Over 100 cars of lumber have been furnished through local institutions.

In the construction of the dam, pipeline and plant there have been 300,000 cubic yards of earth and rock moved.

The dam is of the arch type, built of concrete and is 145 feet high. It is 60 feet thick at the bottom and seven feet thick at the top. Its length from wall to wall of the canyon is 540 feet.

An impressive part of the development is the steel pipeline. This is 1320 feet in length, leading the water from the dam to the penstocks of the generating station. It is 18 feet in diameter and would easily permit the passage of a locomotive and Pullman coaches through it. As the pipeline approaches the station it divides into two branches making a Y. Each arm of the Y feeds into the penstocks from which the water passes through regulating gates to the waterwheels. The waterwheels have a capacity of 21,500 horsepower each and will drive two 15,000-kilowatt or 20,000-horsepower generators each. The current generated will be 6900 volts, passing to the outside transformers in the switchyard where it will be stepped up to 132,000 volts for transmission on a new 80-mile transmission line on wooden towers to the company's terminal substation west of Salt Lake City, from where it will be dispatched to points of use. The plant is now about 80 per cent complete and will probably be completed by the end of November. About two weeks will be required for test runs and then the power will be available for the company's system. The plant is being built by the Phoenix Utilities company under the immediate supervision of Construction Superintendent L. B. Fuller.

The Bear River System.

The Cutler plant of the Utah Power and Light company is the newest unit of its famous Bear river system, known throughout the world by engineers as an example of perfection in conservation and stream control. There is a fall of 1720 feet from Bear lake to Great Salt Lake and 352.5 feet of this fall or head is now utilized. Proposed complete development will use 1168.5 feet, or 68 per cent of the total, a remarkable showing in comparison with other streams of the country.

Bear lake with its remarkable storage of waste water is the foundation of the Bear river system of the Utah Power and Light company. Before the organization of this company in 1912, many scattered and small electric light and power plants were serving communities near each plant. In each case these plants were doing their utmost to meet the demands of power consumers, but lacked the facilities to keep abreast of the times and to plan and construct for the future. In high-water periods there would be water-power to generate far more current than could be used; in the dry seasons there could not be a sufficiency supplied. In all there were about 70 such small plants in operation, with one or two of considerable size and importance. Now there are in the company's entire system about 45 modern plants—on the Bear river alone there are five plants in operation and the sixth one is being built at Cutler.

Before the creation of the Bear river system, Bear river, rising in the low hills southeast of Evanston meandered north to near Soda Springs and then turned west and south and emptied into the Great Salt Lake. In the spring it was its habit to go on a rampage and inundate farm lands, undercut its banks and do much damage with its superabundance of water; in the late summer and fall when crops were thirsty its bed would be nearly dry. The river, oddly enough, did not feed into Bear lake but circled it.

Taming Turbulent Waters.

The Utah Power and Light company undertook to consolidate and organize the vast power resources of Bear lake and Bear river, until then largely wasted. Virtually, it dug a new river—called the inlet canal. Its purpose was to divert the water of Bear river from its course and empty it in Mud lake, separated from Bear lake by a natural dike at the north end of Bear lake. Then works were constructed to put this water into Bear lake and hold it in storage against need for its use. Also, another "river" was dug by the company, the outlet canal, to put water back into Bear river in useful quantities. From highwater level in Bear lake, the first five feet flow by gravity, under control, back into Bear river. To draw off more than five feet of this stored water requires pumping.

At Lifton, on the Bear lake dike, is a pumping plant of magnificent capacity. It has five 750-horsepower motors and five pumps each capable of lifting 300 cubic feet of water per second from the lake, or a pumping capacity of 1500 second feet of water—"a river full in itself." The high water area of Bear lake is 110 square miles or 70,340 acres. Its capacity with a 20-foot drawdown is 1,325,000 acre feet. Each foot of water taken from the entire surface of the lake will produce from the present Bear river plants 42,000,000 kilowatt hours or 56,000,000 horsepower hours. When Cutler is completed this will be increased to 49,000,000 kilowatt hours and with the projected utilization of 68 per cent of the total fall in the river this will be further increased to 60,000,000 kilowatt hours.

This year, as in several years in the past the Lifton pumps have been called upon to transfer the stored water in Bear lake to the channel of Bear river to operate the stations on the system and to provide water for thousands of acres of land under crop that otherwise would be parched, with the consequent loss of crops. Official figures of the United States department of agriculture place the value of the crops saved in this way at several millions of dollars. The diversion of flood waters into the Bear Lake reservoir is of manifold benefit to the owners of land along this once wild stream.

Plants Along Bear River.

The chain of plants along the Bear river operated by the Utah Power and Light company comprise the Soda, Grace, Cove, Oneida and Wheelon generating stations, with the Cutler plant rapidly approaching completion just upstream from the Wheelon plant.

The Soda station was the last completed and put in operation, though it is the first plant below the Bear lake storage. It is unique in construction, having the generating station building built into the face of the great dam. It is situated near Alexander on Bear river, and, as in the case at the Cutler site, was built almost entirely with labor obtained in the vicinity of the plant and utilized vast quantities of local materials in its construction. The dam at Soda affords a gross head of 78.5 feet with an operating head of 77 feet. The highwater area of the reservoir is 1166 acres. Although this gives a storage capacity of 12,500 acre feet with a 20-foot drawdown, it is primarily a regulating reservoir.

The installed generating capacity of the Soda plant is 12,000 kilowatts, or 16,000 horsepower. The stored water there 80,000 kilowatts can be generated at Soda, Grace and Cove stations for 120 hours or five days. This plant, sparkling white, set in a frame of pines and spreading countryside, is a beauty spot of singular charm. As is the case at the Cutler plant, L. B. Fuller was construction superintendent.

The Grace plant, next below Soda, is the largest plant of the Bear river system and has an installed generating capacity of 44,000 kilowatts or slightly more than 58,500 horsepower. Its dam affords an operating head of 525 feet, the largest on the system and also provides a large regulating reservoir.

The Cove station is situated a short distance below Grace. It is a relatively small station, having an installed capacity of 7500 kilowatts, 10,000 horsepower.

A little more than 23 miles downstream from Cove is the Oneida generating station. This is, perhaps, the most picturesque and compact complete installation on the Bear river, the dam, pond, surge, tank and switchyard all coming within one sweep of the eye over the landscape.

The plant operates with an effective head of 140 feet. The area of its reservoir at highwater is 515 acres and a 22-foot drawdown provides 11,160 acre feet of water. The installed generating capacity of the Oneida plant is 30,000 kilowatts, 40,000 horsepower. From storage water alone at Oneida 25,000 kilowatts can be carried for 49 hours, or two days.

The Wheelon plant is about 175 miles below the outlet of Bear river at Lifton. The head of water here is 136 feet and plant is 7125 kilowatts, 9500 horsepower.

The total generating capacity of the Bear river system plants now in operation is thus seen to be 102,625 kilowatts, or 136,832 horsepower. Other hydro plants operated by the company can generate 52,922 kilowatts, 69,560 horsepower. The Jordan steam plant at Salt Lake City, an emergency plant, has a generating capacity of 36,000 kilowatts, 48,000 horsepower. All of this is interconnected. With its Western Colorado, Evanston, Green River, Utah, Green River, Wyo., and Moab plants, the entire system has an installed capacity of approximately 275,000 horsepower, more than 80 per cent of which is from water power. The lines of the Utah Power and Light company extend for 4100 miles with 80 miles to be added when the Cutler plant is on the line. The company serves 85,000 customers in a territory with a population of 376,000.

Utilization of Power.

Electricity is found today doing the menial tasks of the home and doing them better than they have ever been done before. It cooks, sews, launders, irons, sweeps, refrigerates, ventilates and cools the home, curls milady's hair, illuminates and decorates from porch to kitchen. In the shop and factory it has replaced the muscles of countless men, and yet has increased the earning power of the men who use it, has increased their buying power and has created new labor markets so that the toilers of the world owe a great debt to the agency which they once imagined would deprive them of their daily bread. In mercantile and commercial applications electricity has been found indispensable. In transportation and commerce it has all but wiped out distance and time and in the large railway yards has eliminated the intolerable nuisance of smoke and soot. It has made brilliant and safe the thoroughfares and highways. It has become a salesman in merchants' windows. It has made possible recreation, amusement and education that before its coming was impossible.

Everyone is familiar with the application of electricity in the home, theatre, store, office, library, school and in telephonic, telegraphic and radio communication. The list of industries served in this territory is an impressive showing, including food and kindred products, elevators, flour and feed mills, fruit and meat cold storage and packing, canneries and dairies, sugar factories and other beet handling plants, mining and oil, copper mining, mills and smelters, cement works, brick yards, slate and stone quarries, foundries and machine shops, steel works, sheet metal works, automobile and accessories manufacturing, automobile and accessories dealers and garages, wagon and agricultural implement manufacturers, sawmills and logging operations, box, door and sash factories, furniture and cabinet works, planing mills, cotton and woolen mills, silk mills, clothing manufacturers, bedding, carpet and fabric products, railroads and railway shops, waterworks and irrigation, ice companies, hotels, stores, office buildings, powder manufacturing, municipal power, schools, salt gathering and refining, electric railways, resale to municipalities, resale power to corporations, gas and steam heating companies, commercial and residential lighting, municipal lighting and many other minor classifications.

Pioneer Work in Utah.

Pioneer work in the electrical field in Utah really laps over into Colorado, where L. L. Nunn, the father of long distance transmission of power in this region operated the Telluride properties to supply the important mining industries in the Telluride district. In 1890 he was operating plants and transmitting power over distances that amazed even the most advanced engineers engaged in electrical research and development in New York. When he came to Utah in 1897 his operations quickly assumed importance. His lines extended from Provo through Salt Lake City and Ogden to Logan and included the then famous Provo-Mercur-Eureka line, regarded at the time as an epochal achievement.

The high officials of power companies, in spite of their large investments, insist that their real importance in any community is in the value and flexibility of the service rendered and not in the invested capital represented in their plants nor in the annual income therefrom. In single cities the income from motion picture theaters often exceeds the total annual income of the power company. Department stores also represent annual incomes greater than that of power companies.

Utah leads the nation in the adoption of electricity for the tasks and uses of its people. Its farms are electrified to the extent that 37 per cent of the homes adjacent to the rural lines of the Utah Power and Light company are using electricity for home and farm purposes. A record that is unequaled in the nation is that of 99 per cent metropolitan residential service. Utah stands in the front rank of electric power and light quantity consumption, using 1077 kilowatt hours per capita against the national average figure of 515. This may be taken as a certain character index of the people of the state, eager to adopt modern ways of doing things—the "Pioneer Spirit" still alive and leading on to who knows where?

PHOTO 3-17 ELECTRICAL POWER DEVELOPMENT AND CONSERVATION – SEPT. 26, 1926

SALT LAKE TELEGRAM ARTICLES:

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

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 5500 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 pipe line 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 115 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

$181,472,000 Projects Planned for Utah

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.

The projects, some already under construction and some only under study, include the following:

Under construction:

Provo river—Earth dike, canals,

(See Page Five, Column Three)

FDR Urges West Reclamation

(Continued From Page One)

pumps, Provo river; municipal water supply and supplemental irrigation for 100,000 acres; $9,000,000.

Scofield — Earth dam, Price river; flood control and supplemental irrigation for 13,869 acres; $500,000.

Under study:

Gooseberry—Earth dam, tunnel, canals, Price river; supplemental irrigation for 20,000 acres; $1,440,000.

Ogden river extension — Earth dam, canals, pumps, Ogden river; municipal water supply, irrigation for 2000 acres; $1,878,000.

Weber delta—Pump plant, wells, canals, Weber river; irrigation for 6000 acres; $927,000.

Santa Clara—Earth dam, canals, Santa Clara creek; irrigation for 2000 acres, supplemental irrigation for 1700 acres; $1,700,000.

Emery county — Earth dam, canals, Cottonwood creek; irrigation for 3300 acres, supplemental irrigation for 20,000 acres; $2,500,000.

Brush Creek Project

Jensen — Earth dam, Brush creek; irrigation for 800 acres, supplemental irrigation for 3600 acres; $300,000.

Hurricane—Concrete dam, tunnels, canals, Virgin river; power, irrigation for 11,000 acres, supplemental irrigation for 7500 acres; $9,700,000.

Vernal — Earth dam, canals, Ashley creek; irrigation for 1900 acres; supplemental irrigation for 22,300 acres; $1,500,000.

Ouray valley and miscellaneous —Earth dam, canals; irrigation for 4000 acres, supplemental irrigation for 7000 acres; $5,000,000.

Strawberry extension, Diamond fork—Earth dams, power plant, Sixth Water creek; power, flood control, irrigation; $4,990,000.

Green River Power

Uintah-Echo park unit — Concrete dam, power plant, Green river; power; $46,000,000.

Provo river extension — Earth dam, tunnels, canals, Provo river; irrigation for 6000 acres, supplemental irrigation for 5000 acres; $10,000,000.

Manila — Earth dikes, canals, Henry's fork; irrigation for 21,000 acres, supplemental irrigation for 9000 acres; $1,462,000.

South Cache—Two earth dams, canals, Little Bear river; irrigation for 9260 acres, supplemental irrigation for 5000 acres; $2,200,000.

Cutler — Concrete dam, pumps, canals, Bear river; irrigation for 3000 acres, supplemental irrigation for 30,000 acres; $5,000,000.

Dewey reservoir — Earth dam, power plant, Colorado river; power, flood control (estimated to be capable of generating 75,000 kilowatts); $41,000,000.

Duchesne Water

Moon lake extension — Earth dam, canals, Duchesne river; municipal water supply, irrigation for 13,500 acres; $4,500,000.

Woodruff — Earth dam, canals, Bear river; irrigation for 12,000 acres, supplemental irrigation for 25,000 acres; $3,000,000.

Bluff—Concrete dam, San Juan river; power, flood control; $16,000,000.

Transmission lines—$9,000,000.

PHOTO 3-21 PROJECTS PLANNED FOR UTAH – APR. 12, 1945

DRAFT LICENSE APPLICATION

EXHIBIT D

STATEMENT OF COSTS AND FINANCING

CUTLER HYDROELECTRIC PROJECT

(FERC NO. 2420)

Prepared for:

A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

APPLICATION FOR NEW LICENSE FOR
MAJOR PROJECT – EXISTING DAM

EXHIBIT D
STATEMENT OF COSTS AND
FINANCING

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LIST OF TABLES

1.0 ORIGINAL COST OF EXISTING UNLICENSED FACILITIES

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

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 Federal Power Act.

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**

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 will 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. Additionally, components such as dedicated lifting hoists to enable remote Project operation, may be installed to effect EIM capabilities.

Capital and annual cost estimates for the proposed Protection, Mitigation, and Enhancement (PM&E) measure proposals are provided in Table 4-1 (Data to be populated in the Final License Application; note that this list is preliminary and subject to further refinement based on PacifiCorp analysis and pending stakeholder comments). For further details on these proposed PM&E measures, see Exhibit E.

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

PROPOSED PM&E MEASURES	CAPITAL COSTS (2021$)	ANNUAL COSTS (2020$)	LEVELIZED COSTS ($)
	Data to be included as part of the Final License Application.		

Source: PacifiCorp 2021

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 $1,577,850 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. Data for Table 4-3 will be included as part of the Final License Application.

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

DESCRIPTION	2016	2017	2018	2019	2020	5-YEAR AVERAGE
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
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					
Employee Labor					
Employee Expenses			*Data to be included as part of the Final License Application.*		
Relicensing Costs					
Other					

Source: PacifiCorp 2021

4.5 CAPITAL FOR PROPOSED ENVIRONMENTAL MEASURES

PacifiCorp is still in the process of evaluating the need for and refining with additional analysis the proposed environmental PM&E measures, although a preliminary list of measures is included in Exhibit E of this DLA. Capital costs for proposed PM&E environmental measures will be included as part of the 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 MWhs. 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 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 under the Integrated Licensing Process through the filing of the FLA will be provided in the FLA, as outlined in Table 4-3.

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 average 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 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

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 changes in the operational regime are negligible and short-term and will 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. Financial information provided by PacifiCorp.

DRAFT LICENSE APPLICATION

EXHIBIT E

ENVIRONMENTAL REPORT

CUTLER HYDROELECTRIC PROJECT

(FERC NO. 2420)

Prepared for:

PACIFICORP

A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

ERM

NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT E
ENVIRONMENTAL REPORT

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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
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
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	Millions of 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	
OCMP	Operations Compliance Management Plan
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 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 Draft License Application (DLA) for the Cutler Hydroelectric Project (FERC 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 adjoiners, 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 final 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. This Exhibit E of the DLA summarizes data and analysis from both the ISR and USR.

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 DLA 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. It will also serve as a placeholder section for the FERC-prepared EA where it will additionally list agency preparers that contributed to the EA.
- *Section 8.0, Consultation Documentation*: describes where the consultation record can be found and presents a brief description of what the consultation record contains

(consultation to date is presented in Appendix A of the DLA; consultation and comments received for Exhibit E will be presented in the Final License Application (FLA).

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 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. There are no federal lands within the Project Boundary. PacifiCorp is not proposing to increase capacity or construct any new facilities for the Project.

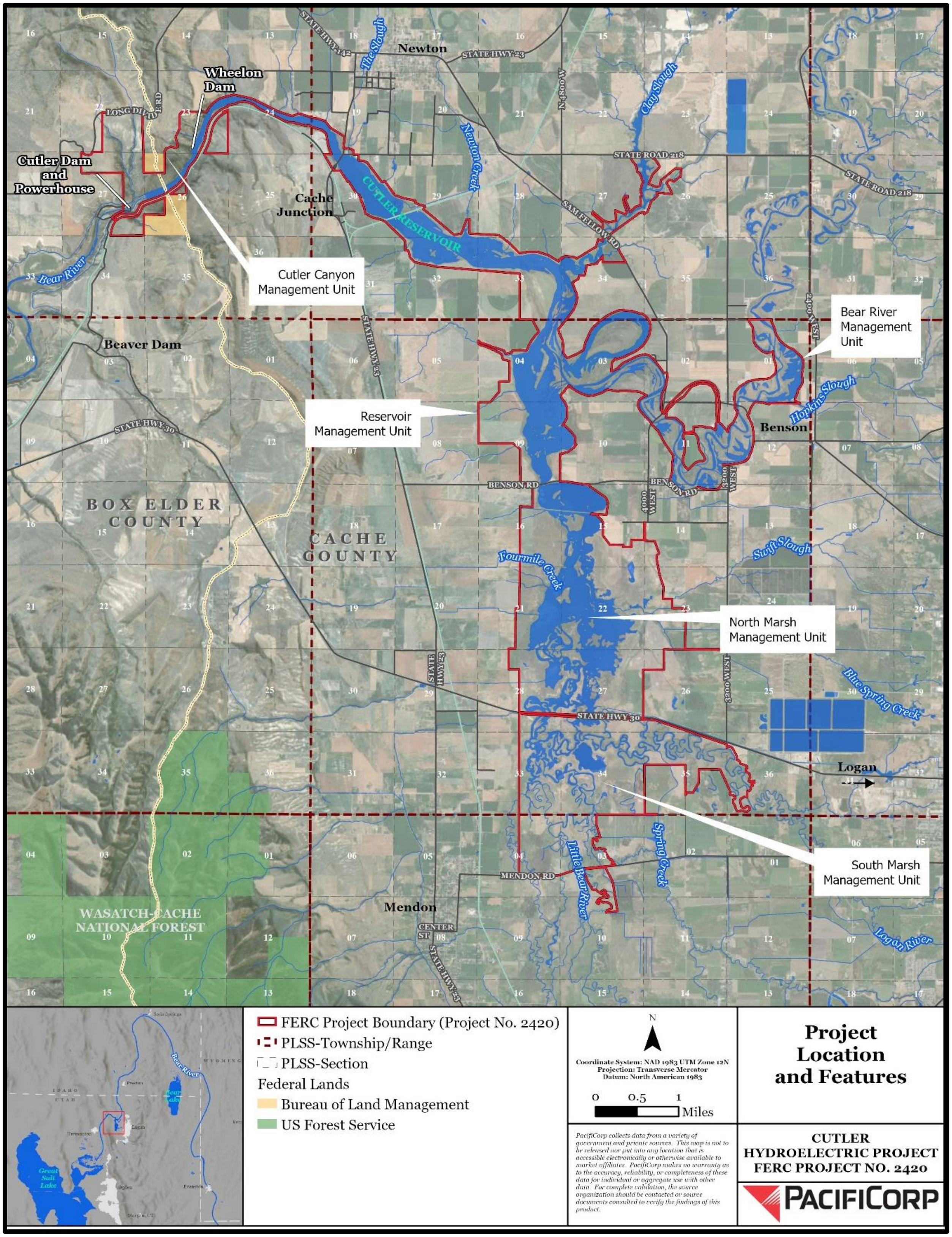


FIGURE 1-1 PROJECT LOCATION AND FERC PROJECT BOUNDARY

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 area[1] is expected to increase over the next 10-year period (between 2021 and 2030) 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 DLA.

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

[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.

designee of the Secretary of Interior has jurisdiction over relevant fish species in the Bear River (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.

[This section is a placeholder for any state or federal agencies that may file recommendations pursuant to Section 18 of the FPA. It will include any recommendations and the date of their filing.]

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 licensing 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.

[This section is a placeholder for any state or federal agencies that may file recommendations pursuant to Section 10(j) of the FPA. It will include any recommendations and the date of their filing.]

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 3.3.2, 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 the FLA, which must be filed prior to March 31, 2022—2 years before the expiration of the current license. 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 3.3.6, Threatened and Endangered Species. The Ute ladies'-tresses are 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 will develop a Historic Properties Management Plan (HPMP) to avoid, reduce, or mitigate any potential effects on historic properties, at least in part by updating the existing Cutler Cultural Resources Management Plan (CRMP). During development of the HPMP, PacifiCorp will consult with FERC, the Advisory Council, the SHPO, Native American tribes, appropriate land-management agencies, and any other consulting party that may be involved with the licensing process. 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 3.3.8, Cultural Resources.

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 3.3.8, 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 complete and documented according to FERC regulations. Appendix A of this 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 DLA, 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.

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 not being provided as part of Appendix A.

1.5.2 INTERVENTIONS

As of the filing of this DLA four parties have filed motions to intervene with FERC, as listed in Table 1-1. Any additional interventions filed after the DLA is filed will be included in the FLA.

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, Montana 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, Utah 84111	275 N 1600 E Tremonton, Utah 843378826 Box Elder
PacifiCorp	Michael Swiger, Partner Van Ness Feldman, LLP 1050 Thomas Jefferson Street, NW Washington, District of Columbia 20007 mas@vnf.com	Todd Olson, Director of Compliance PacifiCorp 825 NE Multnomah Suite 1800 Portland, Oregon 97232 todd.olson@pacificorp.com
U.S. Department of Interior		Michael C. Connor Esq Comm. U.S. Bureau Reclamation

PARTY	PRIMARY PERSON OR COUNSEL OF RECORD TO BE SERVED	OTHER CONTACT TO BE SERVED
		U.S. Department of Interior 1849 C Street NW Washington, District of Columbia 20240

1.5.3 COMMENTS ON THE APPLICATION

[This section is a placeholder for comments filed after DLA filing and will be populated for the FLA. Consultation that has occurred prior to the filing of this DLA 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

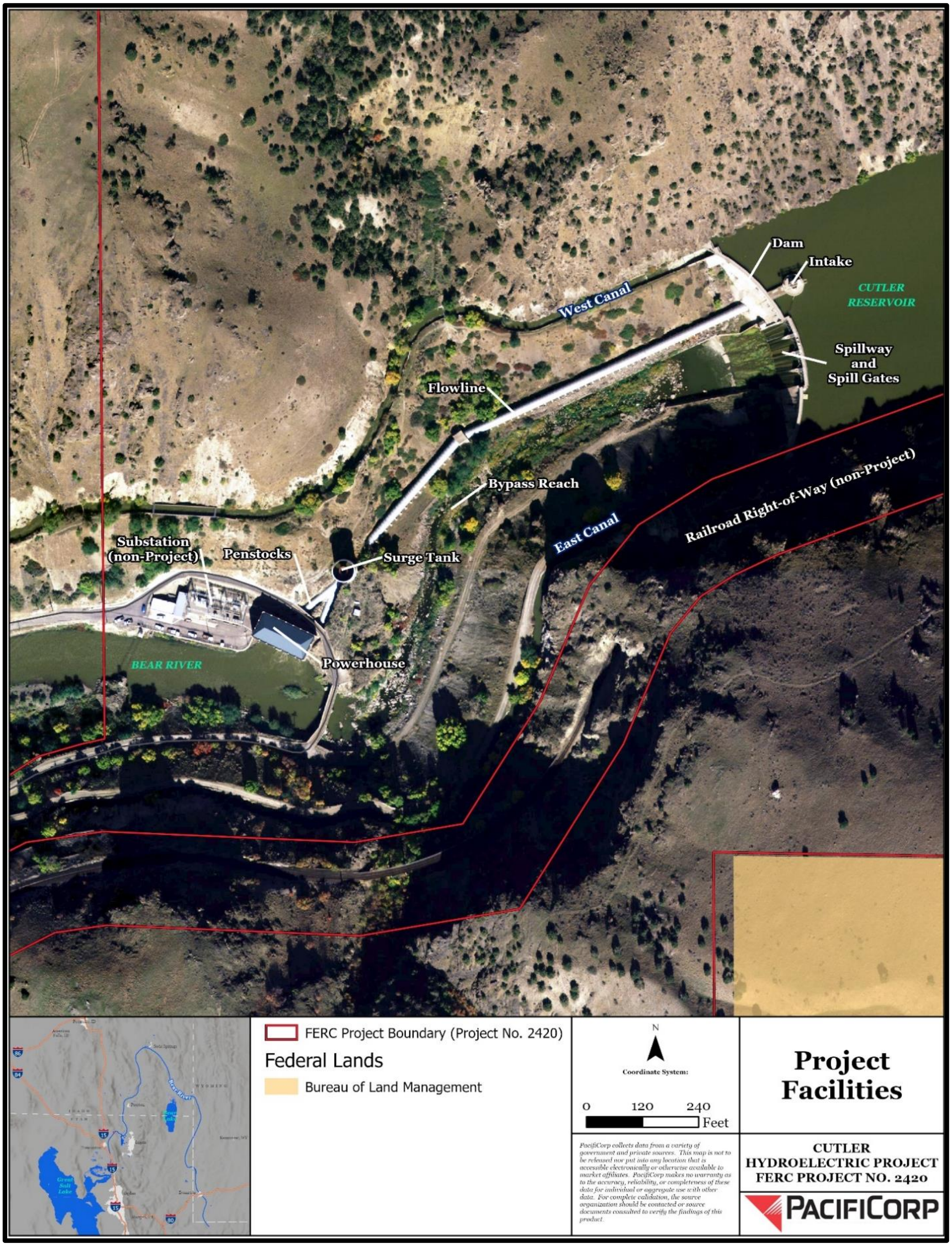
The Project is located on the Bear River in Cache Valley, Utah, between the Wasatch and the Wellsville Mountains (Figure 1-1). While the Cutler Dam is located in Box Elder County, most of the reservoir and adjacent Project lands lie within Cache County. The reservoir is formed at the confluence of the 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 2,467 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, 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.

[3] All elevations reported in this DLA 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.



Source: PacifiCorp 2018

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 DLA 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 those with Critical Energy Infrastructure Information 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 *2020 Annual Emergency Action Plan Status Report* on December 30, 2020. 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 are 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 another 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 2002b

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 below.

2.1.4.1 CURRENT LICENSE ARTICLES

The following current 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: 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, Resource Management Plan, 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 OPERATIONS COMPLIANCE MANAGEMENT PLAN

The Cutler Operations Compliance Management Plan (OCMP) 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 OCMP in turn protects Project water resources as it relates to water use, water quantity, and water quality (e.g., water temperature and dissolved oxygen [DO]).

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 RMP:

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

The 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 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 RMP five-year monitoring report (PacifiCorp 2018).

TABLE 2-2 EXISTING PROJECT 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.
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.

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
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.
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.

RMP PROGRAM/ COMPONENT	MEASURES REQUIRED PER LICENSE	MEASURES COMPLETED
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
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 handful of maintenance projects are proposed (see Exhibit A) following approval of a new license, but no new substantial construction of facilities is proposed. The current and proposed Project Boundary are 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 4407.5 to 4406.5 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 to November), 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 4405.0 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., December 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.

The two general proposed operational scenarios are presented in Table 2-1 (compare to current operations in Table 2-3) 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.

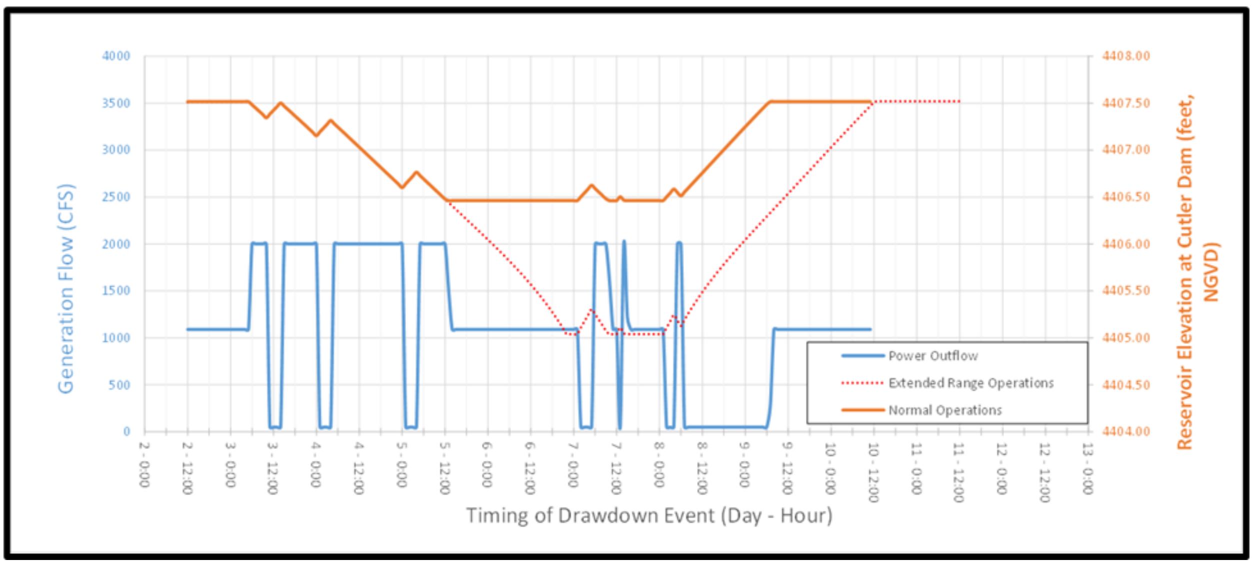


FIGURE 2-2 ILLUSTRATION OF TYPICAL 10-DAY PERIOD UNDER EXISTING (SAME AS NORMAL) AND PROPOSED EXTENDED RANGE OPERATION SCENARIOS

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 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.

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 adjoiners), 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.

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. Any new management plans would be developed after the Project is granted an approved license. 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.

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.

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

Resource Area	Measure Number	Proposed Measure	Management Plan	Standalone Measure
Geology-Soils-Sediment	GEO-1	Maintain vegetated shoreline buffers, including erosion control check dams, to minimize sedimentation to Cutler Reservoir	RMP	
	GEO-2	Identify up to three additional miles of bank stabilization projects within Project Boundary		X
	GEO-3	Continue to monitor existing (and add any potential new) bank stabilizations measures	RMP	
Water Resources-Water Quantity	WR-1	Continue reservoir elevation and river flow monitoring, per updated OCMP	OCMP	
	WR-2	Continue to communicate with USFWS Bear River Migratory Bird Refuge regarding water flows and timing downstream of the Project	RMP	

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE	MANAGEMENT PLAN	STANDALONE MEASURE
Water Resources-Water Quality	WR-3	Continue existing water quality monitoring on approved five-year quarterly schedule; continue to coordinate with UDWQ and other stakeholders regarding Cutler water quality	RMP	
	WR-4	Identify additional watershed improvement projects within Project Boundary; determine specific Project needs prior to FLA		X
Botanical Resources	BOT-1	Continue to manage and monitor weeds in the Project Boundary	RMP	
	BOT-2	Continue to maintain and monitor shoreline buffer vegetation	RMP	
Wildlife and Habitat	WILD-1	Discuss potential for cooperative long-term avian monitoring within Project Boundary; propose cost/time-share with UDWR and Bridgerland Audubon	RMP	
	WILD-2	Maintain wildlife habitat improvements, including erosion control check dams, throughout Project Boundary	RMP	
Special Status Species (not federally listed)	SS-1	Continue to cooperate with UDWR and other interested stakeholders on special status species management (i.e., implement monarch butterfly way stations; various management and monitoring plans)	RMP	
T&E Species (federally listed)	TE-1	Maintain current Ute ladies'-tresses habitat; assess potential to collaborate with BRLC to monitor the existing Ute ladies'-tresses population within Project Boundary	RMP- Ute Ladies'-tresses Management Plan	
Recreation	REC-1	Recreation site facility operations, maintenance, and monitoring of facility conditions	RMP	
	REC-2	Minor recreation site improvements throughout Project Boundary		X

Resource Area	Measure Number	Proposed Measure	Management Plan	Standalone Measure
	REC-3	Extend Cutler Canyon Marina and Benson Marina boat ramps		X
	REC-4	Complete maintenance needs for Benson Marina (picnic shelter, sidewalks, docks, assess other needs)		X
	REC-5	Evaluate and improve accessibility where feasible (e.g., improvements identified by the National Park Service) at several recreation sites		X
	REC-6	Make carry-in boat launch access improvements at Little Bear River and Logan River access sites (add handrails to improve boat entry, assess other needs)		X
	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		X
	REC-8	Review signage at recreation access sites and update as needed		X
	REC-9	Develop and implement new Shoreline Management Plan	RMP	
	REC-10	Communication/discussion with Utah State Parks regarding potential measures for improving public and boater safety		X
Cultural	CUL-1	Develop HPMP (for cultural resources and ongoing inadvertent discoveries protocol)	HPMP	
	CUL-2	Add tribal/cultural history section to PacifiCorp Cutler Project website		X
Land Use	LU-1	Continue to review, update, and improve grazing management and agricultural lease programs	RMP	
	LU-2	Continue to monitor fences for effectiveness and functionality over the new license term	RMP	

RESOURCE AREA	MEASURE NUMBER	PROPOSED MEASURE	MANAGEMENT PLAN	STANDALONE MEASURE
	LU-3	Evaluate fence ends within the Project Boundary, and extend where needed based on water levels		X
	LU-4	Assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve their function as necessary.	RMP	
	LU-5	Coordinate with BLM to evaluate the possibility of constructing a single buffer fence around PacifiCorp and BLM parcels south of the reservoir near Cutler Dam		X
	LU-6	Evaluate irrigation pump intakes within the Project Boundary and extend where needed		X

BLM = Bureau of Land Management; FLA = Final License Application; HPMP= Historic Properties Management Plan; OCMP= Operations Compliance 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

2.2.3.1 UPDATED OPERATIONS COMPLIANCE MANAGEMENT PLAN

A new OCMP will be developed that incorporates many of the measures in the current OCMP. This new OCMP is to be developed after the Project is granted a new license.

2.2.3.2 UPDATED CUTLER RESOURCE MANAGEMENT PLAN

As described above, a new RMP will be developed that incorporates many of the measures in the current RMP. This new RMP is to be developed after the Project is granted an approved license. The new RMP would be expected to include the following sub-component plans:

- Water quality monitoring plan
- Shoreline management
- Erosion control and sediment management
- Vegetation management, including weed management
- Agricultural management (fences, farming and grazing leases)

- Ute ladies'-tresses management and monitoring
- Avian monitoring
- Recreation management
- Property management

2.2.3.3 HISTORIC PROPERTIES MANAGEMENT PLAN

A HPMP will be developed for the Project under the new license. This HPMP is to be filed with the FLA and is currently being reviewed by interested tribes and the SHPO. The measures in the existing CRMP will be 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 be 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

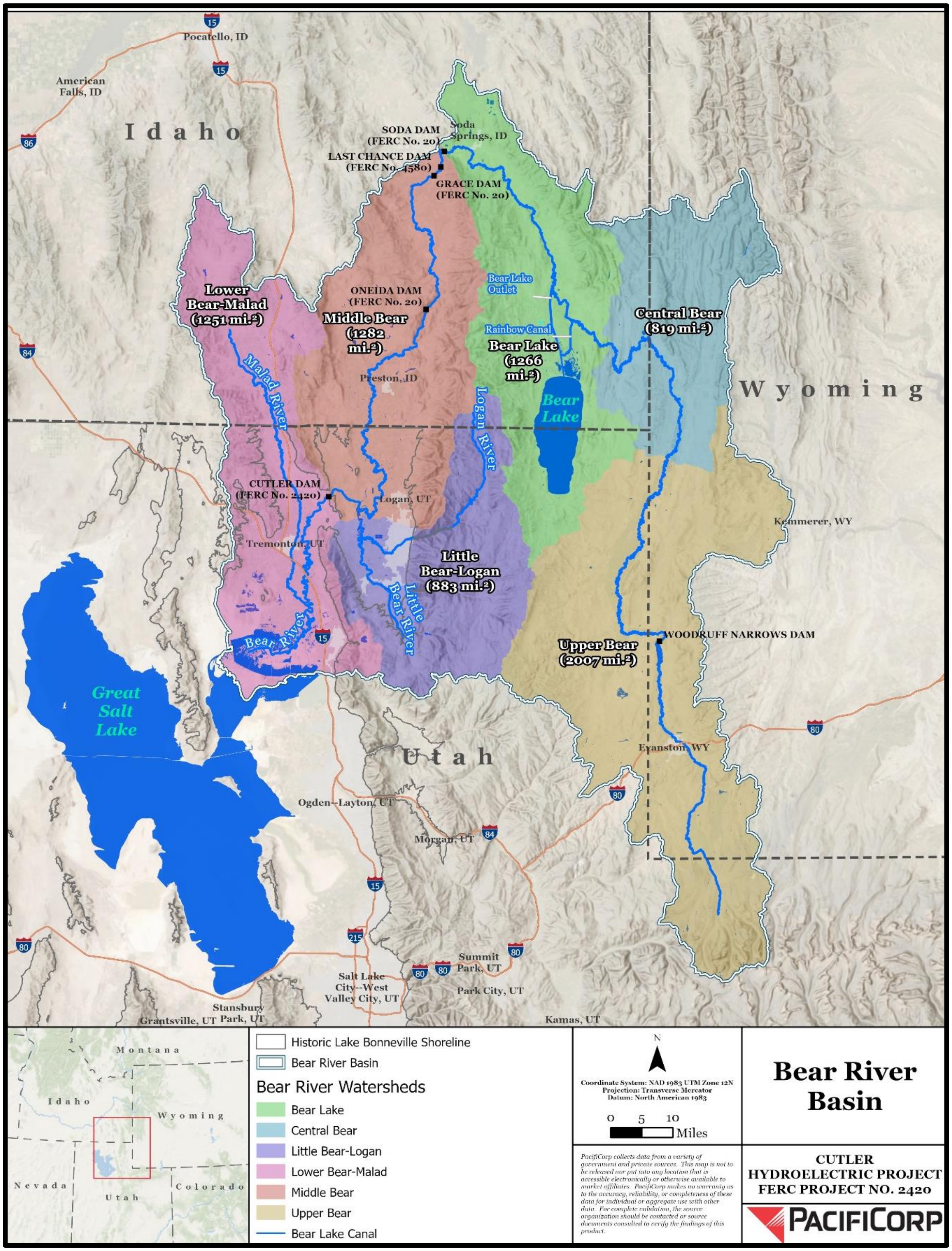
This section presents a general description of the Bear River basin where the Project is located and the affected environment, potential environmental effects, and PM&E measures proposed to avoid or minimize potential environmental effects on the various resources that could be affected by the Project. 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. This analysis also incorporates information documented in two technical study reports: the ISR (PacifiCorp 2021a) and the USR (PacifiCorp 2021b).

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 table 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 channel[5] 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).

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

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

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

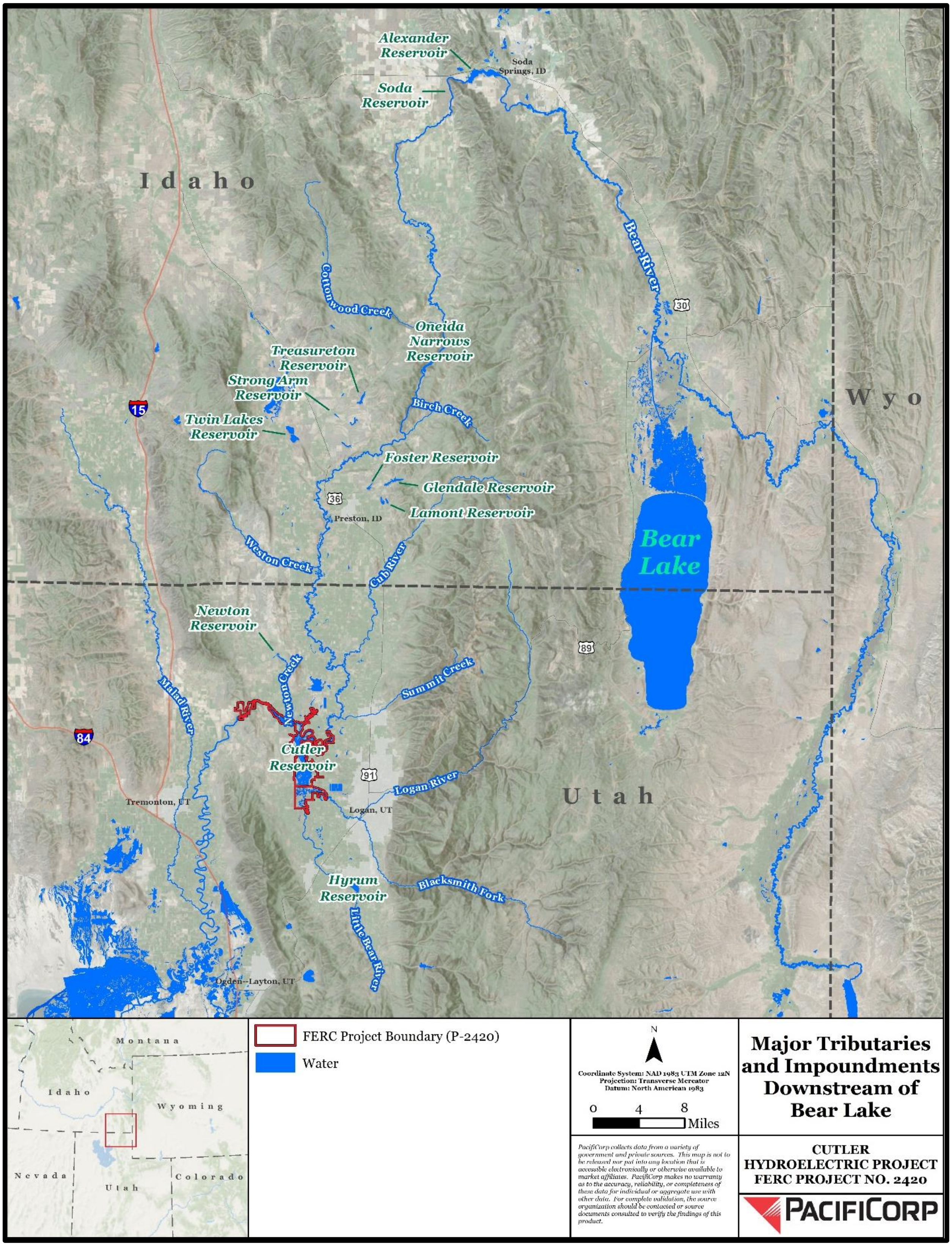
The amount of water available in the Bear River and its tributaries varies seasonally and annually. Snowmelt that originates on the north slope of the Uinta Mountains generally results in high flows in the early spring and is responsible for the base flows that maintain the river naturally throughout 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 DLA, 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 DLA 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 PROPOSED ACTION AND ACTION ALTERNATIVES

3.3.1 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 of this DLA). 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 3.3.1.3.

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	• Hydraulic Modeling ISR sediment transport model (Appendix G of PacifiCorp 2021a) • DLA Exhibit E Section 3.3.1, 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	• Land Use ISR (Appendix D of PacifiCorp 2021a) • Land Use USR (Appendix C of PacifiCorp 2021b) • DLA 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	• Hydraulic Modeling ISR sediment transport model (Appendix G of PacifiCorp 2021a) • DLA Exhibit E Section 3.3.1, 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	• Hydraulic Modeling ISR sediment transport model (Appendix D of PacifiCorp 2021a) • ISR Comment Response Attachment 4 (PacifiCorp 2021c) • DLA Exhibit E Section 3.3.1, 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 3.3.1.2, 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 effects[6] (discussed in Section 3.3.1.2, Environmental Analysis, below).

3.3.1.1 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
- **Sediment**: sediment distribution and volume in the reservoir and downstream in the Bear River; phosphorus in reservoir sediments

[6] Dredging and Wheelon Dam removal is *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.

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.

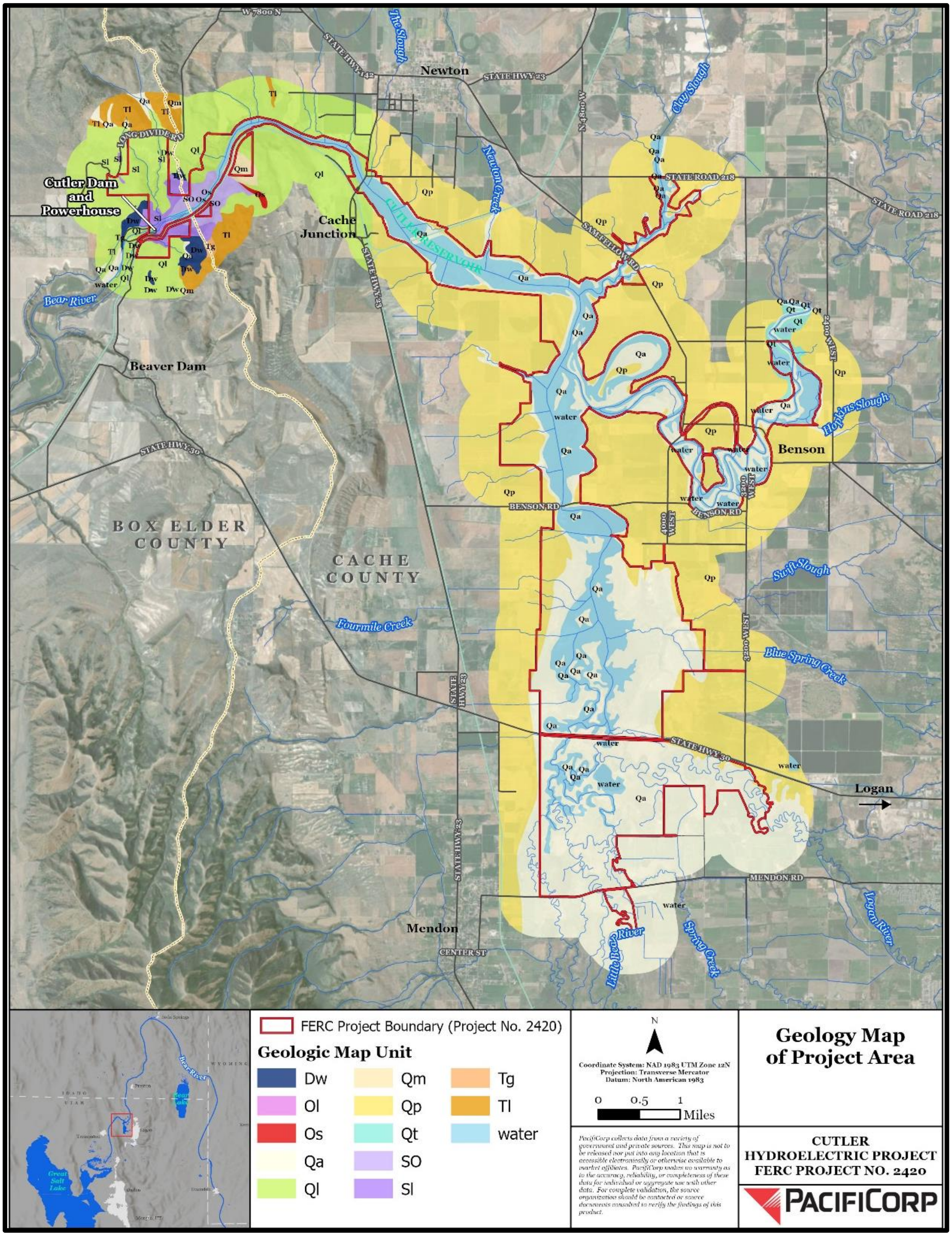


FIGURE 3-3 GEOLOGIC FEATURES AND ROCK FORMATIONS IN THE PROJECT AREA

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

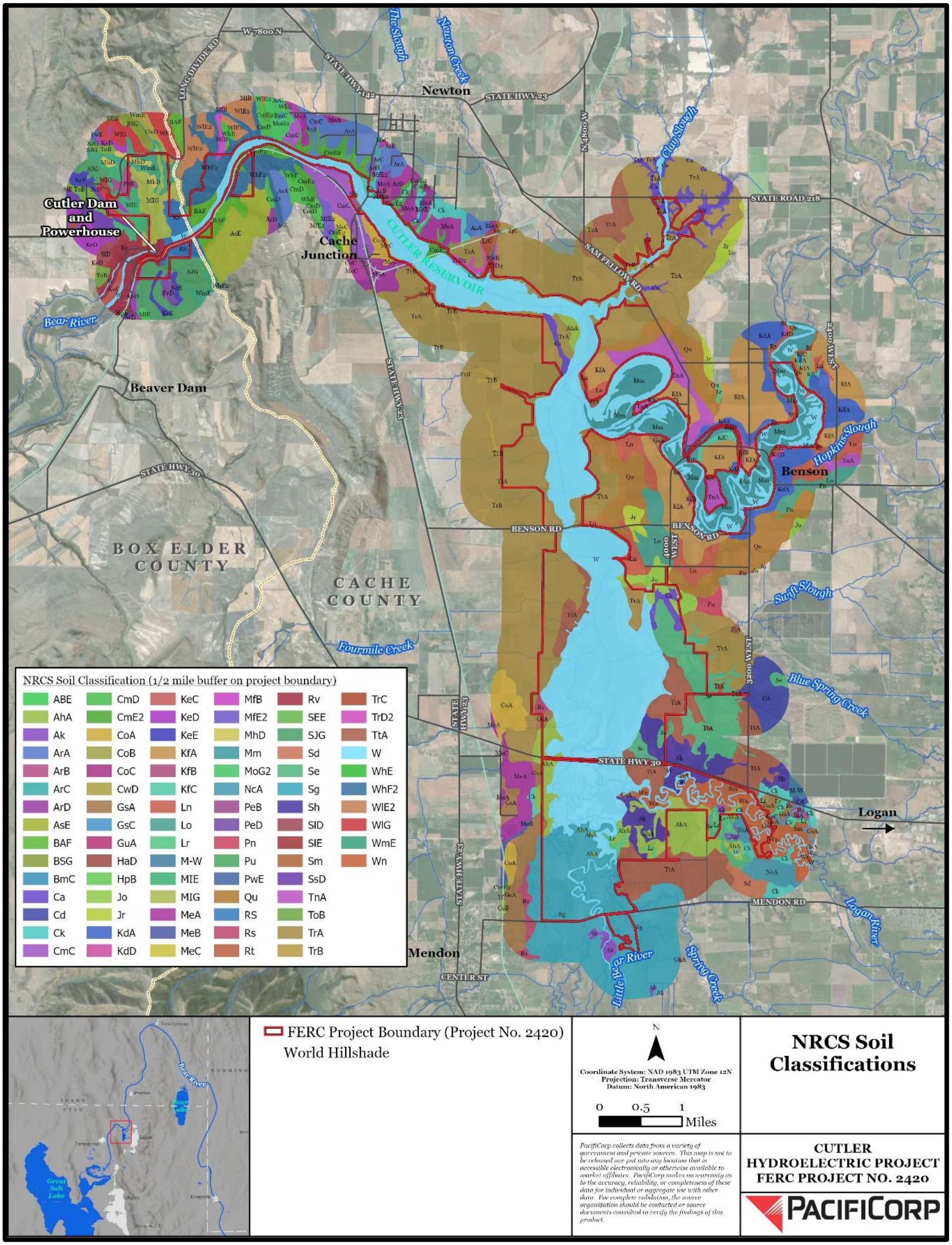
The Project is situated in the Intermountain Seismic Belt (Utah Geological Survey 1996). This belt extends from southern Nevada through Utah, north through western Wyoming, and north through western Montana. The Intermountain Seismic Belt is characterized by moderate to large magnitude earthquakes with 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.



Source: NRCS 2020

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 eastfacing 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.

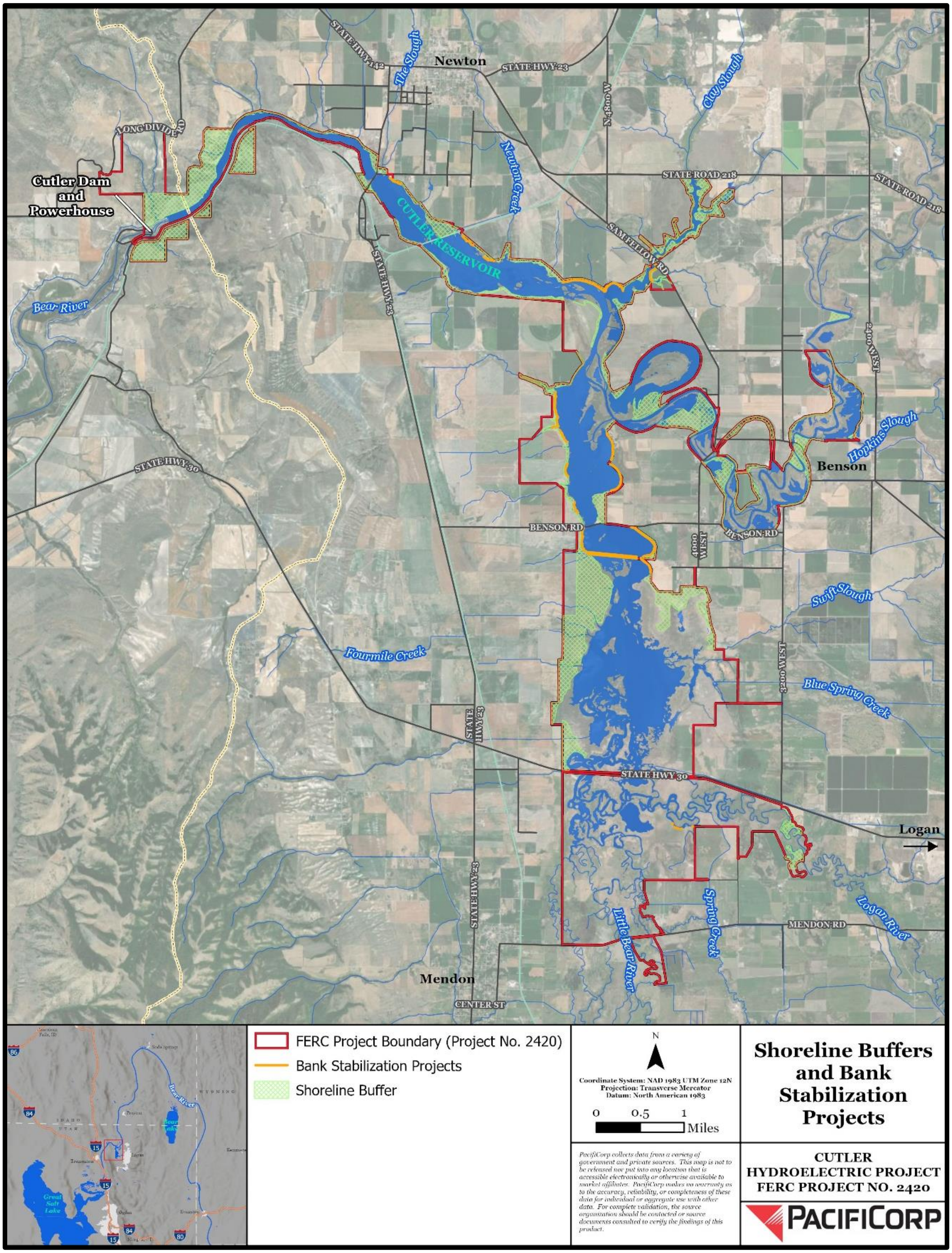
Eroding banks within the Project Boundary and broader Project Area have substantially improved during the last three decades due to removal and replacement of concrete and car bodies that were previously used to prevent shoreline erosion. During the current license period, PacifiCorp replaced these materials 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 3.3.1.4, 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 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 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 Water Surface Elevations (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 3.3.2.1, [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 that 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 of 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 3.3.2.3, Water Quality.

3.3.1.2 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 November), with changes to proposed operations occurring exclusively during periodic 10-day cycles (the proposed extended operating range) 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 4,405.0 feet during the winter months (typically December 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 3.3.1.3, 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 3.3.2, 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.

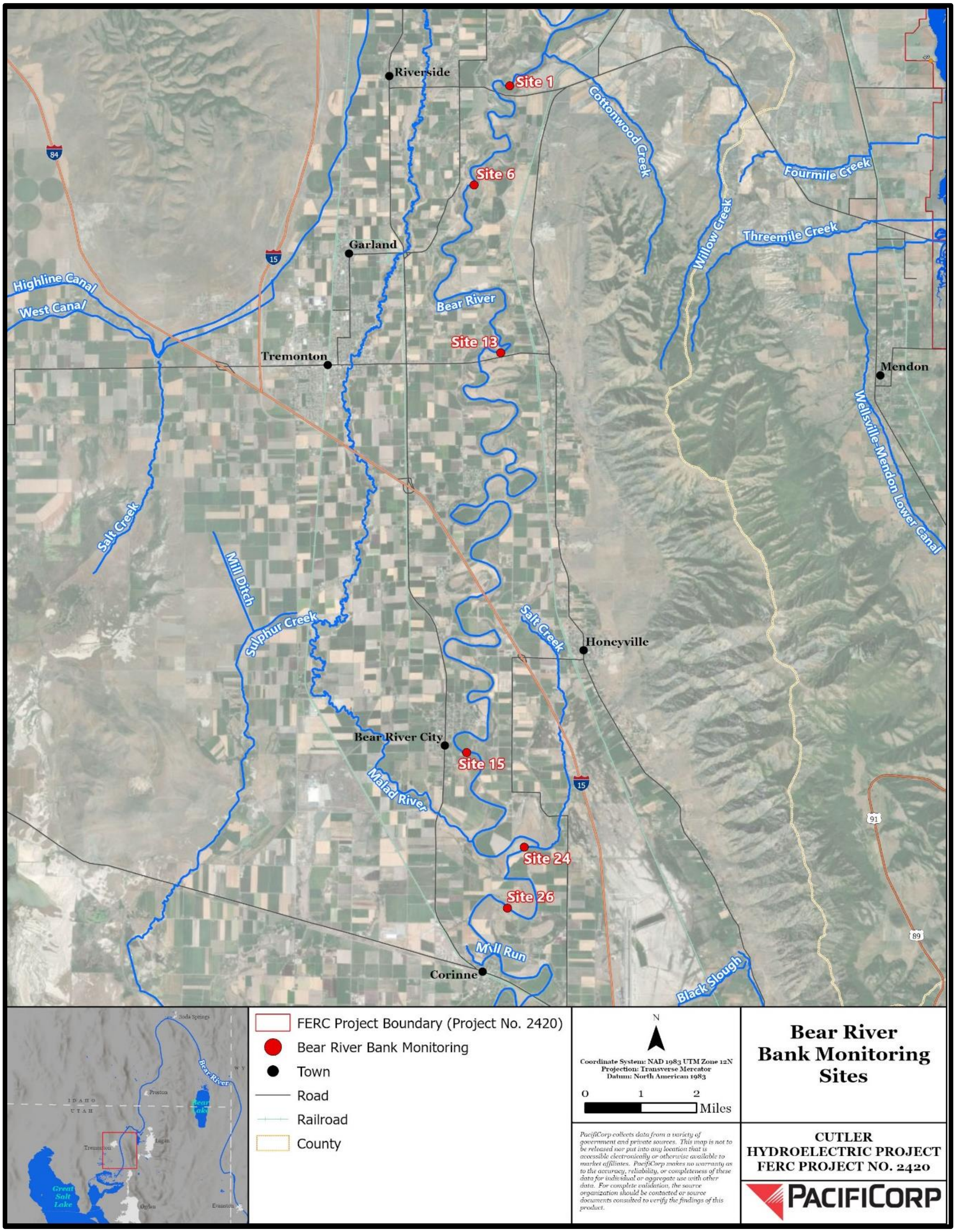
Although reservoir discharge associated with the additional foot of reservoir fluctuation under proposed extended operations was noted as a concern regarding the potential to exacerbate ongoing bank erosion on the Bear River downstream of Cutler Dam, studies completed for relicensing suggest that would 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.



Source: PacifiCorp 2021b

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 ºF 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 RMP Vegetation Enhancement Program (PacifiCorp 1995a). These measures are described above in Section 3.3.1.1, [Affected Environment] Soils, and are also included below in Section 3.3.1.4, 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 3.3.1.2 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 3.3.1.3, 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.

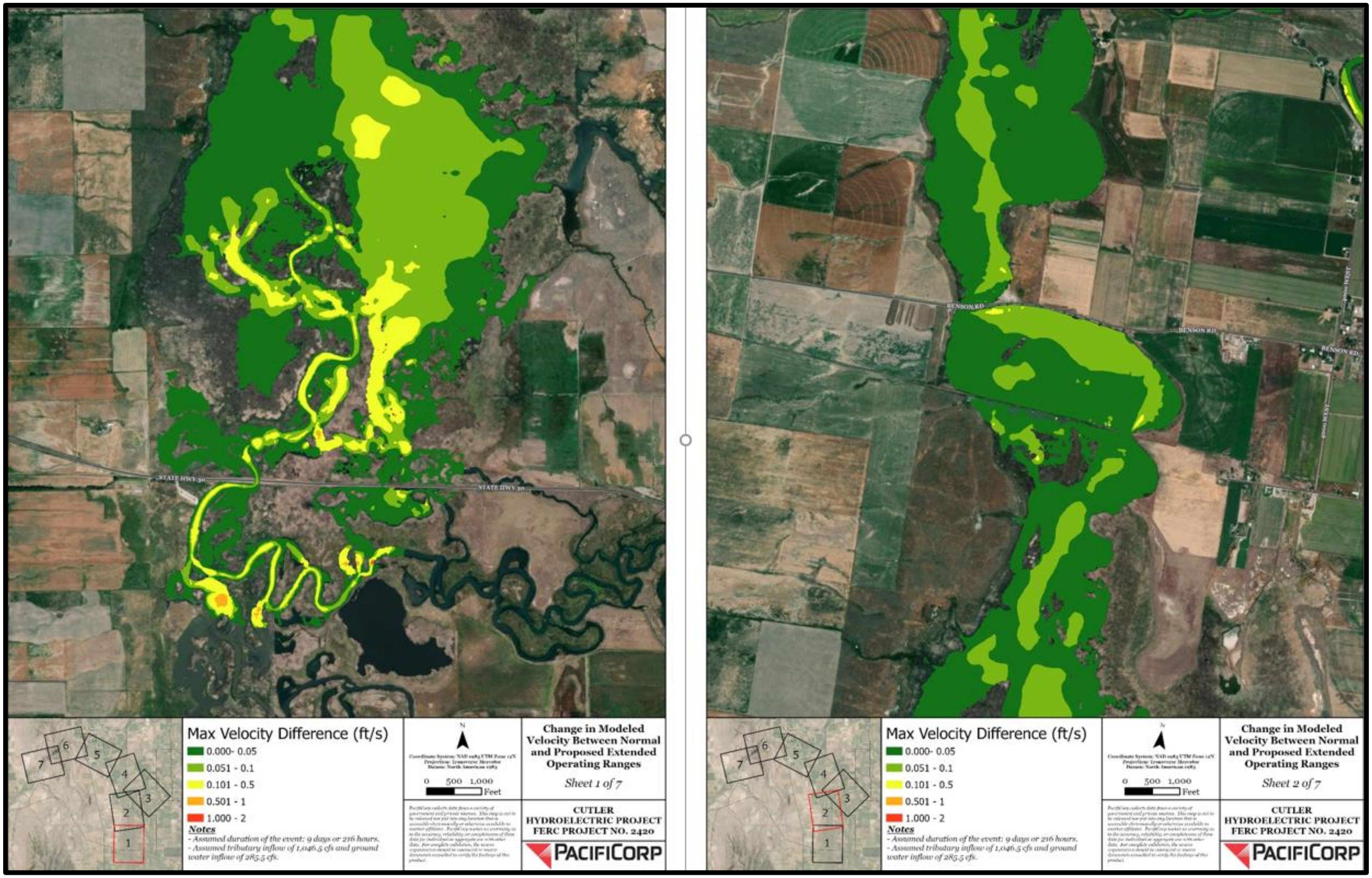


FIGURE 3-7 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

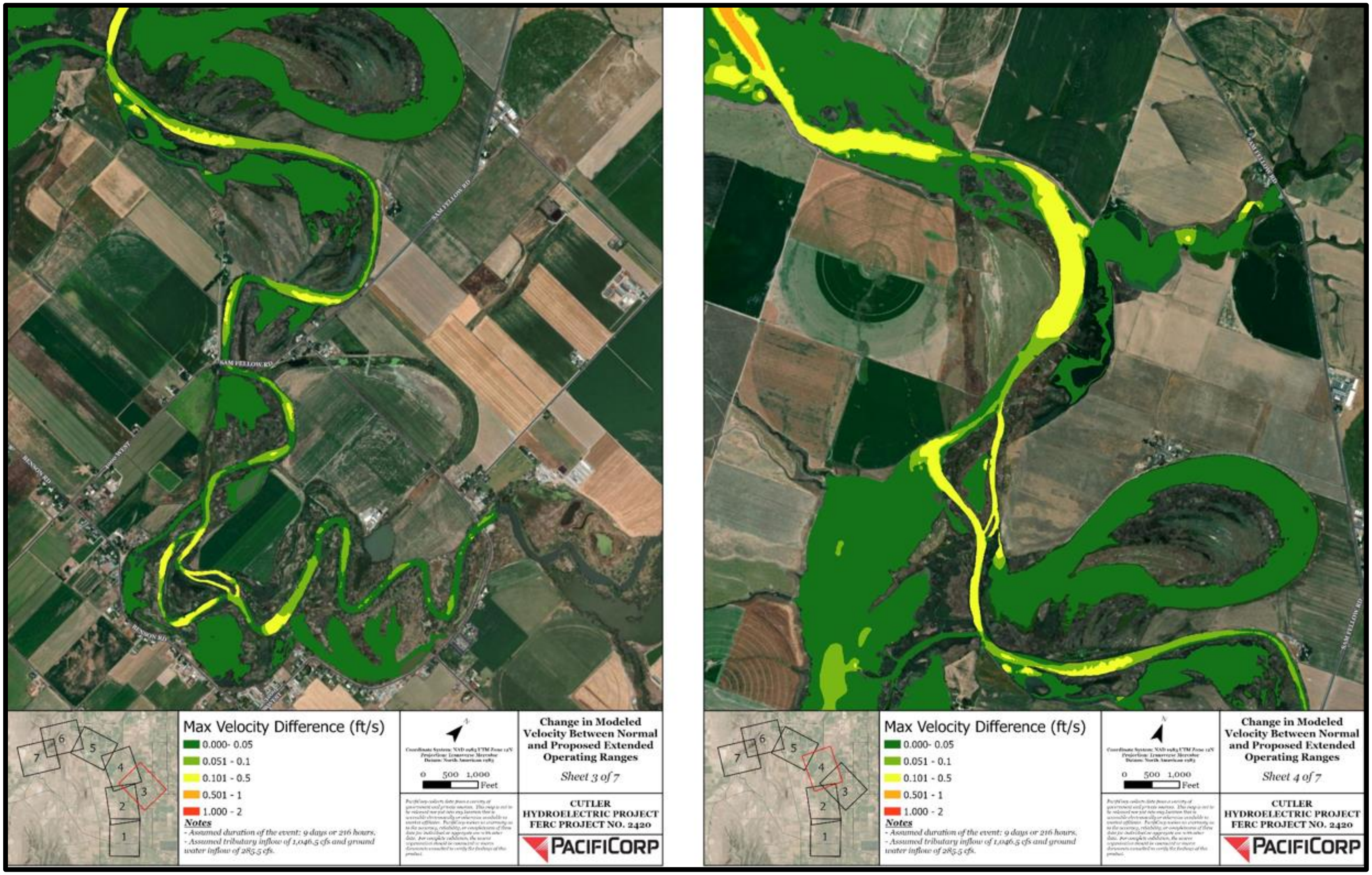


FIGURE 3-8 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

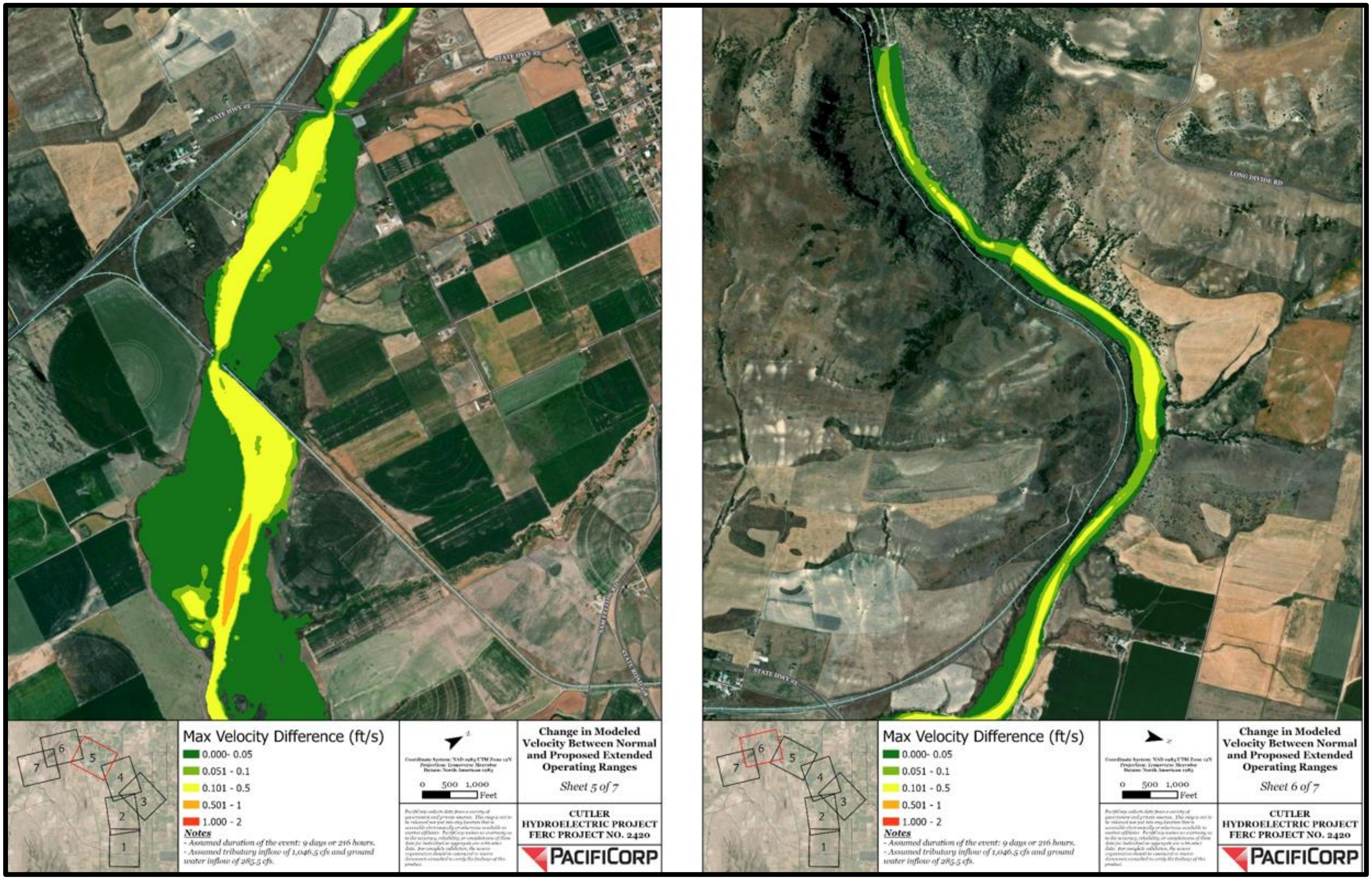


FIGURE 3-9 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

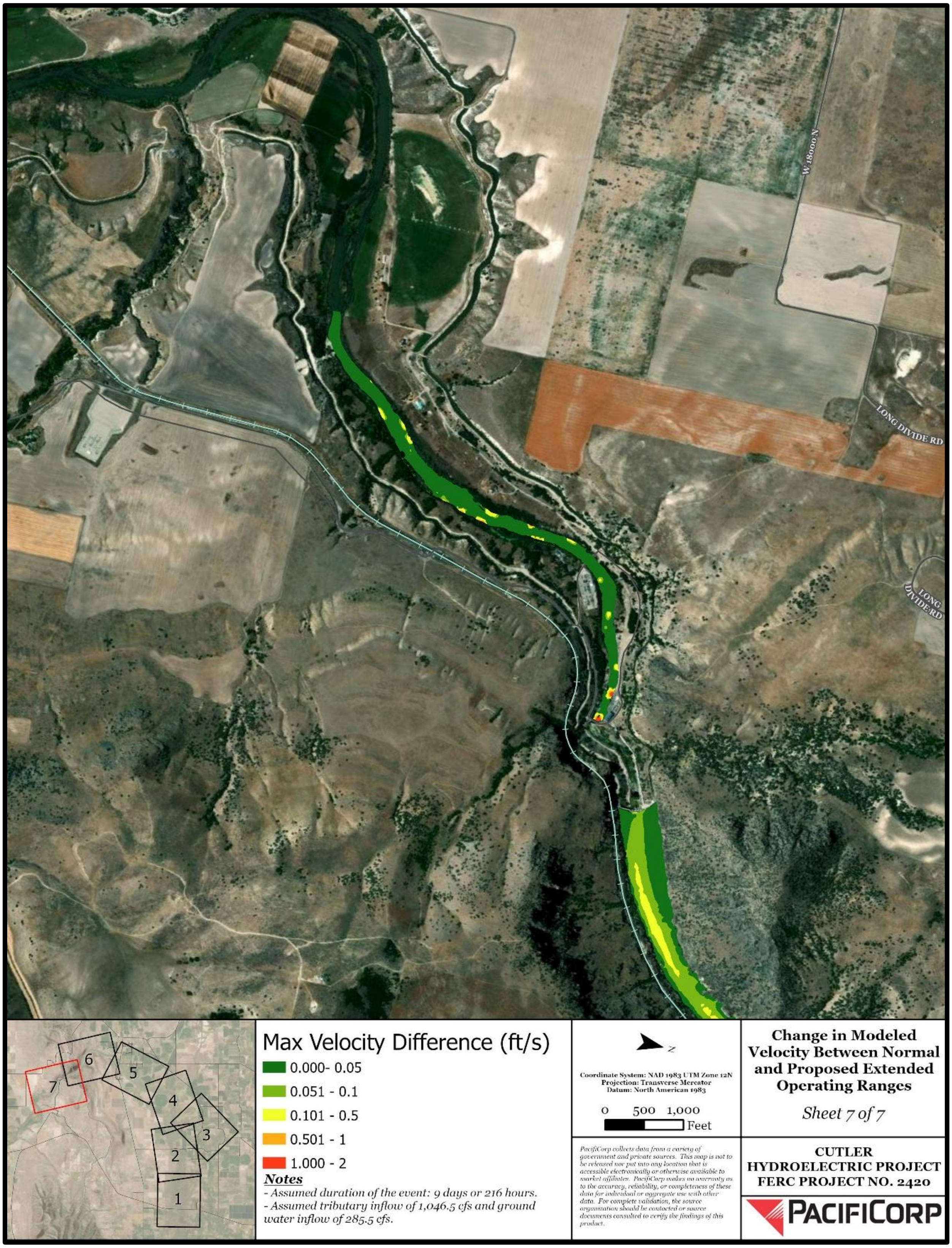


FIGURE 3-10 MODELED CHANGE IN VELOCITY BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

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.

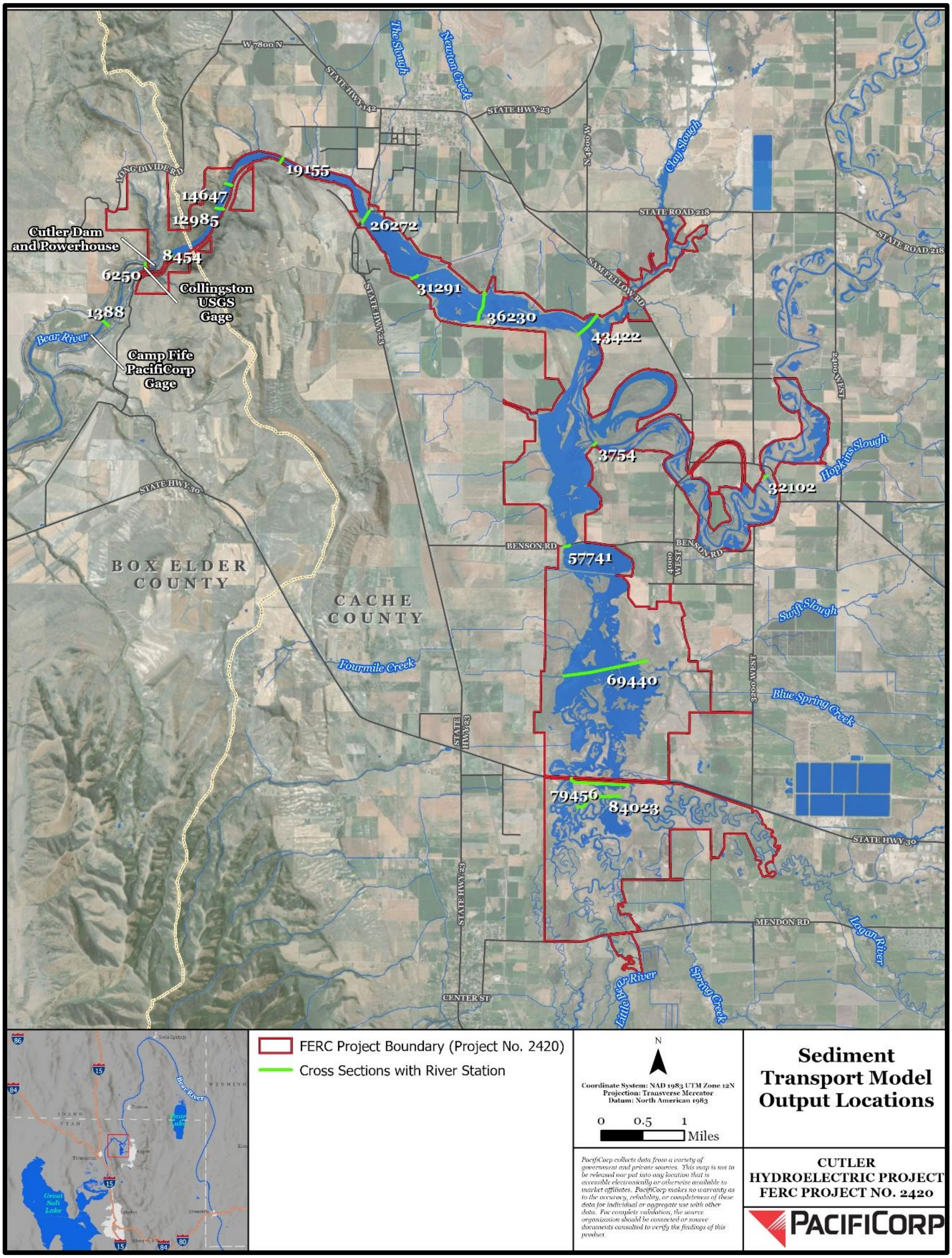


FIGURE 3-11 SEDIMENT MODEL OUTPUT LOCATIONS

TABLE 3-5 SEDIMENT MODEL RESULTS FOR NORMAL AND PROPOSED EXTENDED OPERATIONS

Area	XS ID[a]	Location	Normal Operational Range (4407.5 – 4406.5 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	4394.6	1.27	4394.6	1.58	-0.02	0.31	22%
Reservoir	84023	South Marsh	4403.1	3.01	4403.1	4.96	0	1.95	49%
	79456	U.S. Highway 30	4396.4	0.96	4396.4	1.80	0	0.84	61%
	69440	Cutler Reservoir-North Marsh	4404.3	0.22	4404.3	0.49	0	0.28	78%
	57741	Benson Marina	4388	0.13	4388	0.29	0	0.16	75%
	3754	Bear River Confluence	4391.5	3.59	4391.5	5.73	0	2.14	46%
	43422	Clay Slough	4401.6	2.60	4401.6	4.51	0	1.91	54%
	36230	Cutler Reservoir	4401.3	2.40	4401.3	4.31	0	1.91	57%
	31291	U.P. Railroad Bridge	4388.3	2.17	4388.3	3.77	0	1.60	54%

AREA	XS ID[a]	LOCATION	NORMAL OPERATIONAL RANGE (4407.5 – 4406.5 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	4388	2.06	4388	3.52	0	1.45	52%
	19155	Cutler Canyon	4391.5	2.01	4391.5	3.43	0	1.42	52%
	14647	Cutler Canyon	4390.5	1.80	4390.5	2.96	0	1.17	49%
	12985	Cutler Canyon	4389.2	1.78	4389.2	2.95	0	1.16	49%
	8454	Cutler Dam (upstream)	4369.9	1.57	4369.9	2.57	0	1.00	48%
Bear River Down-stream of Dam	6250	Collinston Gage	4271.8	0.28	4271.7	0.41	-0.04	0.13	38%
	1388	Camp Fife	4266.1	0.83	4266.1	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 data[7] 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

[7] 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 andFigure 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.

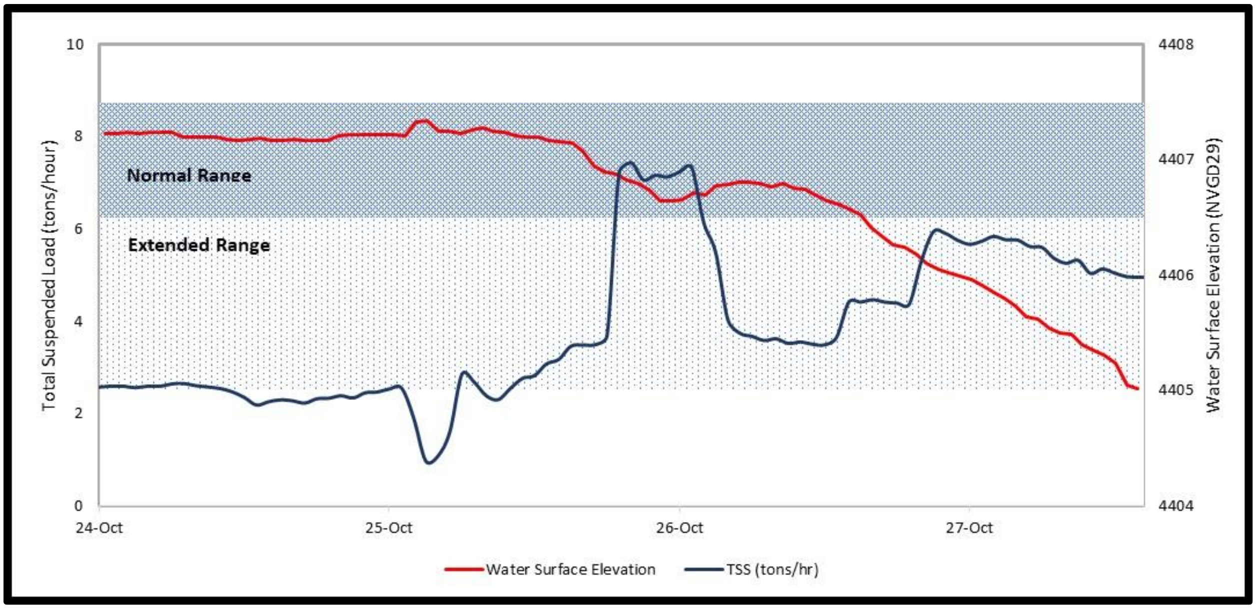


FIGURE 3-12 WSE AND TSS LOADING AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WSE

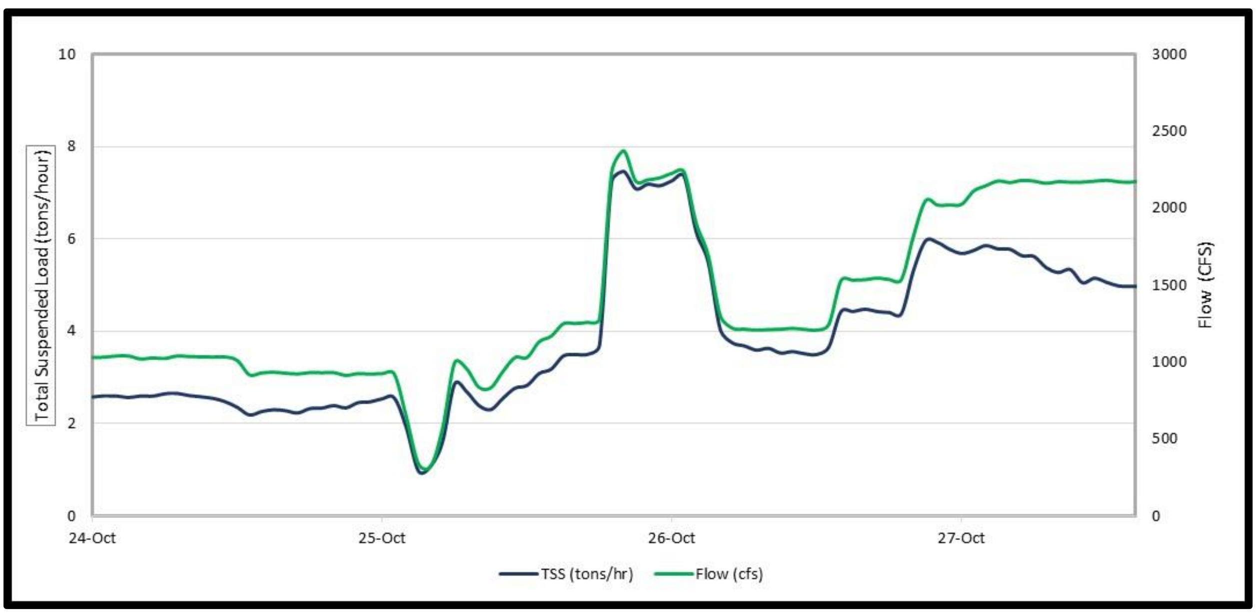


FIGURE 3-13 FLOW AND TSS LOADING AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WATER LEVELS

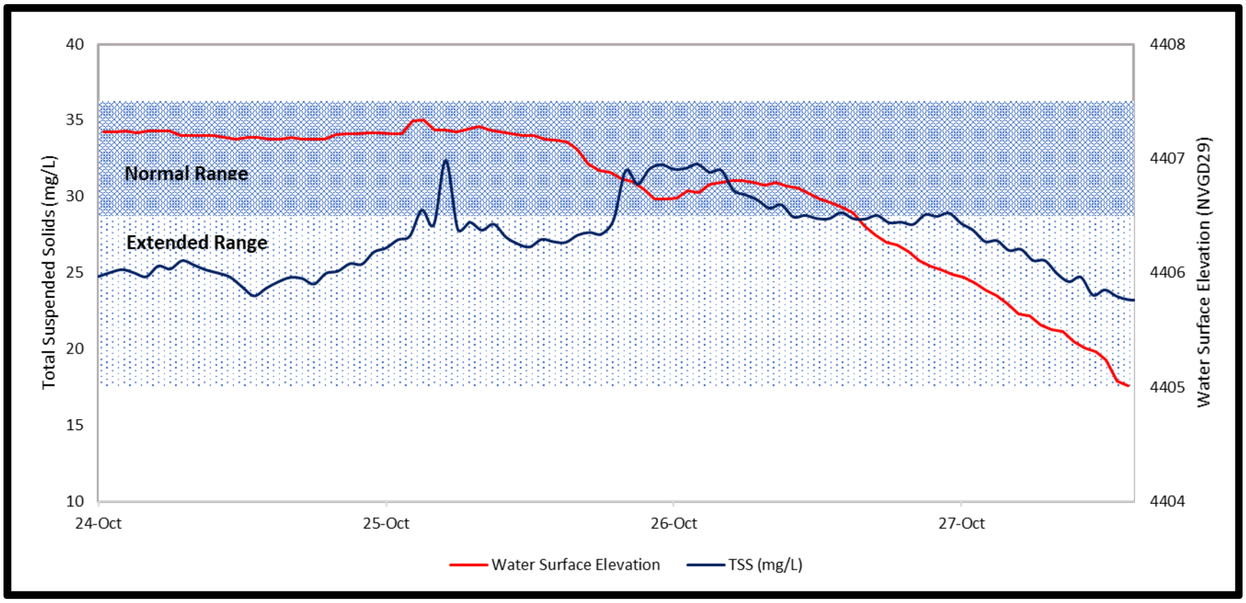


FIGURE 3-14 WSE AND TSS CONCENTRATION AT COLLINSTON GAGE DURING 2019 DRAWDOWN UNDER NORMAL AND PROPOSED EXTENDED OPERATING REGIME WATER LEVELS

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.

3.3.1.3 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 No. 20)[8] 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

[8] The Bear River Project (FERC 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 3.3.1.2, 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 3.3.1.2, 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.

3.3.1.4 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 (RMP)

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 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 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 3.3.1.1, 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 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 RMP that would incorporate and improve upon the management, monitoring, and best practices contained in the current RMP. Aspects to be included in the new 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.

Standalone Measures

- Identify additional bank stabilization projects within Project Boundary.

Management Plans

An updated RMP would be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license. The new RMP would be expected to include the following sub-components relevant to geology, soils, erosion, and sediment:

- Shoreline management (maintaining vegetated buffers including erosion control check dams to minimize sedimentation to Cutler Reservoir)
- Erosion and sediment management (potential bank stabilization projects and monitoring; erosion control check dams on shoreline areas)
- Agricultural management (cattle management, farming and grazing leases)

Operations and Compliance Plan

- 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 Operations and Compliance Plan to avoid flow fluctuations during winter periods of extreme ice build-up.

3.3.1.5 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.

3.3.2 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 is the area within the Project Boundary and along the Bear River for 2 miles downstream of Cutler Dam.

3.3.2.1 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 in Section 3.1).

Bear River Flow

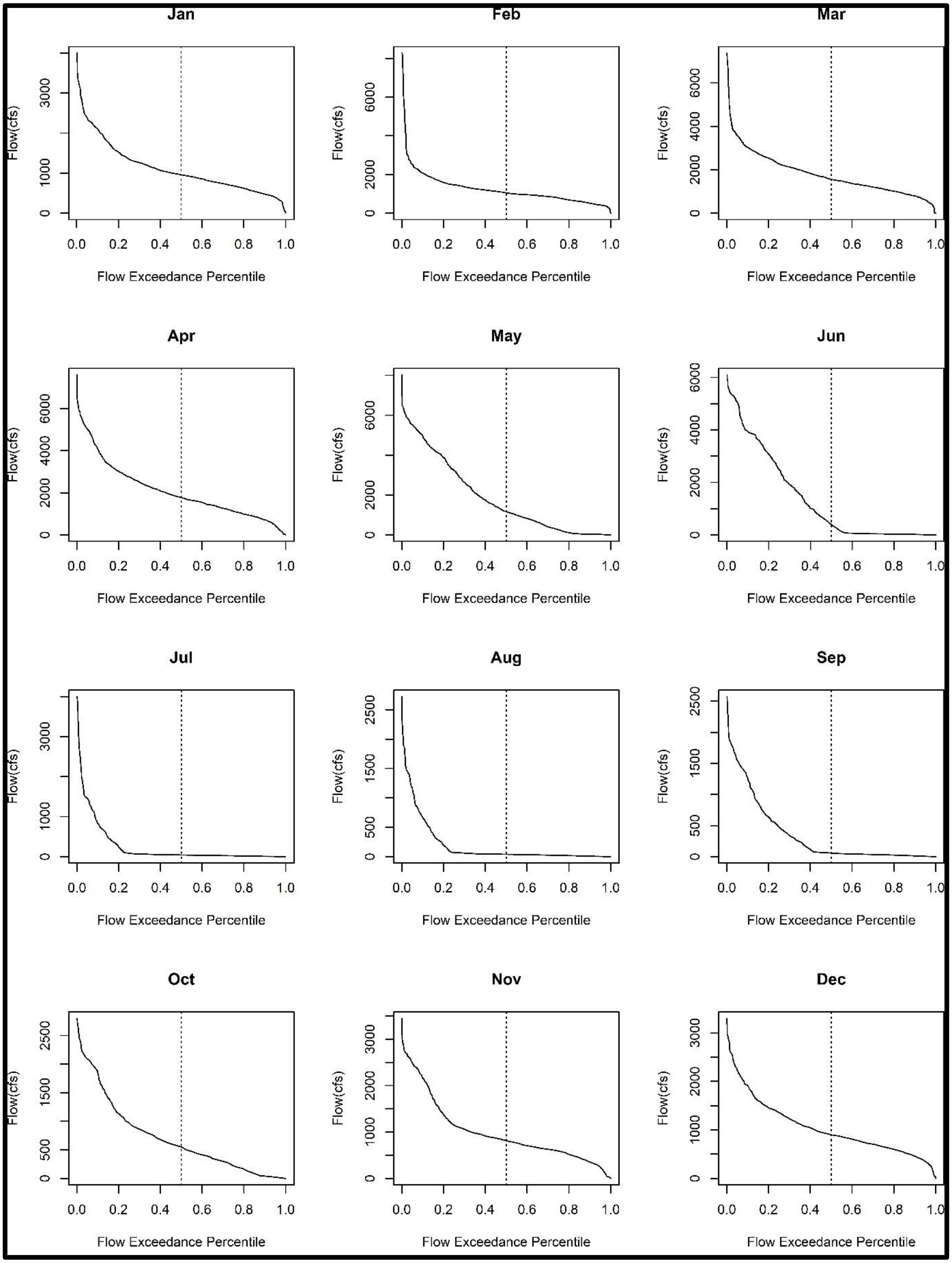
The Bear River and its tributaries are of key importance to Cutler Reservoir in terms of water quantity and quality. The U.S. Geological Survey (USGS) Collinston gage (Station No. 10118000) is located on the Bear River approximately 800 feet downstream from the Cutler Powerhouse and is used to determine 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 does not provide a definition. 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 33 cubic feet per second (cfs), which is essentially leakage from the dam. 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 most recent 32-year record at the Collinston gage are presented in Table 3-6. Flow duration curves for the Project are illustrated in Figure 3-15. The 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 2,467 acres with storage of approximately 8,563 af at a normal operating elevation of 4,407.5 feet msl.[9] 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 4407.5 to 4406.5 feet as measured at Cutler Dam from March to December and expands to a lower limit of 4406.0 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

[9] 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.

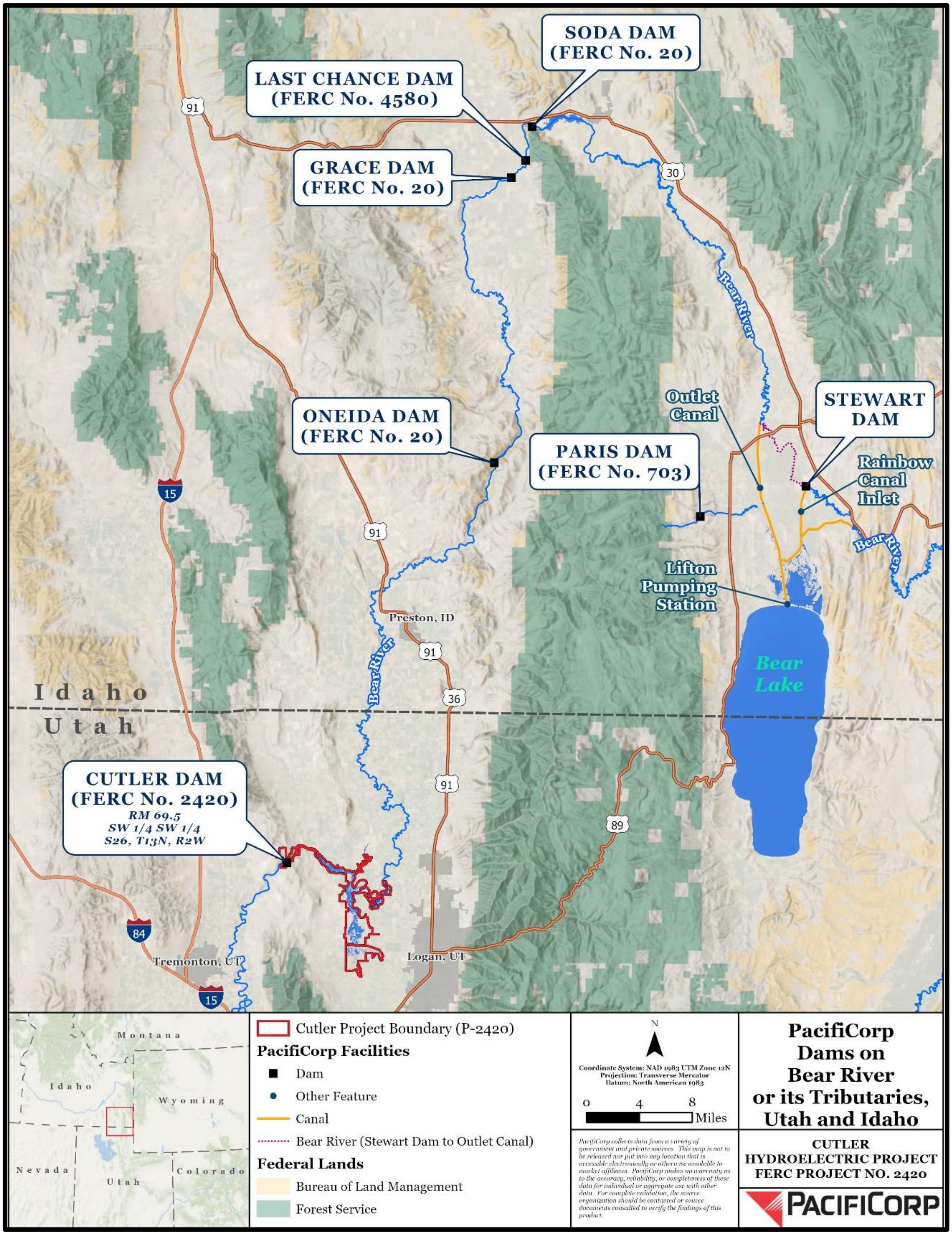
WATER USE

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 No. 20). Additionally, Cutler (FERC No. 2420), Last Chance (FERC No. 4580), Paris (FERC 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).
- Gradual increase in flow at the end of the summer from September 1 to October 15, 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.

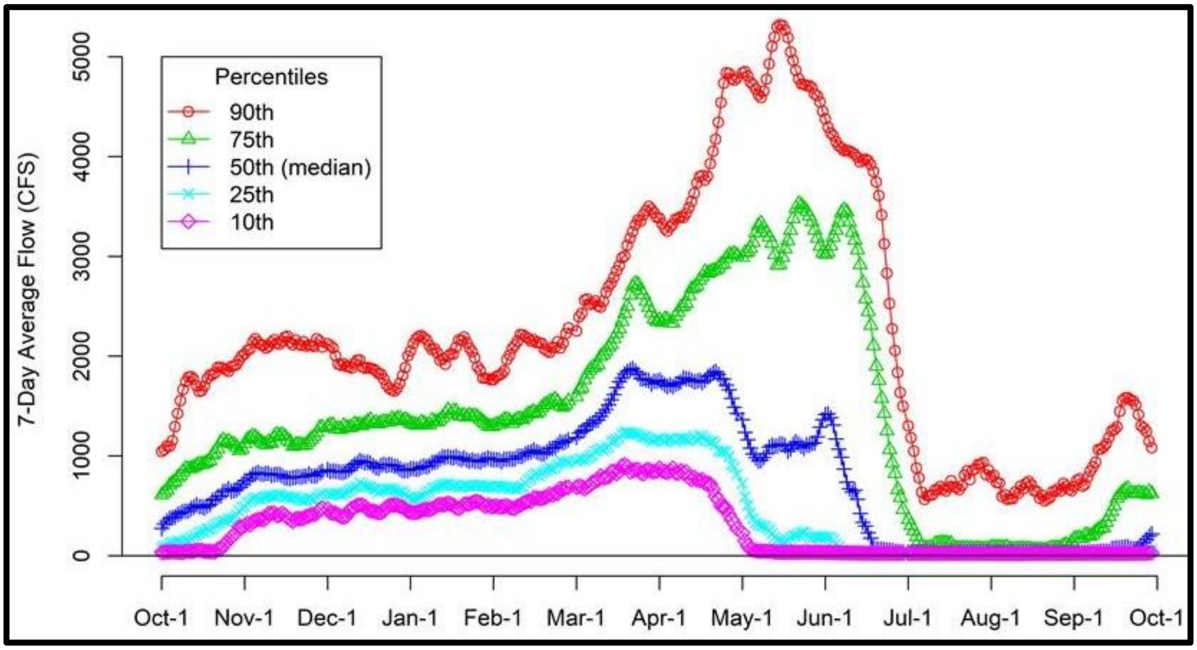


FIGURE 3-17 ANNUAL DISCHARGE PATTERNS DOWNSTREAM OF CUTLER DAM, COLLINSTON GAGE (USGS NO. 10118000, 1988 TO 2018)

Water Rights

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	270	NA	12/1/1903	Decreed
29-2146	135	NA	12/1/1906	Decreed
29-2147	135	NA	12/1/1908	Decreed
29-2148	500	NA	12/1/1912	Decreed
29-1506	2,500	23,800	12/19/1923	Certificate
29-4364	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	"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)			

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 representative[10] 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 3.3.1, 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);

[10] 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 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 the Section 3.3.1, 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 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 PacifiCorp 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.

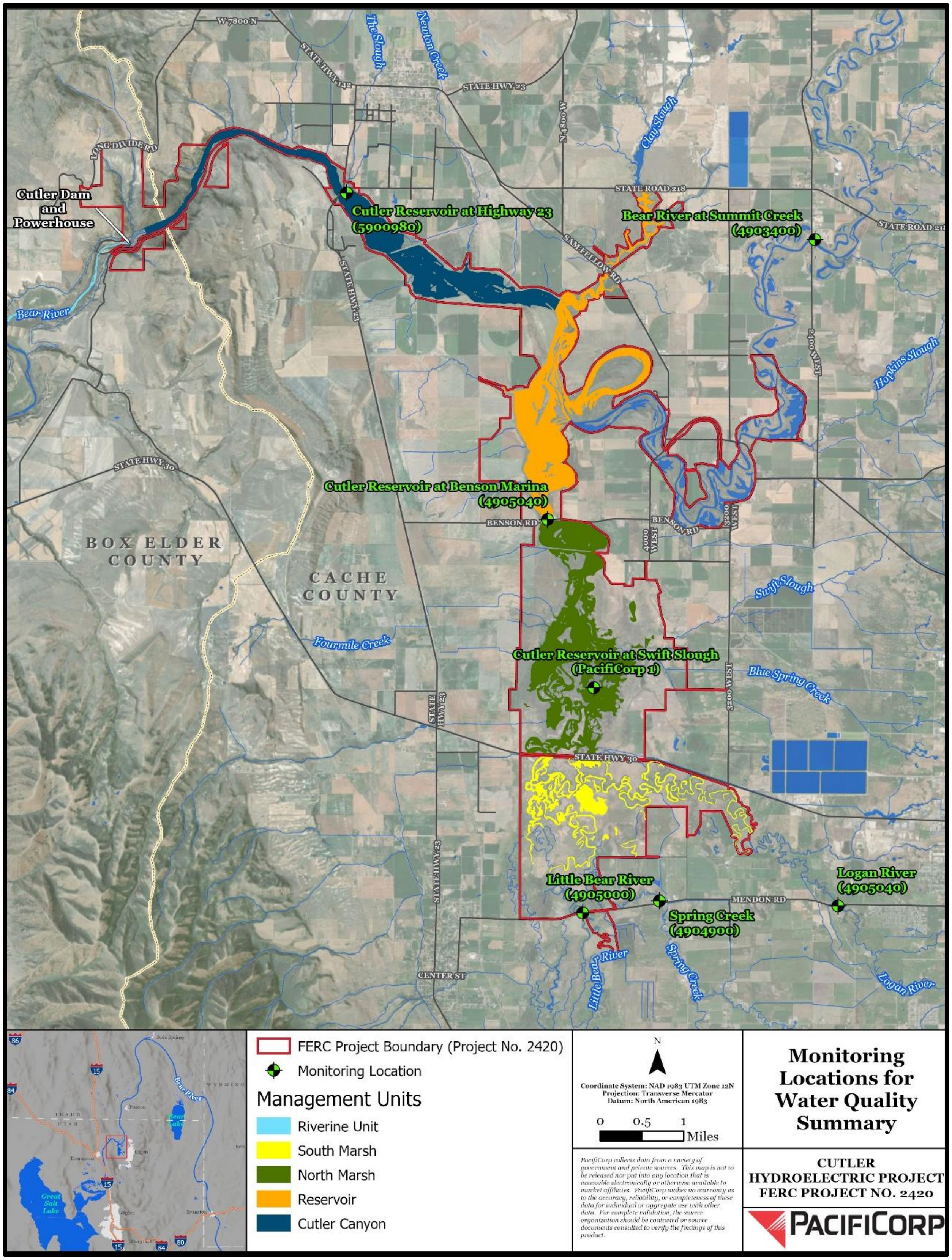


FIGURE 3-18 WATER QUALITY MONITORING SUMMARY LOCATIONS

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 3.3.1, 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).

3.3.2.2 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 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, December to March only) down 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 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 4,407.7 to 4,405 feet up to15 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 requires and 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 explained. 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 30 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 3.3.2.1, Affected Environment [Water Use]. Changes to existing water rights or water-related agreements, as described in the PAD (PacifiCorp 2019), 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 (Section 3.3.9).

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 3.3.2.1, 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 the greater-than 20 feet during the full drawdown).

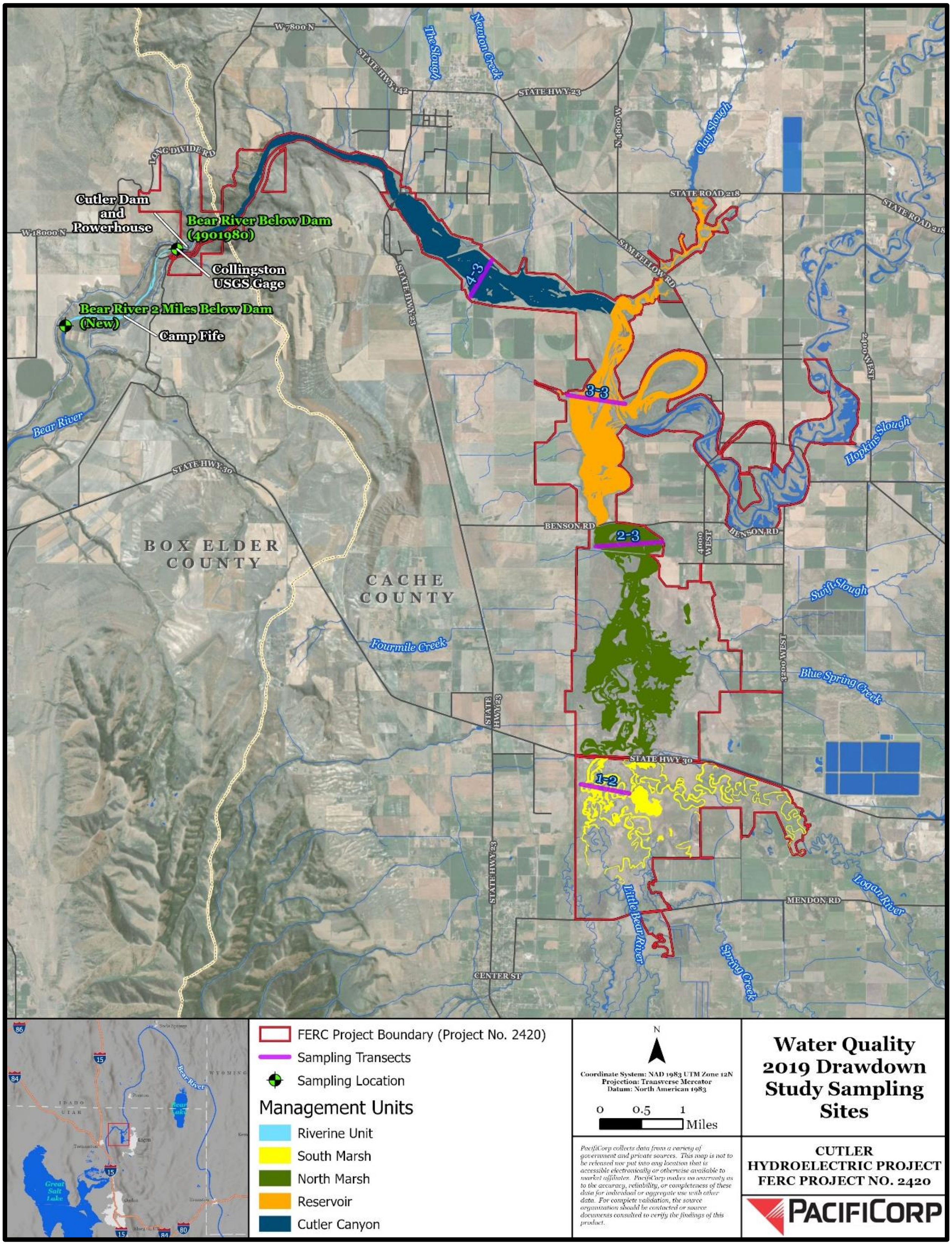


FIGURE 3-19 WATER QUALITY DRAWDOWN STUDY SAMPLING LOCATIONS

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 from December to March when temperatures are low and relatively stable. Average water temperatures were lower when compared to the pre-drawdown temperature date 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 in Section 3.3.1, Geology, Sediment, and Soils). TSS concentrations ranged from 25 to 32 mg/L (see Figure 3-13 in Geology and Soils Section), well below the standard. A detailed description of the TSS analysis is provided in Section 3.3.1.2, [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 3.3.1, 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 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.

3.3.2.3 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 3.3.1 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 (RMP). 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 RMP would not continue in its current form under the new license. Rather, PacifiCorp plans to draft a number of standalone management plans that will incorporate and improve upon the management, monitoring, and best practices contained in the 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 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.

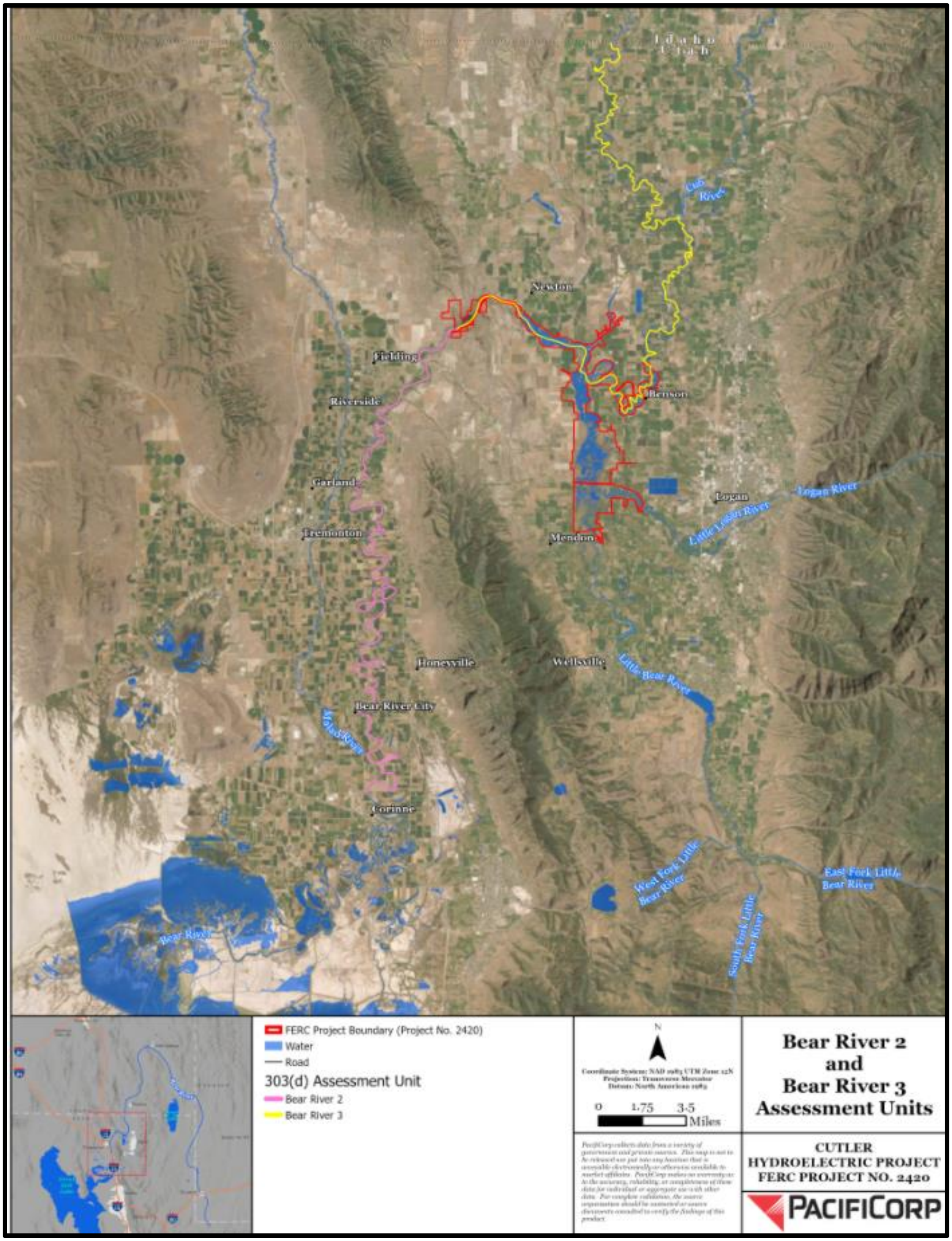


FIGURE 3-20 TMDL 303(d) BEAR RIVER 2 AND BEAR RIVER 3 ASSESSMENT UNITS ENCOMPASSING THE CUTLER PROJECT

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. In addition to PM&E measures that would be part of the RMP and Project operations described below, PacifiCorp is proposing additional watershed improvement projects within the Project Boundary that would have beneficial effects on water quality. Given the existing water quality data that has been collected for the Project and data that will continue to be collected by UDWQ, PacifiCorp proposes to continue to conduct the same water quality monitoring as it does currently over the next license period (quarterly, every 5 years). In addition, PacifiCorp would continue to coordinate with UDWQ and USFWS Bear River Migratory Bird Refuge regarding water quality within the Project Boundary and downstream of the Project.

Standalone Measures

- Identify additional watershed improvement projects within Project Boundary; determine specific Project needs prior to FLA.

Management Plans

An updated RMP is proposed to be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license. The new RMP would be expected to include the following sub-components relevant to water resources:

- Shoreline Management Plan
    - This plan would include continued and new erosion and sediment control measures for the reservoir shoreline and Bear River streambanks (e.g., maintenance and monitoring of erosion control check dam sediment basins, vegetated buffers, buffer and boundary fences)
    - New bank stabilization projects along several segments of reservoir shoreline

- Erosion and Sediment Control Management Plan
  - Plan to address construction and ground disturbance-related activities, including standard and Project-specific BMPs and requirements.
- Water Quality Monitoring Plan
  - Continue existing water quality monitoring protocols, quarterly every five years.

Project Operations

In addition to the updated RMP, flow monitoring and operations management would continue as part of a new Project Operations Compliance Management Plan. 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 (see Section 2.2.2, Proposed Project Operations, for detailed description). PacifiCorp's proposed operations in the new license would mimic the existing operational range (see Table 3-10, above) 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 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 4405 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 (4407.5 to 4406.5 feet, at least 85 percent of the time, and 4407.5 to 4405.0 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 4406.5 to 4407.5 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.

3.3.2.4 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.

3.3.2.5 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 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 tributary inflow 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.

3.3.3 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 species[11] 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 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

[11] Species that are not fully aquatic (e.g., amphibians) are reviewed in Section 3.3.5, Wildlife and Habitat.

(NOAA 2021). Therefore, rare, sensitive, threatened, endangered, and candidate species and EFH are not further addressed in this section.

3.3.3.1 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 2,467 acres.[12] 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 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).

[12] 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 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, as described in Section 3.3.3.1, [Affected Environment] Fish Community) 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 (see Section 3.3.2.4, [Water Resources] Unavoidable Adverse Impacts), 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) (see Section 3.3.2, Water Resources).

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*).

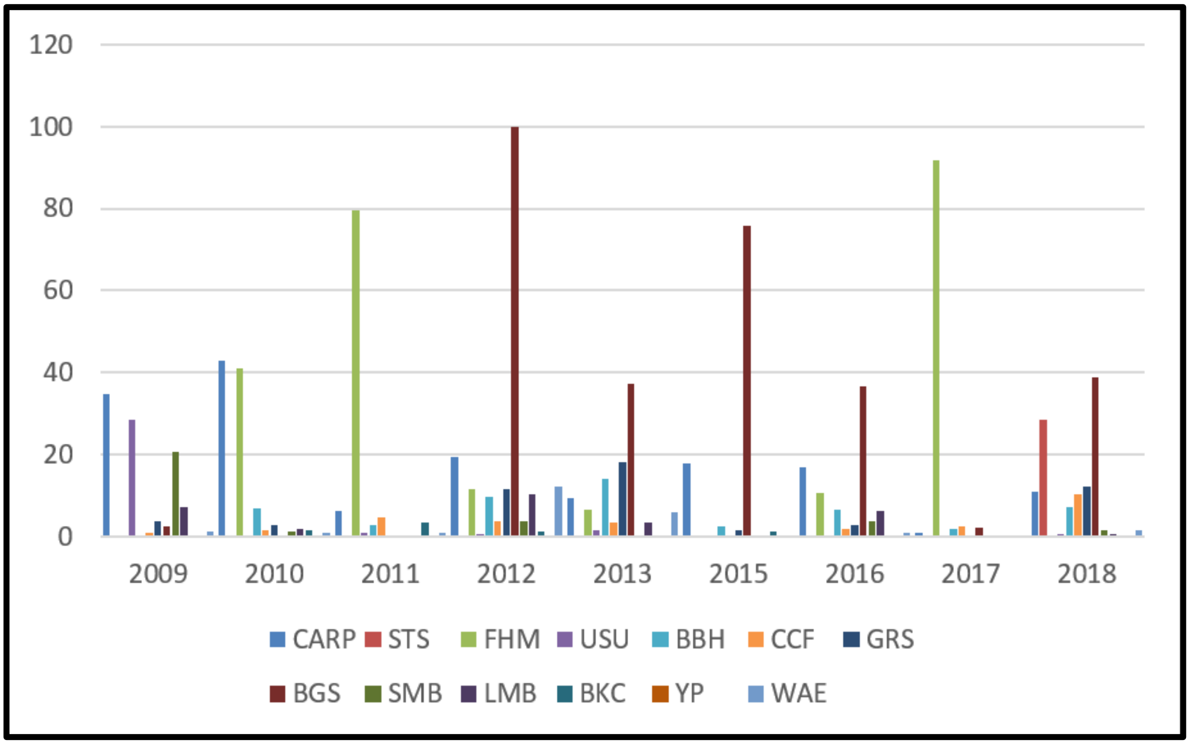
Cutler Reservoir

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 aquatics 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 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				
Orthocladiinae	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				
Hyalella 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	Craspedacusta sowerbyi
Asellid isopod	*Caecidotea racovitzai*
Waterflea	*Daphnia lumholtzi*
Anchor worm	*Lernaea cyprinacea*
Signal crayfish	*Pacifastacus leniusculus*
Virile crayfish	*Faxonius virilis*
Red swamp crayfish	*Procambarus clarkii*
Asian clam	*Corbicula fluminea*
Zebra mussel	*Dreissena polymorpha*
Quagga mussel	*Dreissena rostriformis bugensis*
New Zealand mudsnail	*Potamopyrgus antipodarum*
Red-rim melania	*Melanoides tuberculata*
Chinese mysterysnail	*Cipangopaludina chinensis*

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.

3.3.3.2 CUTLER 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 4,407.5 and 4,405.0 feet, as measured at Cutler Dam (Figure 3-22). 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.

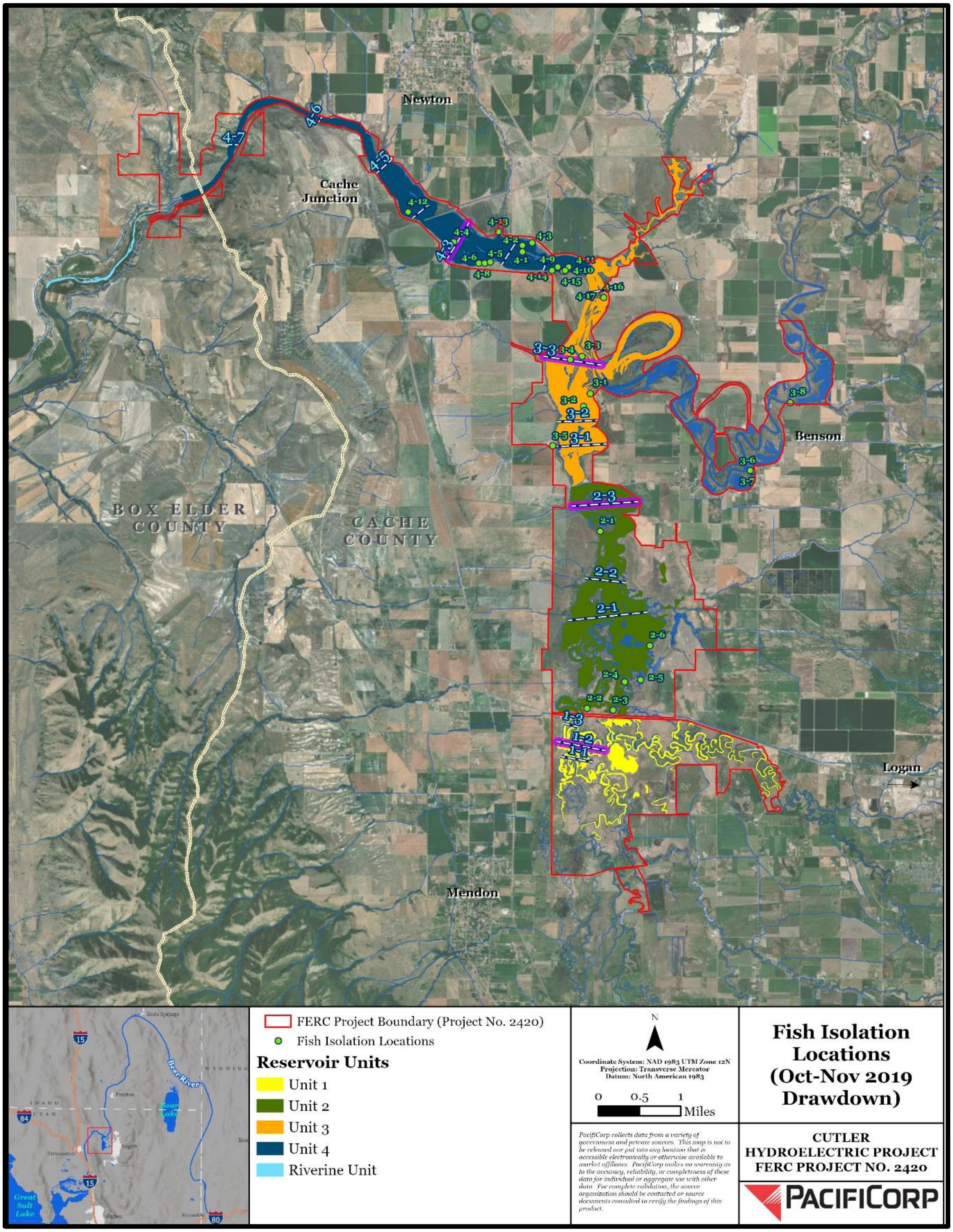


FIGURE 3-22 POTENTIAL FISH ISOLATION LOCATIONS IDENTIFIED DURING THE NOVEMBER 2019 FULL DRAWDOWN AT CUTLER RESERVOIR

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 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. 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	
Orthocladiinae	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.

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. In addition, 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.

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). PacifiCorp's proposed operations would result in short-term, cyclical, reservoir fluctuations of 2.5 feet or less, which would not result in 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.

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. 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 are not considered detrimental to the mussel community (UDWR 2019b).

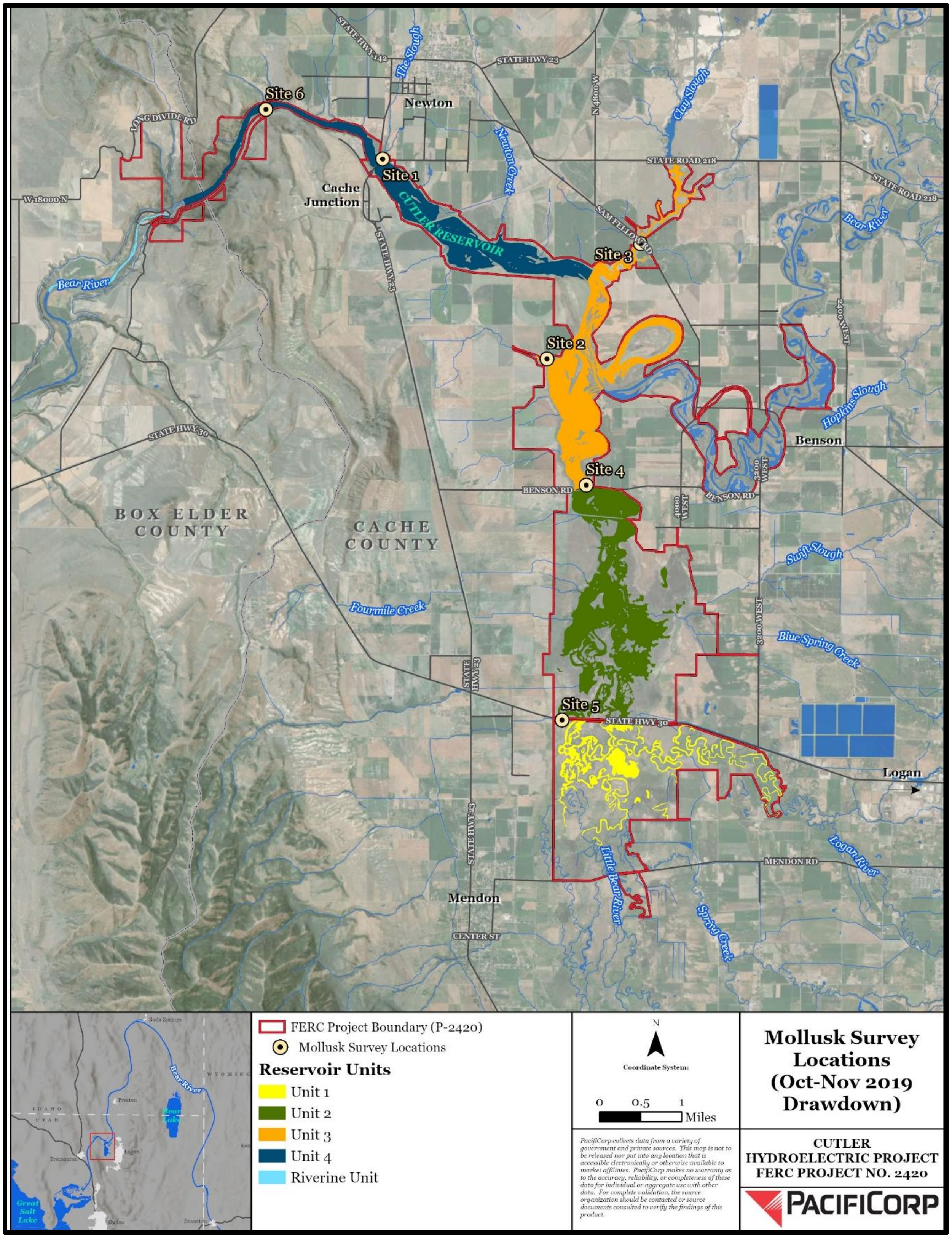


FIGURE 3-23 UTAH DIVISION OF WILDLIFE RESOURCES AQUATIC MOLLUSK SURVEY LOCATIONS

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 may 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 WSEs 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.

3.3.3.3 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

The following sections discuss existing PM&E measures under the current license (FERC 1994); some are proposed to potentially continue under a new license (note that not all measures are proposed to continue), and new 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 2 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 thousand acres of tilled ground for grassland buffer and installed 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 and erosion control measures. No changes are proposed for irrigation or other withdrawals at the dam.

3.3.3.4 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.

3.3.4 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.

3.3.4.1 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 (*Juniperus* sp.), Cottonwoods (*Populus* sp.), Willows (*Salix* sp.), and Russian Olive (*Elaeagnus angustifolia)*.	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 (*Typha* 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)

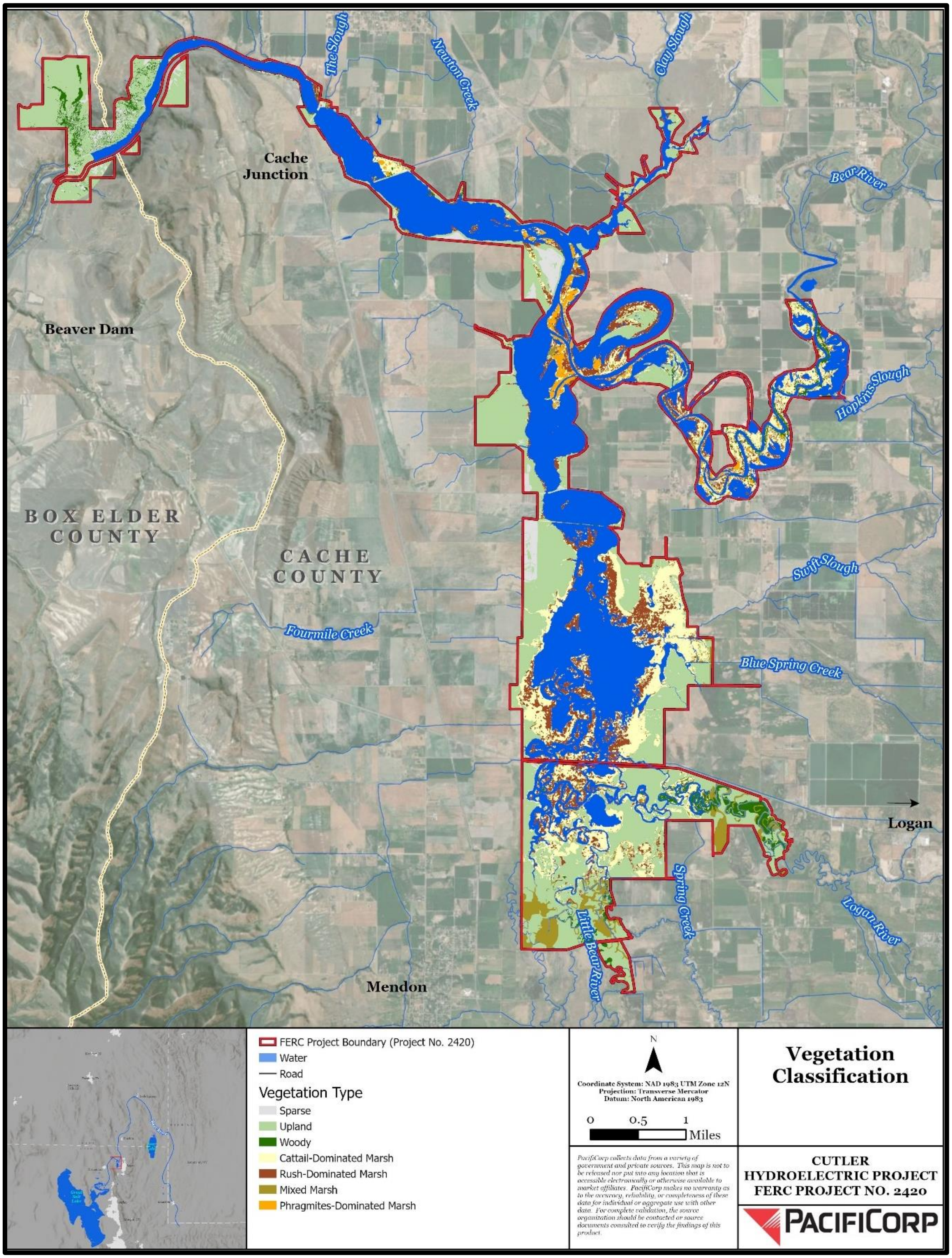


FIGURE 3-24 VEGETATION TYPES WITHIN THE PROJECT BOUNDARY

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 Inventory[13] (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 3.3.5, 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 arunidinacea*), sedges (*Carex* spp.), rushes (*Juncus* spp.), pale spike rush (*Elocharis macrostachya*), Kentucky bluegrass (*Poa pratensis*), foxtail barley (*Hordeum jubatum*), cocklebur (*Xanthium strumarium*), sneezeweed (*Helenium autumnale*), and curly dock (*Rumex crispus*) (PacifiCorp 1991; USDA 2019). 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*

[13] 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 shoreline[14] 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 3.3.1, 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 RMP five-year monitoring reports provide information on the condition of these shoreline buffer areas, including vegetation conditions. The most recent 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.

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

Source: PacifiCorp 2002

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

The 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	*Cynodon dactylon*	3
Canada Thistle	*Cirsium arvense*	3
Dyers Woad	*Isatis tinctoria*	2
Field Bindweed	*Convolvulus spp.*	3
Goatsrue	*Galega officinalis*	1B
Hoary Cress	*Cardaria spp.*	3
Houndstongue	*Cynoglossum officinale*	3
Jointed Goatgrass	*Aegilops cylindrica*	3
Musk Thistle	*Carduus nutans*	3
Perennial Pepperweed	*Lepidium latifolium*	3
Phragmites, common reed	*Phragmites australis* ssp.	3
Poison Hemlock	*Conium maculatum*	3
Purple Loosestrife	*Lythrum salicaria*	2
Puncturevine	*Tribulus terrestris*	3
Quackgrass	*Elymus repens*	3
Russian Olive	*Elaeagnus angustifolia*	4
Scotch Thistle	*Onopordum acanthium*	3
Tamarisk	*Tamarix ramosissima*	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.

3.3.4.2 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 1-foot reservoir operating range fluctuation), which would occur for a minimum of 85 percent of the year (April through November) and throughout the irrigation season. For up to 15 percent of the year, typically between December 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. Although the proposed extended operations would potentially decrease the lower WSE and increase the amount of exposed reservoir bank and shoreline, it is unlikely that this 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, 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

The up to 1.5-foot change in reservoir WSE fluctuation under the proposed extended operations could periodically expose generally submerged areas of shallow, low-gradient reservoir shoreline. In theory, any repeatedly exposed shoreline or littoral habitat could become colonized by invasive weeds. However, the introduction and spread of invasive species along any newly exposed shoreline would be unlikely to occur under the proposed extended operating range, as no potential changes would occur during the growing season when invasive plants could become established. Furthermore, the cyclic nature of the proposed extended operating conditions would likely not expose the reservoir bed long enough for plants to establish, and the exposed areas would be covered by ice or snow for much of the 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.

3.3.4.3 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 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, 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 RMP and would incorporate and improve upon the management, monitoring, and best practices contained in the current RMP. Aspects to be included in the new 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 botanical resources are presented here.

Management and Monitoring Plans

A new RMP would be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license. The new RMP would be expected to include the following sub-components relevant to botanical resources:

- Shoreline management (vegetation monitoring and maintenance)
- Vegetation management

- Weed management (Phragmites management; noxious weed and invasive plant monitoring and treatment within the Project Boundary)
- Agricultural management (fences, cattle management, farming and grazing leases)
- Ute ladies'-tresses management

3.3.4.4 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.

3.3.4.5 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.

3.3.5 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 3.3.3, Fish and Aquatics. Vegetation and plants are presented in Section 3.3.4, Botanical Resources, but are summarized here as needed as part of the wildlife habitat descriptions. Federally threatened and endangered species are described in Section 3.3.6, 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.

3.3.5.1 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

HABITAT TYPE	MANAGEMENT UNIT LOCATION	DESCRIPTION	APPROXIMATE ACREAGE IN PROJECT BOUNDARY
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, playas, alluvial flats, plains	103
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

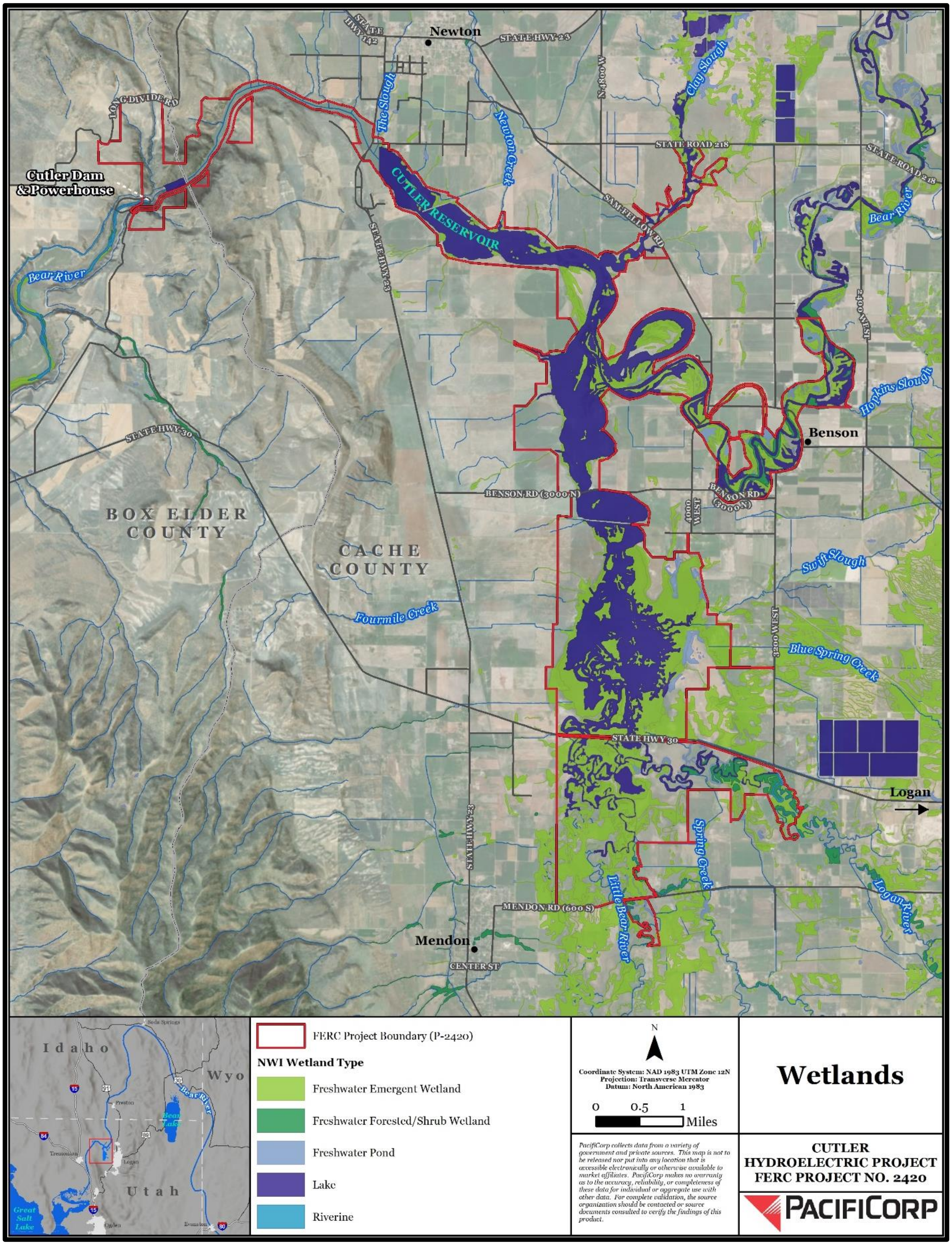
Source: NatureServe 2009

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.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

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 DLA 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 exposed 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 3.3.4, 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 in Section 3.3.3, Fish and Aquatics.

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 this habitat type is located adjacent to 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 then evaluated in Section 3.3.5.2, Environmental Analysis.

The littoral zone is the interface between the open 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 lower (4,406.5 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. 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". Also, these open water/flooded wetland acreages reflect spring through fall conditions, as the 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 (open water depths and exposed shoreline), but the littoral zone itself and the overall amount of littoral habitat do not change with the water level fluctuations. At the 4,407.5 WSE, more open water is present within the littoral zone. At the 4,406.5 WSE, more reservoir shoreline is exposed. The hydraulic modeling conducted as part of the ISR predicted approximately 11 percent less open water/flooded wetland habitat at the 4,406.5 WSE, resulting in up to 316 acres of exposed reservoir shoreline, although that figure is based on the hydraulic model and is extremely conservative (i.e., worst-case), as aerial photos taken at numerous locations around the reservoir and at an elevation greater than 1.5 feet below 4,406.5 show almost no exposed reservoir bed and very little reservoir shoreline.

TABLE 3-20 EXTENT OF OPEN WATER / FLOODED WETLAND HABITAT AT THE LOW AND HIGH SURFACE WATER ELEVATIONS OF THE CURRENT OPERATING RANGE

Management Unit	Open Water at WSE 4,407.5 (acres)[a]	Open Water at WSE 4,406.5 (acres)	Percent Change in Open Water[b]	Littoral and Exposed Shoreline Habitat at WSE 4,406.5 (acres)
Cutler Canyon	183	180	1%	3
Reservoir	1185	1,060	11%	125
Bear River	430	381	12%	50
South Marsh	99	82	17%	17
North Marsh	994	872	12%	121
Reservoir Totals	2,891	2,575	11%	316

WSE = Water surface elevation
[a] Percent change in open water is the percent difference of open water at the lower WSE 4,406.5 compared to the upper WSE of 4,407.5. Percent totals may be greater or less than 100 percent due to rounding. Open water acreages were modeled using the hydraulic modeling conducted as part of the ISR and include open water and flooded wetland areas.
[b] Exposed shoreline is the difference of open water at the lower WSE 4,406.5 compared to the upper WSE of 4,407.5.

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. The table also shows the change in each depth class. Generally, the more shallow depths 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 herodia*) 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 DLA.

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 List[15], 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

[15] 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.

forward for further analysis. Species were not moved forwarded 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, 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 *Recurvirostra americana*	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 *Fulica americana*	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
American Pipit *Anthus rubescens*	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 *Pelecanus erythrorhynchos*	Forage in water with islands for resting and nesting.	Migratory	6
American Wigeon *Mareca americana*	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 *Haliaeetus leucocephalus*	Roosts in large trees. Generally nests in mature or old-growth trees within 2 kilometers of water.	R4 Sensitive, Migratory	13
Barrow's Goldeneye *Bucephala islandica*	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 *Megaceryle alcyon*	Forage in streams, rivers, lakes, ponds, wetlands and reservoirs with abundant fish and aquatic vertebrates or invertebrates. Typically capture prey	Migratory	2

SPECIES NAME	HABITAT	STATUS [a]	NUMBER OBSERVED [b]
	within the top 60 centimeters of the water.		
Black-crowned Night-heron *Nycticorax*	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 *Himantopus mexicanus*	Forage in shallow water up to the height of their breast, generally around 11 centimeters deep.	Migratory	0
Blue-winged Teal *Anas discors*	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
Bonaparte's Gull *Chroicocephalus philadelphia*	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 *Bucephala albeola*	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 *Branta hutchinsii*	Forage for both submergent vegetation as well as on short vegetation in upland habitat.	Migratory	0
California Gull *Larus californicus*	Forage in open habitat including farmland, marshes, meadows, garbage dumps, streams, and rivers.	Migratory	1,233
Canada Goose Branta canadensis	Forage in lakes, slow-moving rivers, marshes, mudflats, ponds, grassy fields, pastures, and agricultural fields.	Migratory	4,428
Canvasback *Aythya valisineria*	Forage in a variety of aquatic habitat, often diving to reach submerged vegetation and invertebrates diving for	Migratory	9

SPECIES NAME	HABITAT	STATUS [a]	NUMBER OBSERVED [b]
	food in water between 0.5 and 2 meters deep.		
Cinnamon Teal *Anas cyanoptera*	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 *Aechmophorus clarkii*	Forage in fresh or salt water of varying depths.	Migratory	26
Common Goldeneye *Bucephala clangula*	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 *Gavia immer*	Forage in large water bodies with islands and fish.	R4 Sensitive, Migratory	0
Common Merganser *Mergus merganser*	Forage in lakes, reservoirs, rivers, bays, and estuaries; typically in shallow water (less than 4 meters).	Migratory	264
Double-crested Cormorant *Phalacrocorax auritus*	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 *Podiceps nigricollis*	Forage in shallow wetlands, ponds and lakes, diving for fish up to 5 meters in the water.	Migratory	42
Franklin's Gull *Leucophaeus pipixcan*	Forage in flocks over wet pastures, grasslands, and fields searching for grains and insects along the ground.	Migratory	0
Gadwall *Anas strepera*	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 *Ardea herodias*	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

SPECIES NAME	**HABITAT**	**STATUS** [a]	**NUMBER OBSERVED** [b]
Greater Yellowlegs *Tringa melanoleuca*	Forage in aquatic habitat, generally wading in shallow water no higher than their belly (about 11 centimeters).	Migratory	0
Green-winged Teal *Anas carolinensis*	Forage in shallow water near shorelines, typically in water less than 12 centimeters deep.	Migratory	50
Herring Gull *Larus argentatus*	Forage in aquatic habitat near shallow water and exposed shores for aquatic vertebrates and fish.	Migratory	0
Hooded Merganser *Lophodytes cucullatus*	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 *Podiceps auritus*	Forage in small to medium freshwater ponds and marshes; in shallow water (less than 6 meters).	Migratory	0
Killdeer *Charadrius vociferus*	Forage on the ground in open habitat and shallow water, wading into the water's edge for invertebrates.	Migratory	0
Lesser Scaup *Aythya affinis*	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
Long-billed Dowitcher *Limnodromus scolopaceus*	Forage in shallow water, mudflats, wetlands, and wet meadows probing for food in water 0 to 16 centimeters deep.	Migratory	0
Mallard *Anas platyrhynchos*	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 *Cistothorus palustris*	Forage at or near the surface of water and among the emergent vegetation for invertebrates.	Migratory	1
Northern Pintail *Anas acuta*	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

SPECIES NAME	HABITAT	STATUS [a]	NUMBER OBSERVED [b]
Northern Shoveler *Anas clypeata*	Forage in freshwater wetlands in open water often skimming the surface of the water with their bills for invertebrates and vegetation.	Migratory	121
Osprey *Pandion haliaetus*	Forage in salt or freshwater habitat in both shallow and deep water; biggest requirement is the presence of fish.	Migratory	0
Pied-billed Grebe *Podilymbus podiceps*	Forage in open water by diving for submergent vegetation and dabbling among emergent vegetation.	Migratory	33
Red-breasted Merganser *Mergus serrator*	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 *Phalaropus lobatus*	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 *Aythya americana*	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 *Larus delawarensis*	Forage in fresh or saltwater habitat, utilizing deeper water for plunging into the surface of the water, or shallower water for wading, feeding on land near water or among plowed fields.	Migratory	700
Ring-necked Duck *Aythya collaris*	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 *Chen rossii*	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 *Oxyura jamaicensis*	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	Migratory	10

SPECIES NAME	HABITAT	STATUS [a]	NUMBER OBSERVED [b]
	in open water with submergent vegetation, typically diving for invertebrates.		
Snow Goose *Chen caerulescens*	Forage in freshwater and brackish marshes, slow-moving rivers, lakes, impoundments, and farm fields.	Migratory	59
Trumpeter Swan *Cygnus buccinator*	Forage in freshwater ponds, lakes, or marshes with abundant aquatic vegetation.	R4 Sensitive, Migratory	119
Tundra Swan *Cygnus columbianus*	Forage on aquatic plants and grasses in water up to 1 meter deep and in open agricultural fields occasionally.	Migratory	50
Virginia Rail *Rallus limicola*	Forage in shallow water (typically 0–15 centimeters deep) or mudflats near and among emergent vegetation.	Migratory	0
Western Grebe *Aechmophorus occidentalis*	Forage in open fresh or saltwater/brackish lakes and marshes diving for fish.	Migratory	20
Wilson's Snipe *Gallinago delicata*	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 *Aix sponsa*	Forage in flooded timber and shallow wetlands with dense emergent vegetation in areas 18–40 centimeters deep along the edges of flooded areas.	Migratory	0

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).

3.3.5.2 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). 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 Section 3.3.1, Geology, Soils, and Sediment, and the Land Use ISR, Appendix D of PacifiCorp 2021a).

Wetland Habitat

Negligible effects on wetland habitats are expected. 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. Potential effects on open water habitat at the Cutler Reservoir are discussed below in the Littoral and Open Water Habitat subsection.

Littoral and Open Water Habitat

The potential for proposed operations to cause increased bank erosion was evaluated in Section 3.3.1, Geology, Soils, and Sediment. It was 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 motor boats 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 changes in WSE and depths for open water conditions in Cutler Reservoir, as indicated by the hydraulic modeling of the proposed extended operating conditions (Appendix G of PacifiCorp 2021a). 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 wetlands at the current and proposed upper WSE of 4,407.5 feet, the current/proposed normal WSE of 4,406.5 feet, and the proposed extended WSE of 4,405.0 feet within the five management units shown in Figure 1-1. As described above in Section 3.3.5.1, [Affected Environment] Littoral and Open Water Habitat, 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.

Based on the hydraulic modeling for the reservoir, the current/proposed normal operating conditions potentially result in an approximate 11 percent decrease in open water / flooded wetland area from full pool (WSE 4,407.5) to WSE 4,406.5. The proposed extended operating conditions could potentially result in up to an approximate 21 percent decrease in open water at WSE 4,405.0 compared to the upper WSE limit (as previously noted, these modelled changes are not visually apparent in the aerial photo series that was taken near the approximate high WSE level and several inches below the lowest extended operating range WSE of 4405.0 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 open water and exposed reservoir shoreline within the littoral zone.

As described in Section 3.3.5.1, [Affected Environment] Littoral and Open Water Habitat, 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 occurs generally 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 3-23 AMOUNT OF OPEN WATER AND EXPOSED RESERVOIR BED UNDER THE CURRENT AND PROPOSED EXTENDED OPERATIONS

Management Unit	Open Water at WSE 4,407.5 (acres) [a]	Current / Proposed Normal Operations			Proposed Extended Operations		
		Open Water at WSE 4,406.5 (acres)	Change in Open Water [b] (percent)	Littoral and Exposed Shoreline Habitat [c] at WSE 4,406.5 (acres)	Open Water at WSE 4,405.0 (acres)	Change in Open Water [a] (percent)	Littoral and Exposed Shoreline Habitat [c] at WSE 4,405.0 (acres)
Cutler Canyon	183	180	1%	3	171	6%	12
Reservoir	1,185	1,060	11%	125	902	24%	283
Bear River	430	381	12%	50	363	16%	68
South Marsh	99	82	17%	17	70	29%	29
North Marsh	994	872	12%	21	777	22%	217
Totals	2,891	2,575	11%	316	2,283	21%	608

Source: These data were source from the hydraulic modeling discussed in Appendix G of PacifiCorp 2021a

WSE = Water surface elevation
[a] Change in open water is the percent difference of open water compared to the upper WSE of 4,407.5. Percent totals may be greater or less than 100 percent due to rounding.
[b] Exposed shoreline is the difference of open water compared to the upper WSE of 4,407.5.
[c] Open water acreages were modeled using the hydraulic modeling conducted as part of the ISR and include open water and flooded wetland areas.

TABLE 3-24 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 3-23, 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 in Table 3-23 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 in Section 3.3.5.1, Affected Environment. 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 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 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 in Section 3.3.5.1, [Affected Environment] Littoral and Open Water Habitat section, 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 (Section 3.3.5.2, [Environmental Analysis] Littoral and Open Water Habitat; 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.
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	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. Snow geese are likely to continue to utilize areas with suitable resting habitat under the proposed operating conditions.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
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.
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.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
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.
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.	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. 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.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
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.
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.

WATER DEPTH CLASS / HABITAT TYPE	AVIAN SPECIES UTILIZING HABITAT	HABITAT EFFECTS	SPECIES EFFECTS
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.
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 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.

3.3.5.3 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 (RMP).

Under the current license, the following measures were required to be included in the 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 RMP and would incorporate and improve upon the management, monitoring, and best practices contained in the current RMP. Aspects to be included in the new 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. New proposed measures and management plans relevant to wildlife and wildlife habitat are presented here. PacifiCorp proposes to discuss cooperative measures between potentially interested NGOs and UDWR to facilitate long-term avian monitoring within the Project Boundary. The avian monitoring would be developed under a proposed Avian Monitoring Plan.

Management and Monitoring Plans

A new RMP would be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license. The new RMP is expected to include the following sub-components, relevant to wildlife and habitat:

- Water quality monitoring plan
- Shoreline management (maintaining vegetated buffers and wildlife habitat improvements, including erosion control check dams)
- Erosion and sediment management (potential bank stabilization projects and monitoring, including erosion control check dams throughout Project Boundary)
- Vegetation management
- Weed management (Phragmites management; noxious weed and invasive plant monitoring and treatment)
- Avian monitoring (potential long-term and seasonal monitoring of avian species to identify population and use trends)
- Continue to cooperate with UDWR and other interested stakeholders on special status species management (i.e., implement monarch butterfly way stations)

3.3.5.4 UNAVOIDABLE ADVERSE IMPACTS

Based on the potential effects assessed above, it is possible that effects to open water 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.

3.3.6 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 Section 3.3.5, 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 Section 3.3.3, Fish and Aquatics, and Section 3.3.5, Wildlife and Habitat, for aquatic and terrestrial species, respectively.

3.3.6.1 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	*Lynx canadensis*	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 Cuckoo	*Coccyzus americanus*	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	*Oncorhynchus clarkii henshawi*	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	*Spiranthes diluvialis*	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	*Primula maguirei*	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.[16] 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.

[16] 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.

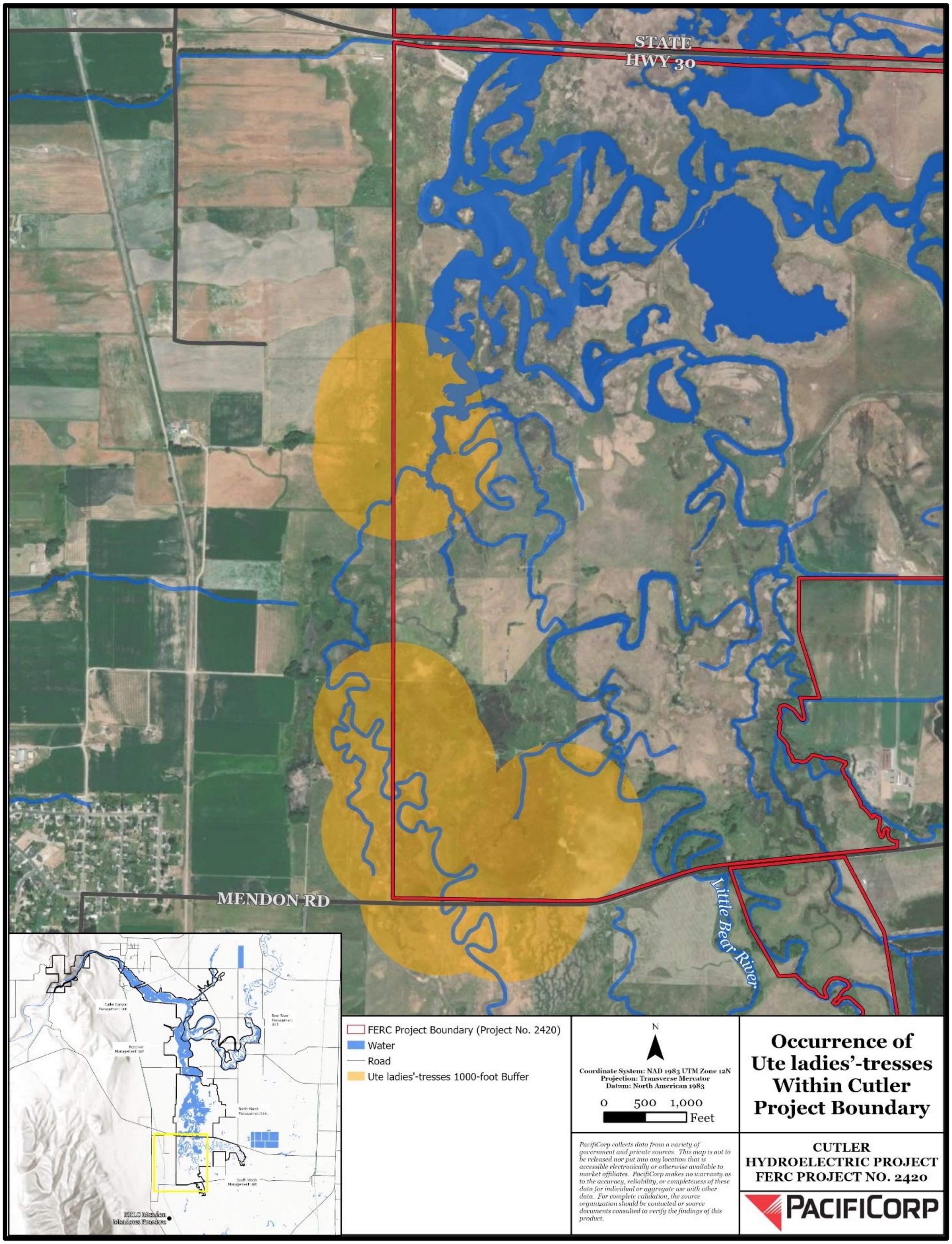


FIGURE 3-26 UTE LADIES'-TRESSES OCCURRENCE WITHIN THE PROJECT BOUNDARY

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.

3.3.6.2 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 Section 3.3.4, Botanical Resources, and Section 3.3.5, 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 on the exposed shoreline given that the fluctuation periods consist of short-term changes that would only occur during the winter months exposing additional shoreline for less than 10 days at a time. 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 (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 (see Section 3.3.9.1, Land Use, for a more detailed description of grazing management). 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 Section 3.3.6.3 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.

3.3.6.3 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 RMP. This new RMP would be developed after the Project is granted an approved license. 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: 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. An updated RMP is proposed to be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license.

PacifiCorp has proposed updating or developing new management plans for the following resources that are relevant to the protection of Ute ladies'-tresses and their habitat: grazing management, habitat management, and weed management. These management plans would be part of the overall Cutler resource management program, and would guide Project management actions to minimize habitat impacts. A proposed Cutler Ute ladies'-tresses Management Plan 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.

3.3.6.4 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.

3.3.7 RECREATION

This section describes recreation facilities and opportunities within the Project Boundary and the surrounding region. The Project Boundary encompasses approximately 9,115 acres (FERC 2009). With the exception of three 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.	• *Recreation Resources Initial Study Report* (Appendix I of PacifiCorp 2021a) • DLA Exhibit E Section 3.3.7, Recreation	No

3.3.7.1 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

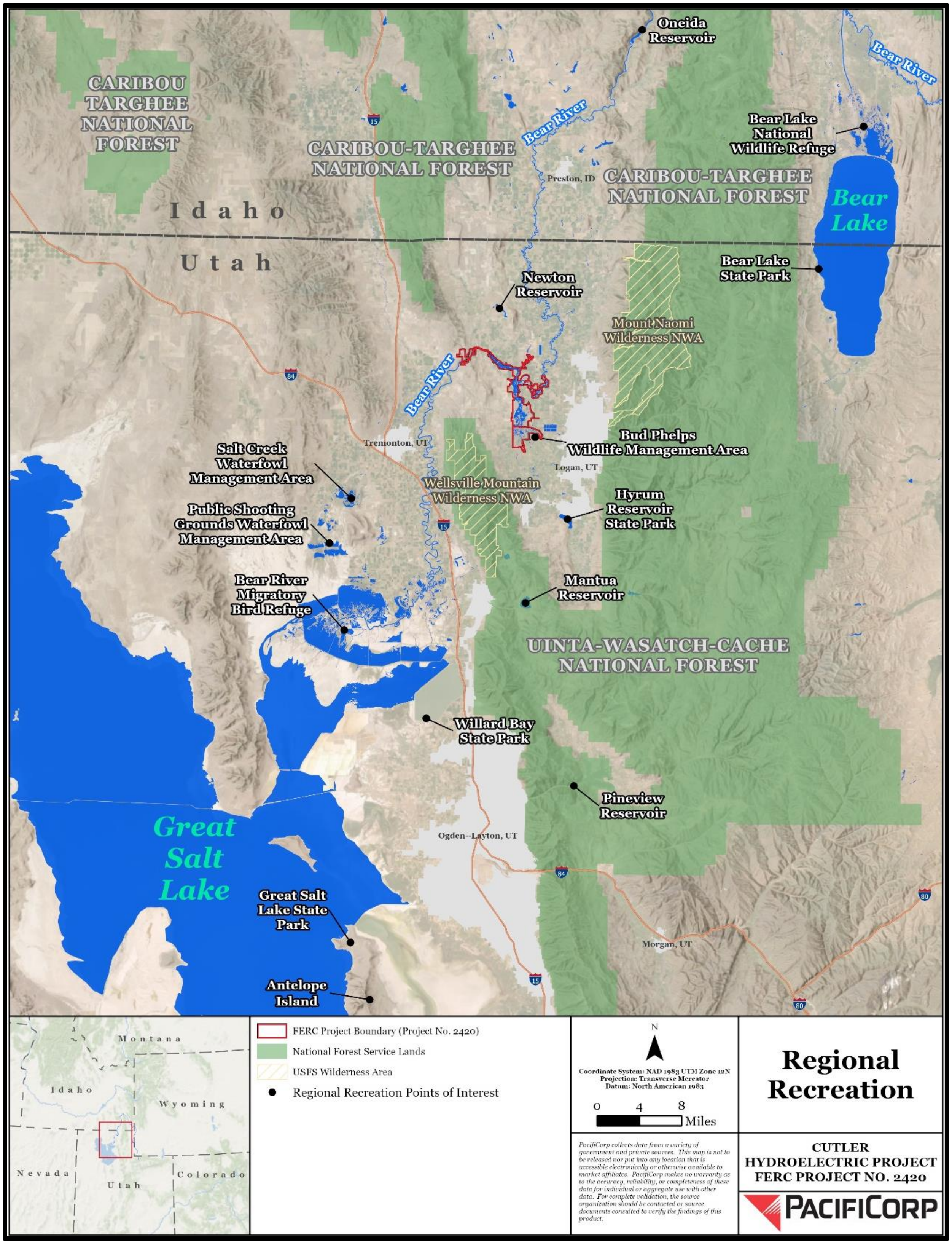
The Bear River passes through varied terrain in the states of Utah, Wyoming, Idaho, and back into Utah before emptying into the Great Salt Lake. With lower-lying valleys and desert ranges in the western portion, including the Great Salt Lake, and rugged mountains and plateaus on the eastern side, the 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,[17] 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

[17] Non-motorized boating includes uses such as canoeing, kayaking, rafting, sail boating, and standup paddle boarding.

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.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

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 waterfowl[18] hunting season, Salt Creek Waterfowl Management Area provides opportunities for waterfowl hunting, upland game[19] hunting, furbearer[20] trapping and hunting, camping, and use of motorized and non-

[18] "Waterfowl" means ducks, including mergansers, geese, brant, and swans (UDWR 2020a).
[19] "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).
[20] "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 2,467 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:

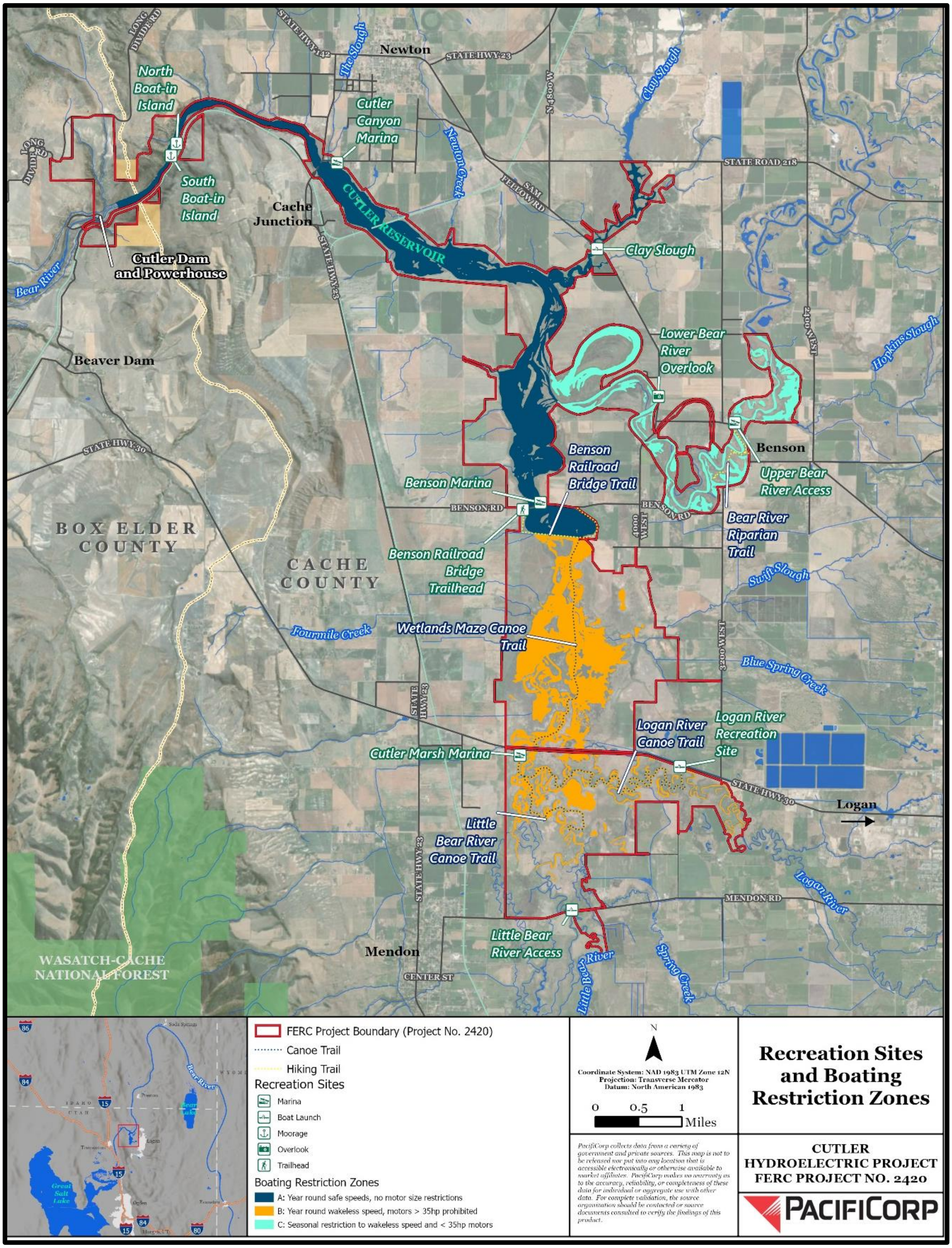
- Site maintenance
- Vandalism repair
- Adding gravel to parking areas as needed
- Sign repair
- Maintaining seasonal permanent and portable recreation facilities
- Standardized signs for all recreation sites (maps, FERC Form No. 80, regulations for motorized uses, and prohibitions on drones and tobacco/cannabis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

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.

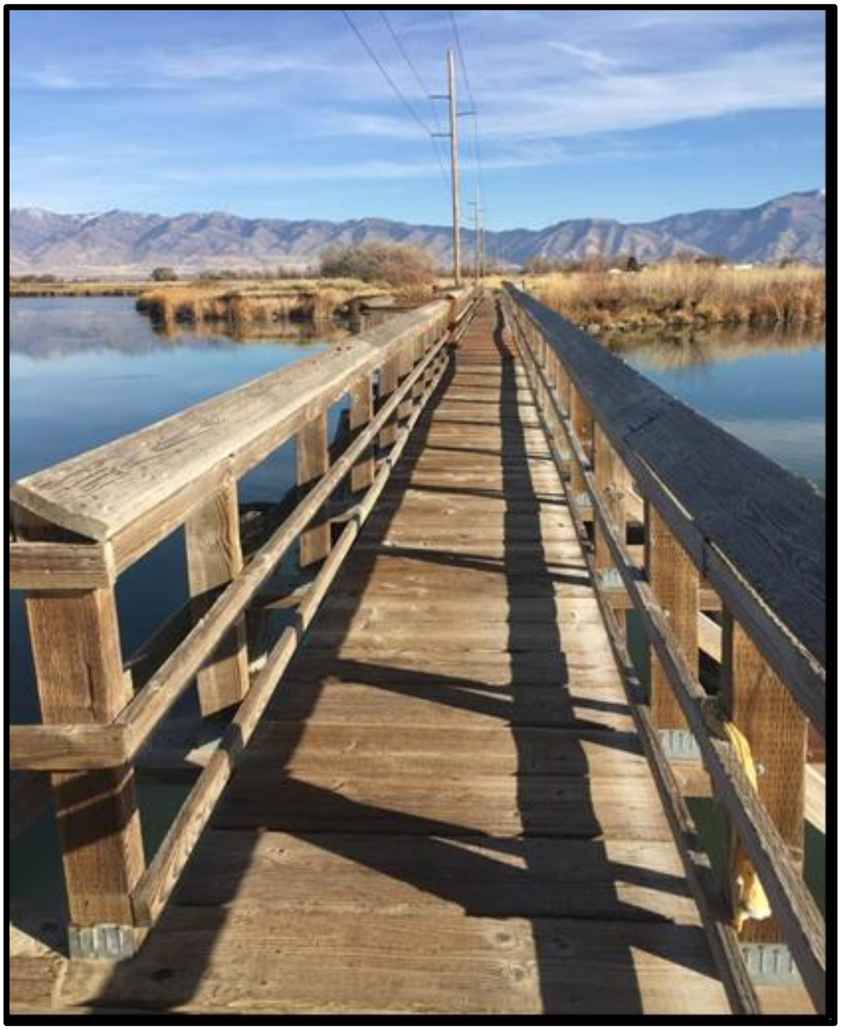


PHOTO 3-8 BENSON RAILROAD BRIDGE TRAIL AND FISHING BRIDGE

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 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 is as 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

NUMBER	DESIGNATED RECREATION SITES	TYPE OF COUNTER
7	Little Bear River Access	Vehicle 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

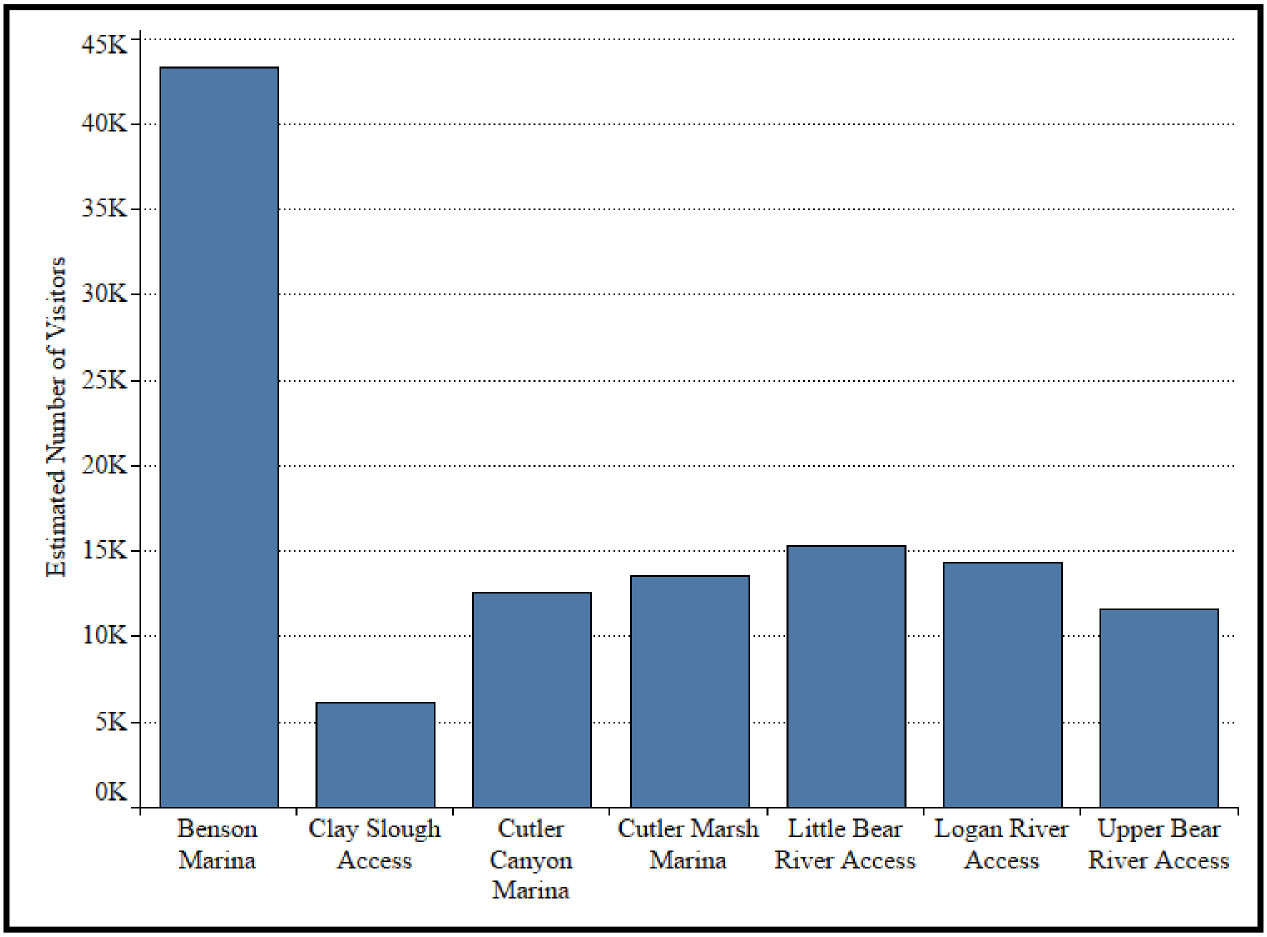
TABLE 3-33 ESTIMATED VISITOR COUNTS AT CUTLER RECREATION SITES (2020)

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

RECREATION SITE	APRIL*	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
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

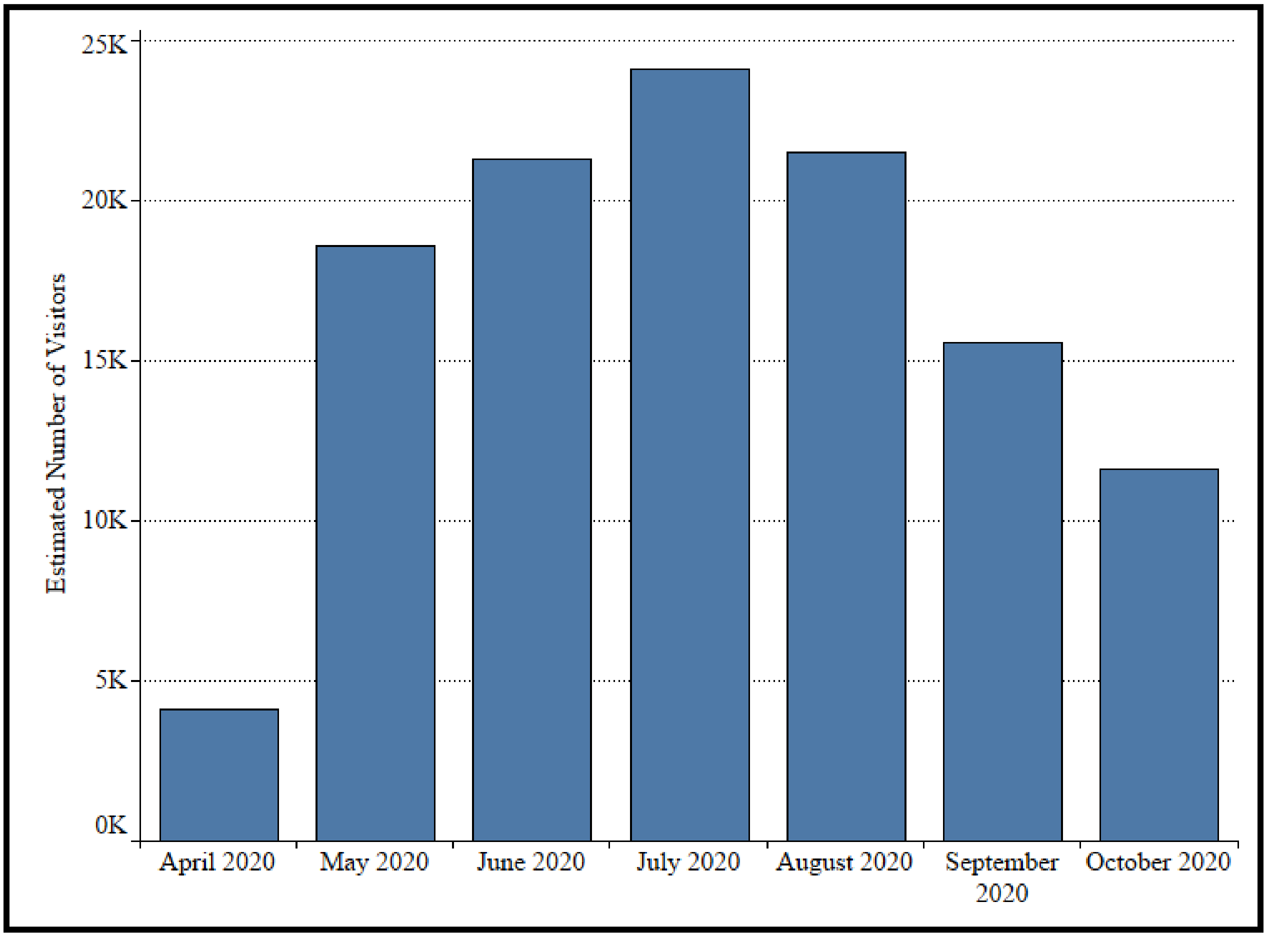
Source: Appendix I of PacifiCorp 2021a

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



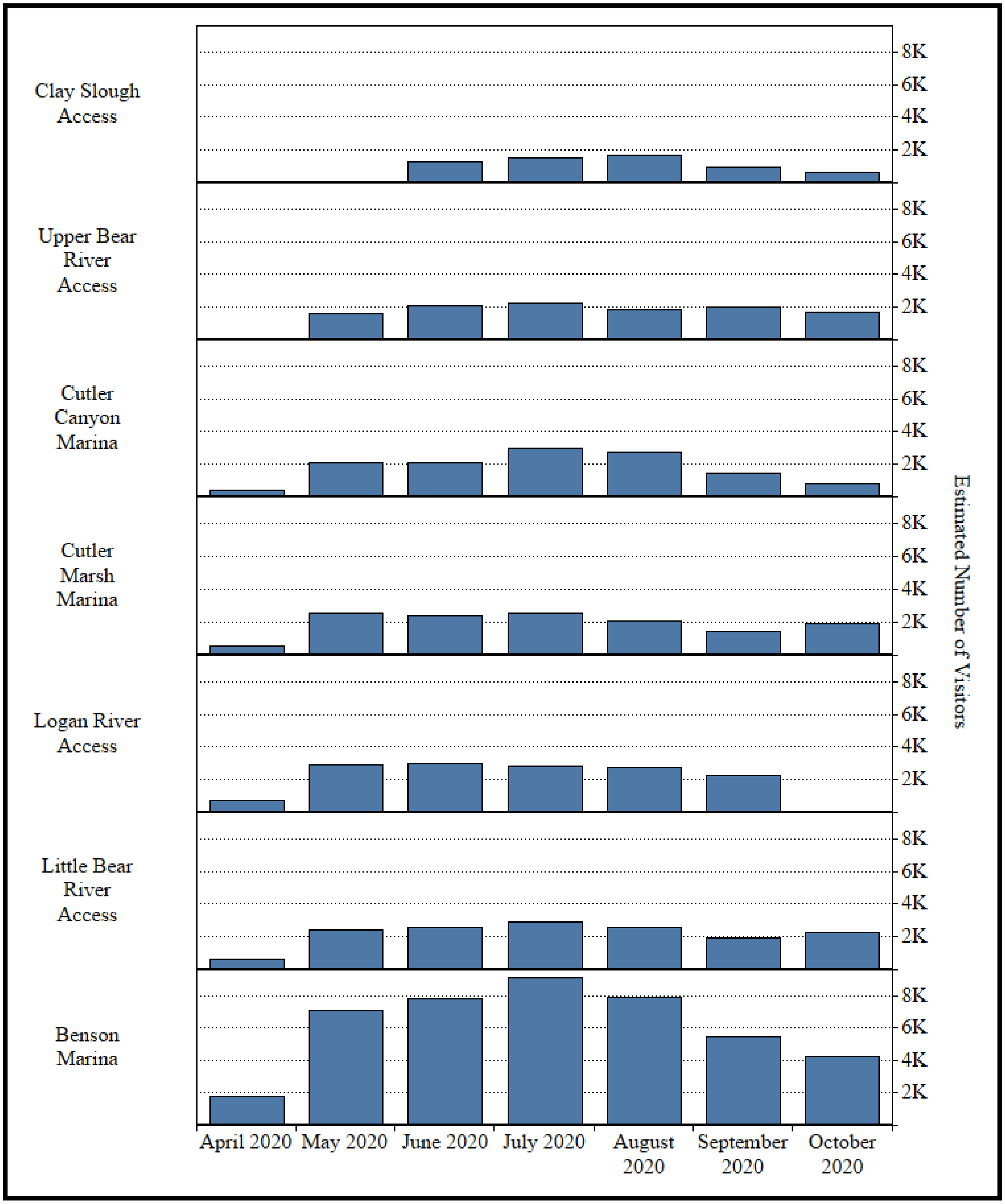
Source: Appendix I of PacifiCorp 2021a
K = thousand

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



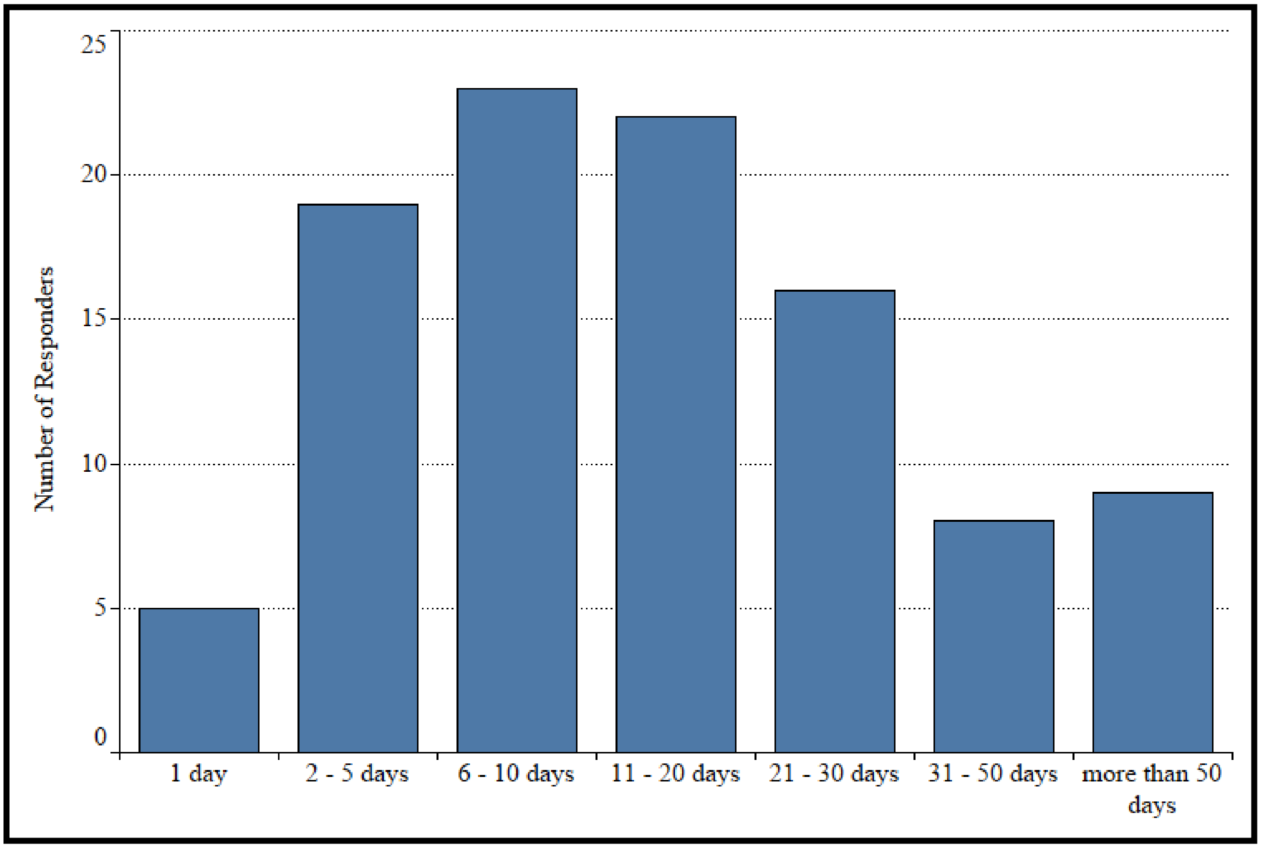
Source: Appendix I of PacifiCorp 2021a
K = thousand

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).

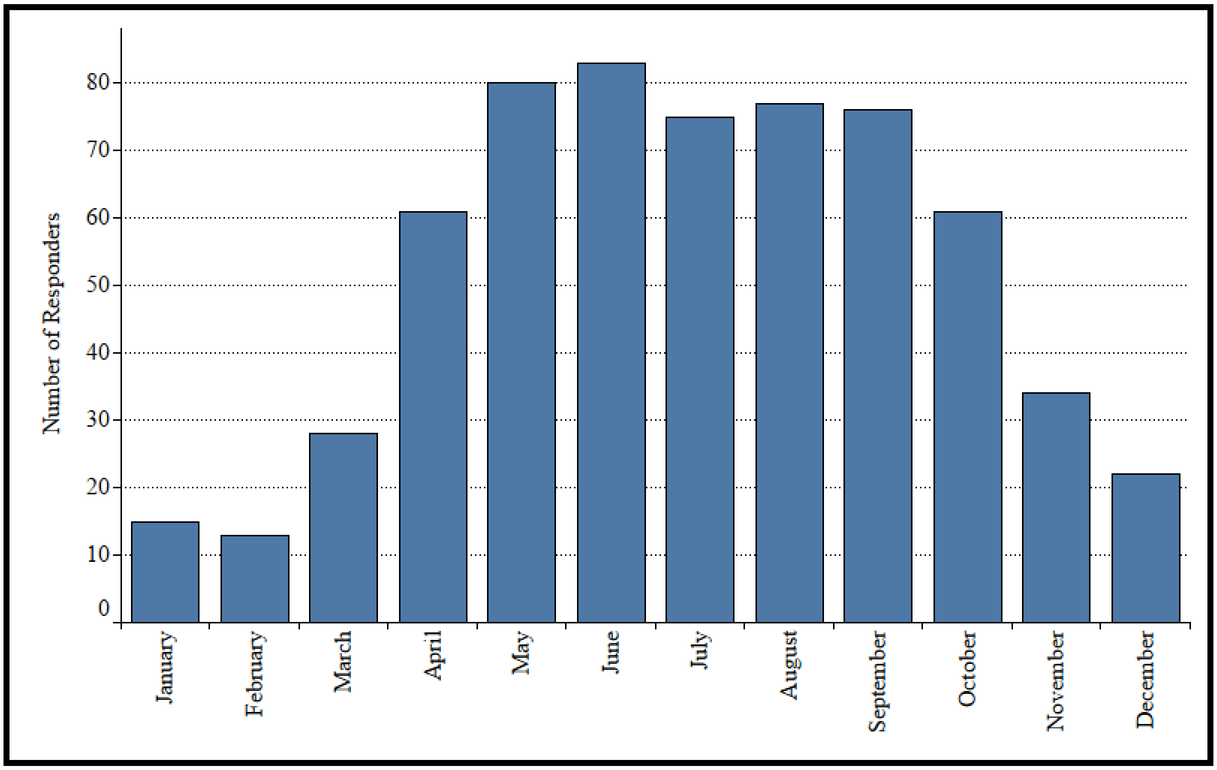
On average, respondents had been visiting the Project Area for 22 years, and most visited multiple times annually (Figure 3-32). Spring and summer were the most popular seasons to visit (Figure 3-33). Saturday was the most popular day to visit, with Friday and Thursday close behind in popularity (Figure 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.



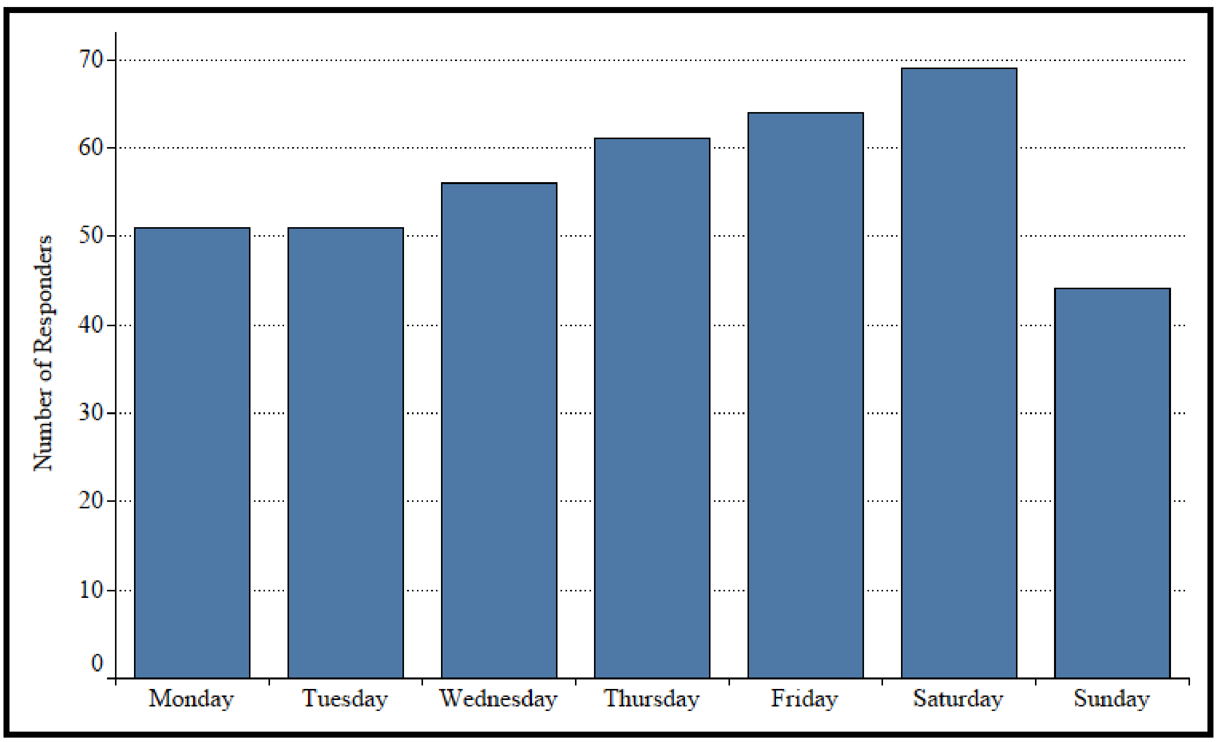
Source: Appendix I of PacifiCorp 2021a

FIGURE 3-32 ANNUAL NUMBER OF DAYS SPENT VISITING THE PROJECT, PER VISITOR SURVEY RESPONDENTS



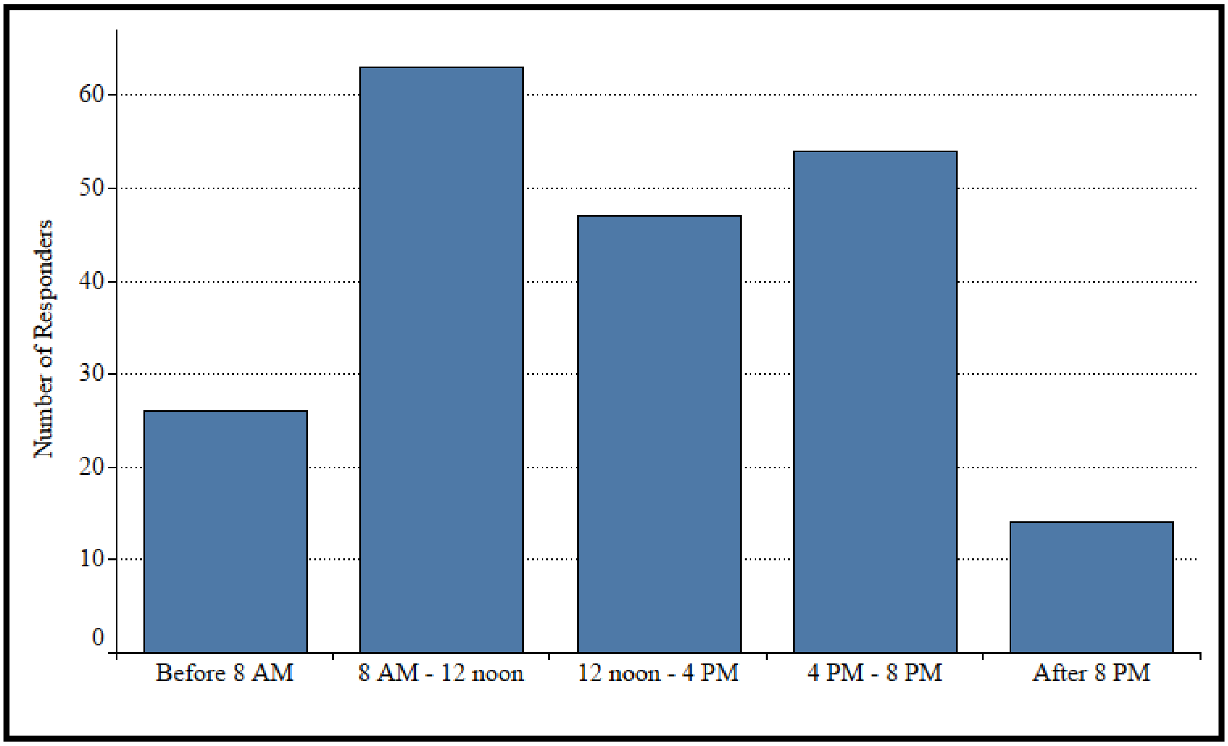
Source: Appendix I of PacifiCorp 2021a

FIGURE 3-33 PROJECT VISITATION BY MONTH, PER VISITOR SURVEY RESPONDENTS



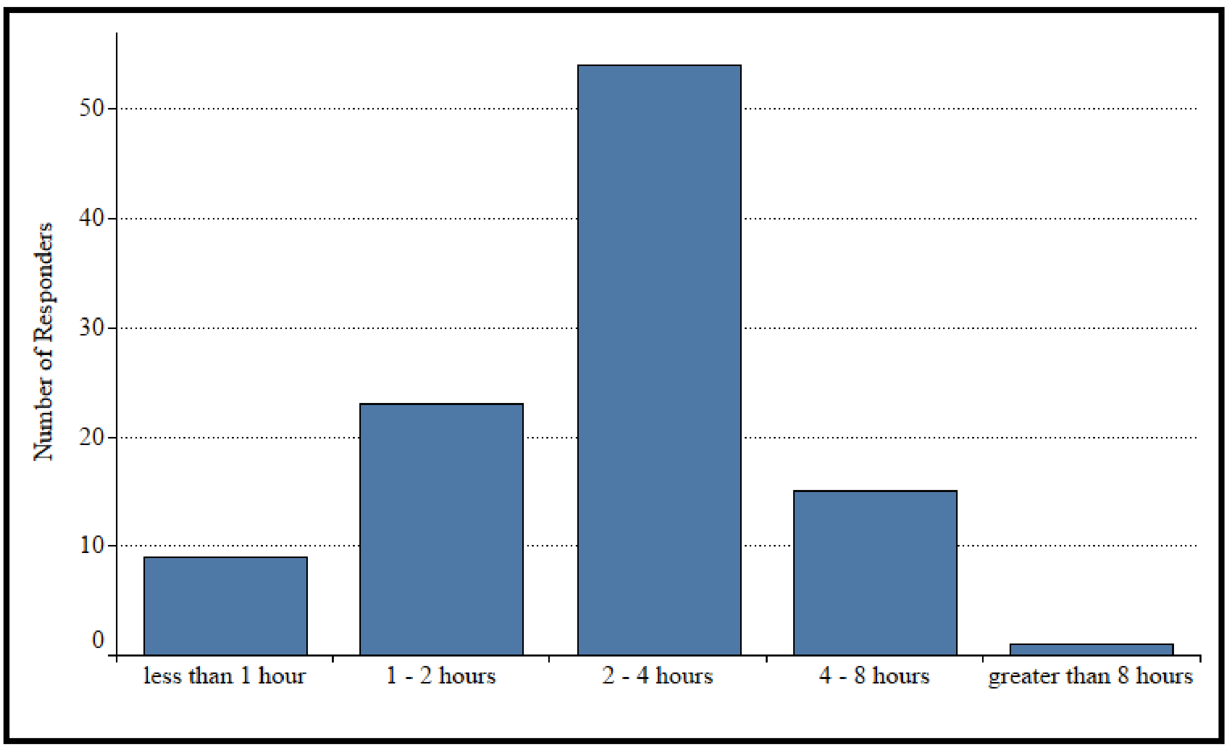
Source: Appendix I of PacifiCorp 2021a

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.

3.3.7.2 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 in Section 3.3.7.3. 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 suitable[21] 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,[22] requiring both waterfowl and hunters to temporarily shift to other locations in the reservoir.

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). 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

[21] Noting 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.

[22] 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.

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.

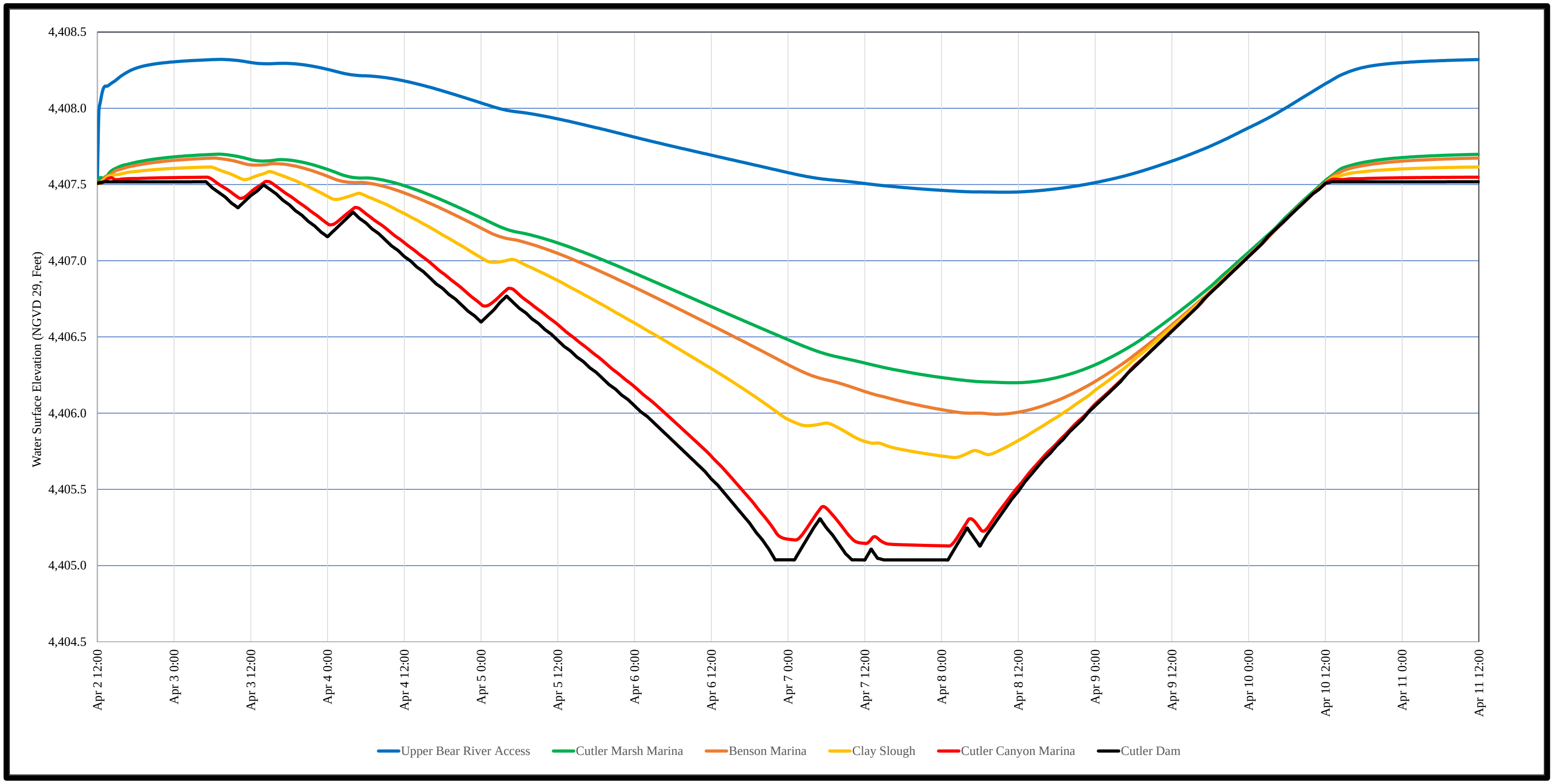
Both the Recreation ISR (Appendix I of PacifiCorp 2021a) and the USR (PacifiCorp 2021b) includes comparative photographs showing the differences between normal and extended operating range water levels at the Cutler Canyon Marina. WSEs at the recreation sites on Cutler Reservoir do not respond uniformly 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

3.3.7.3 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 2.0 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 (RMP). (The following measures were required to be included in the 1995 RMP.
    - Recreation Plan (pages 5-28 to 5-36 of 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. Powerboat use discouraged by signage. 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, files a 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 RMP. Aspects to be included in the new 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.

Management Plans

A new RMP would be developed that incorporates many of the measures in the current RMP. This new RMP would be developed after the Project is granted an approved license. The new RMP would be expected to include the following sub-components relevant to recreation:

- The Recreation Management Plan portion of the overall Cutler RMP would be developed/revised. Monitoring and maintenance of recreation sites would continue.
- Shoreline Management Plan: Develop and implement a Shoreline Management Plan to codify and clarify approved recreation and other uses of PacifiCorp land within the Project Boundary by third parties. The plan would address items such as permanent structures (e.g., hunting blinds and private docks) and other shoreline land uses.

Standalone Measures

- Evaluate and improve accessibility where feasible (e.g., improvements identified by the National Park Service [NPS 2019]) at several recreation sites.
- Extend boat ramps at both Cutler Canyon and Benson marinas to improve trailered boat access at both sites.
- Complete additional maintenance needs for Benson Marina (picnic shelter, sidewalks, docks, assess other needs).
- Make carry-in boat launch access improvements at Little Bear River and Logan River access sites (add handrails to improve boat entry, assess other needs).
- Recreation sites with temporary restroom facilities will be assessed for potential upgrades to permanent vault toilet facilities. Sites must be the appropriate size and have correct conditions for vault toilet construction. Temporary restrooms would be retained at the sites where upgrades are determined to not be feasible.

- Create an online map or map series for PacifiCorp's website that indicates PacifiCorp property boundaries, trails, and access restrictions for hunting, trapping, and other recreation users.
- The hard copies and digital versions of the wetland maze map will be revised.
- Consult with Utah State Parks regarding potential additional measures for improving public and boater safety.

3.3.7.4 Unavoidable Adverse Impacts

No unavoidable or 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. Waterfowl, and therefore 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.

3.3.8 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.

3.3.8.1 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, the applicant should consult with FERC, the Advisory Council, the SHPO, Native American tribes, appropriate land-management agencies, and any other consulting party that may be involved with the licensing process. 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 (FERC 2002a).

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 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.

3.3.8.2 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, which is effectively the same as the APE / Project Boundary, encompassed approximately 9,171 acres. 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 9,171-acre 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 proposed HPMP) 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
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.

3.3.8.3 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.

3.3.8.4 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 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 focuses 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 RMP that would incorporate and improve upon the management, monitoring, and best practices contained in the current RMP. This new RMP is proposed to be developed after the Project is granted an approved license.

NEW PROPOSED MEASURES

A summary of new proposed PM&E measures is presented in Section 2.2.3, Proposed Environmental Measures. 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. These updated procedures would be included in an HPMP to be developed for the new license. The HPMP would include 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 current Renewable Resources protocols and training, the HPMP would formalize and include 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.

3.3.8.5 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.

3.3.9 LAND USE AND MANAGEMENT

This section addresses land use and land management within the Project Vicinity, including land ownership, land use/land cover, and agricultural infrastructure (irrigation withdrawal, fencing, and agricultural leases). Shoreline and streambank 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 3.3.7.

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.	• Exhibit E Section 3.3.9, Land Use • *Land Use Initial Study Report* (Appendix D of PacifiCorp 2021a) • *Land Use Updated Study Report* (Appendix C of PacifiCorp 2021b)	No

3.3.9.1 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.

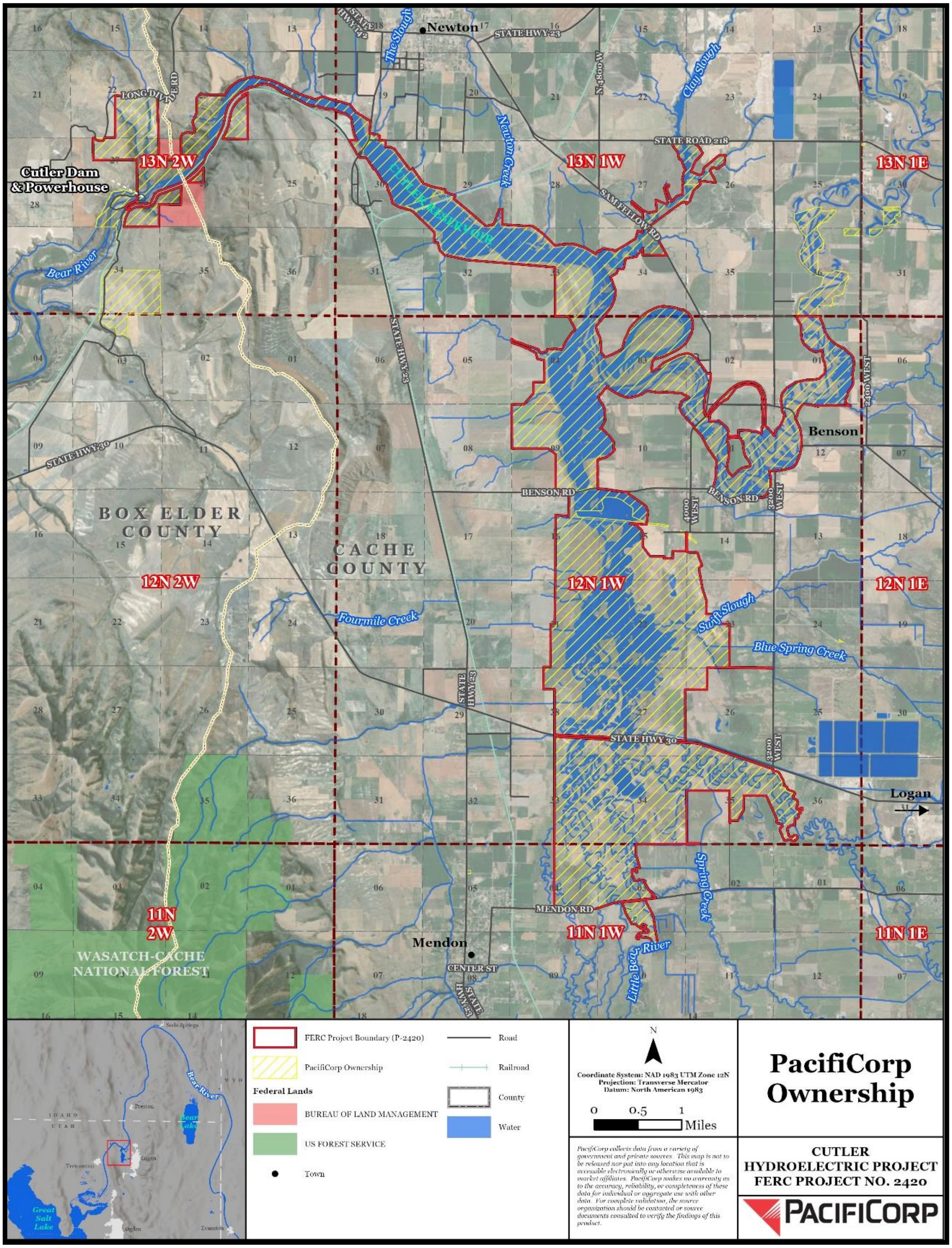
Although agriculture is the base economy of Cache Valley, there are numerous manufacturing industries including printing, dairies, lumber mills, farm equipment manufacturers, exercise equipment manufacturers, canneries, and meat packing operations. Utah State University in Logan is the county's major 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 PacifiCorp[23] (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 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. As stated in the FERC Order, the total Project Boundary includes 9,151 acres of Project lands.

[23] 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.



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 Area[24] 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.

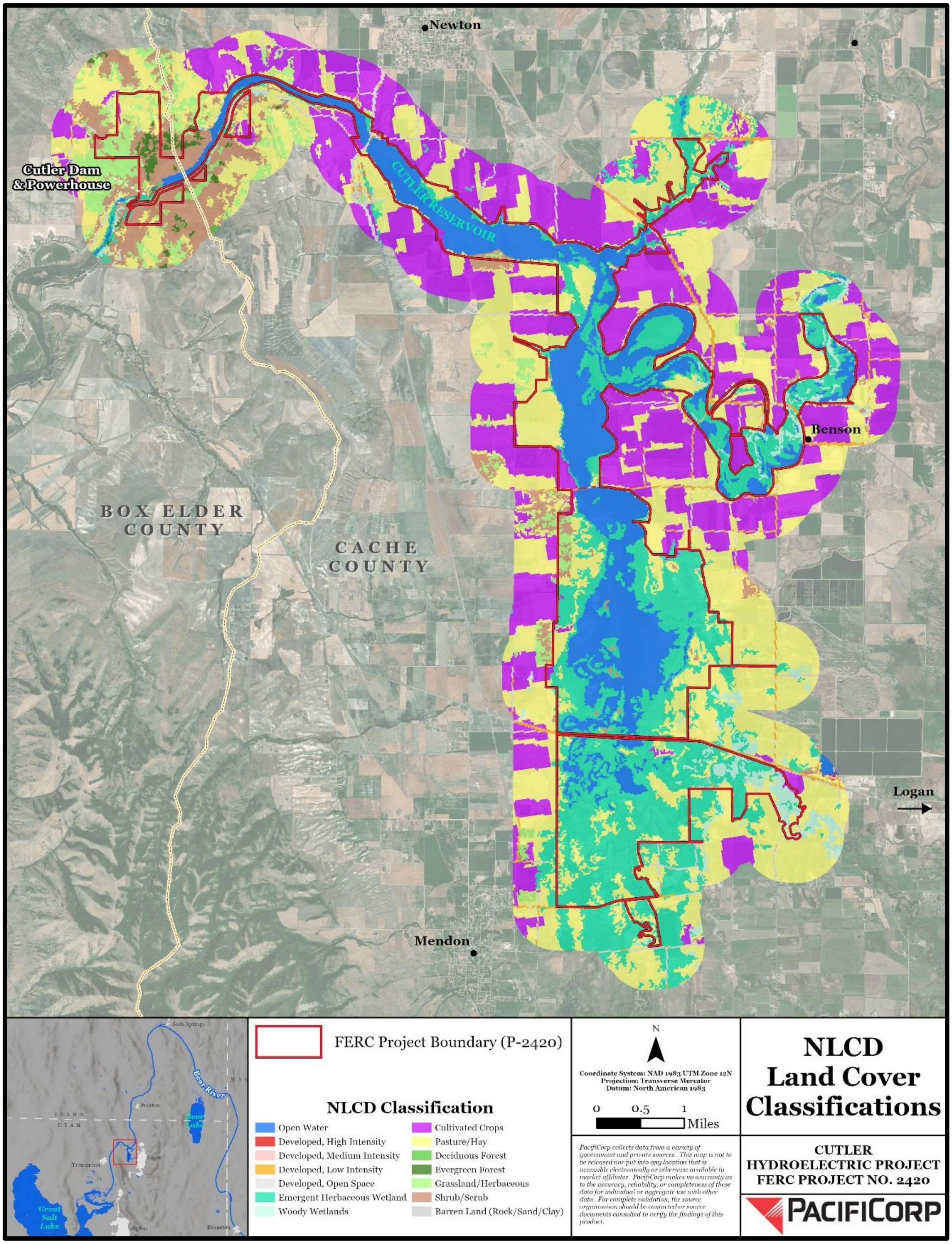
Within the Project Boundary, predominant land cover is the reservoir (32 percent) and associated wetlands (42 percent) (primarily emergent herbaceous wetlands); upland classifications are dominated by pasture/hay (16 percent) and shrub/scrub (4 percent) (MRLC 2011). Within the Project Area, predominant 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.

[24] The Project Area is defined in this DLA 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).

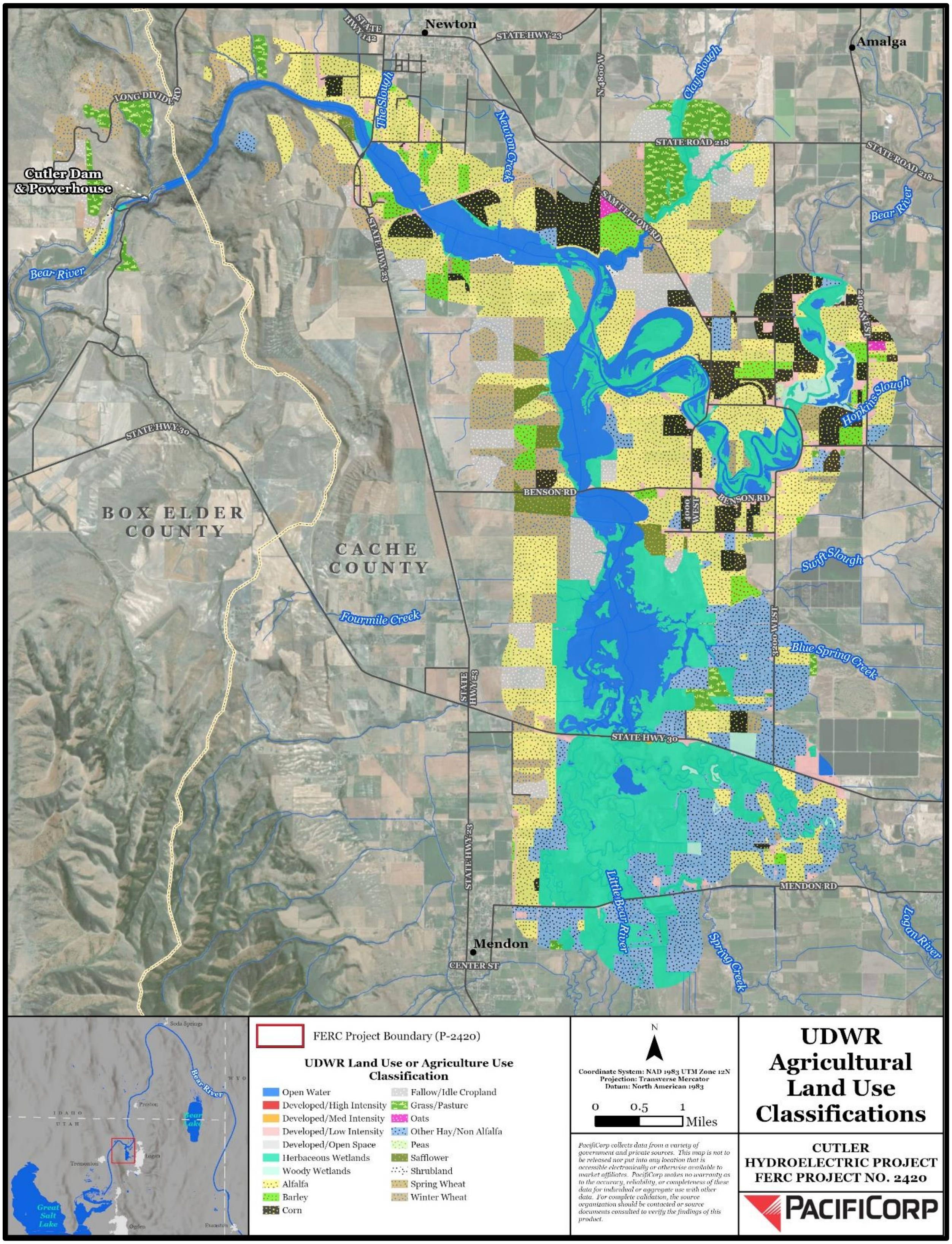
The Utah Division of Water Resources at the Department of Natural Resources annually publishes agricultural land use data for the state of Utah (Utah Division of Water Resources 2017). Excluding lands designated as herbaceous and woody wetlands, which are often used as grazing areas, the data estimate 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

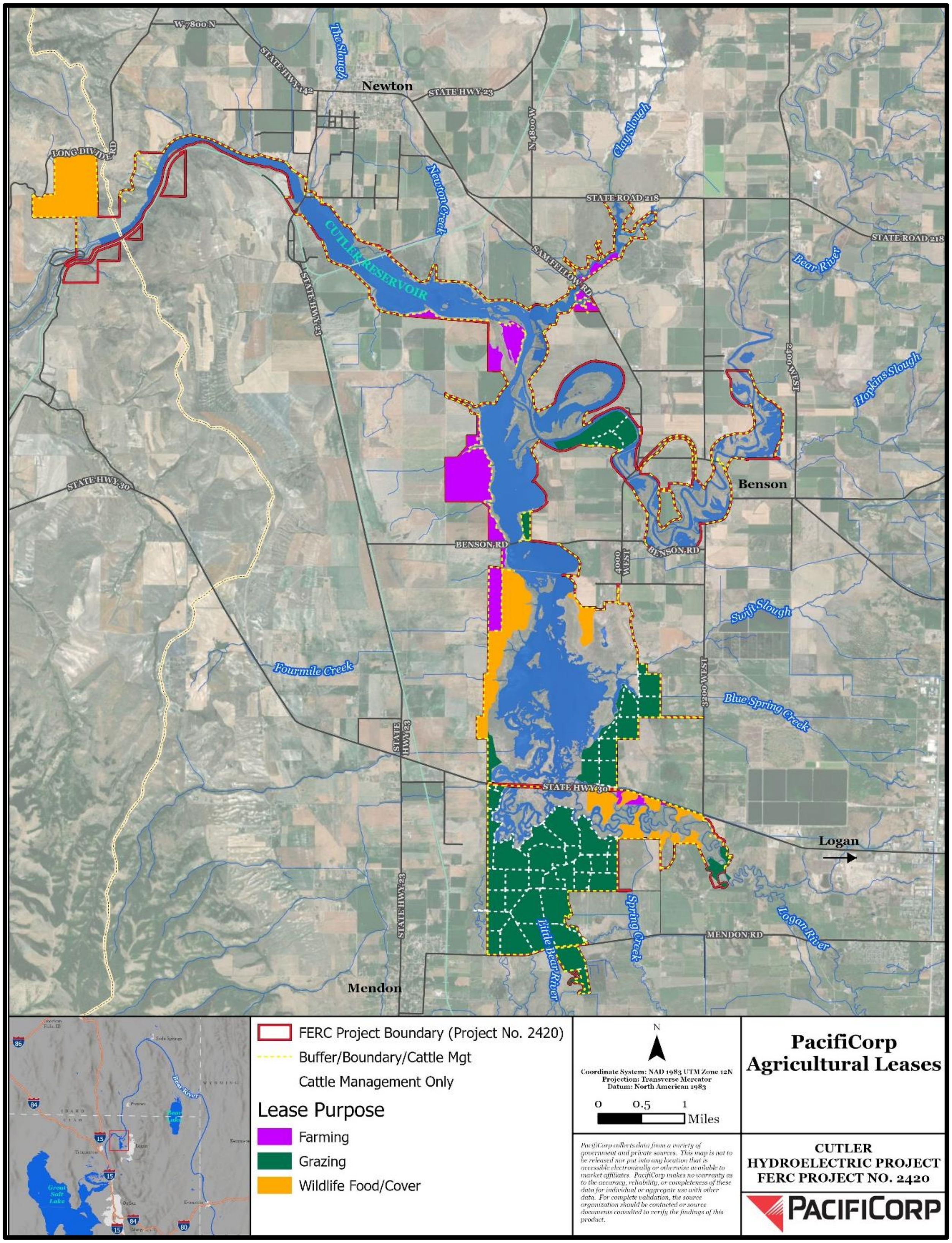
AGRICULTURAL LEASE PROGRAM AND AGRICULTURAL INFRASTRUCTURE

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 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 Project RMP Agricultural Lease Program currently consists of 1,733 acres of Project lands available for use as grazing pastures and approximately 445 acres of Project lands available for farming (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.



Source: PacifiCorp 2018a as cited in PacifiCorp 2019

FIGURE 3-41 PROJECT SHORELINE BUFFERS AND AGRICULTURAL LEASES

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).

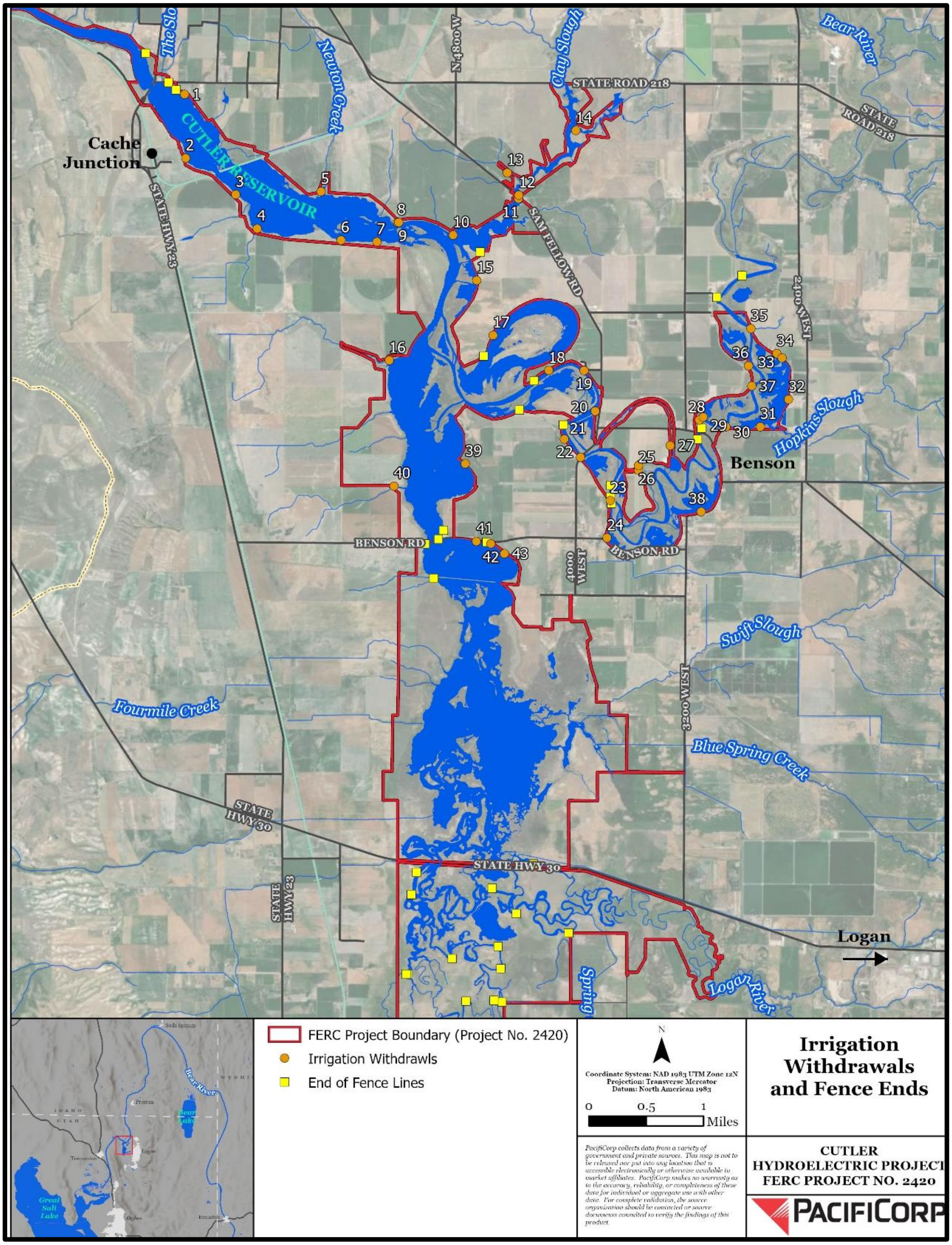


FIGURE 3-42 IRRIGATION WITHDRAWALS AND FENCE ENDS DOCUMENTED DURING THE 2020 LAND USE INITIAL STUDY REPORT

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 criteria 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 RMP[25] (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)

[25] Under the new license, the RMP is proposed to evolve into an updated and more comprehensive resource management program composed of several individual 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 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 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.

3.3.9.2 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 effects of proposed changes to Project operation and maintenance on agricultural land uses, water withdrawals, and wastewater treatment facilities. PM&E measures are summarized in Section 2.2.3 and measures relevant to land use are presented in Section 3.3.9.3.

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 shoreline 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).

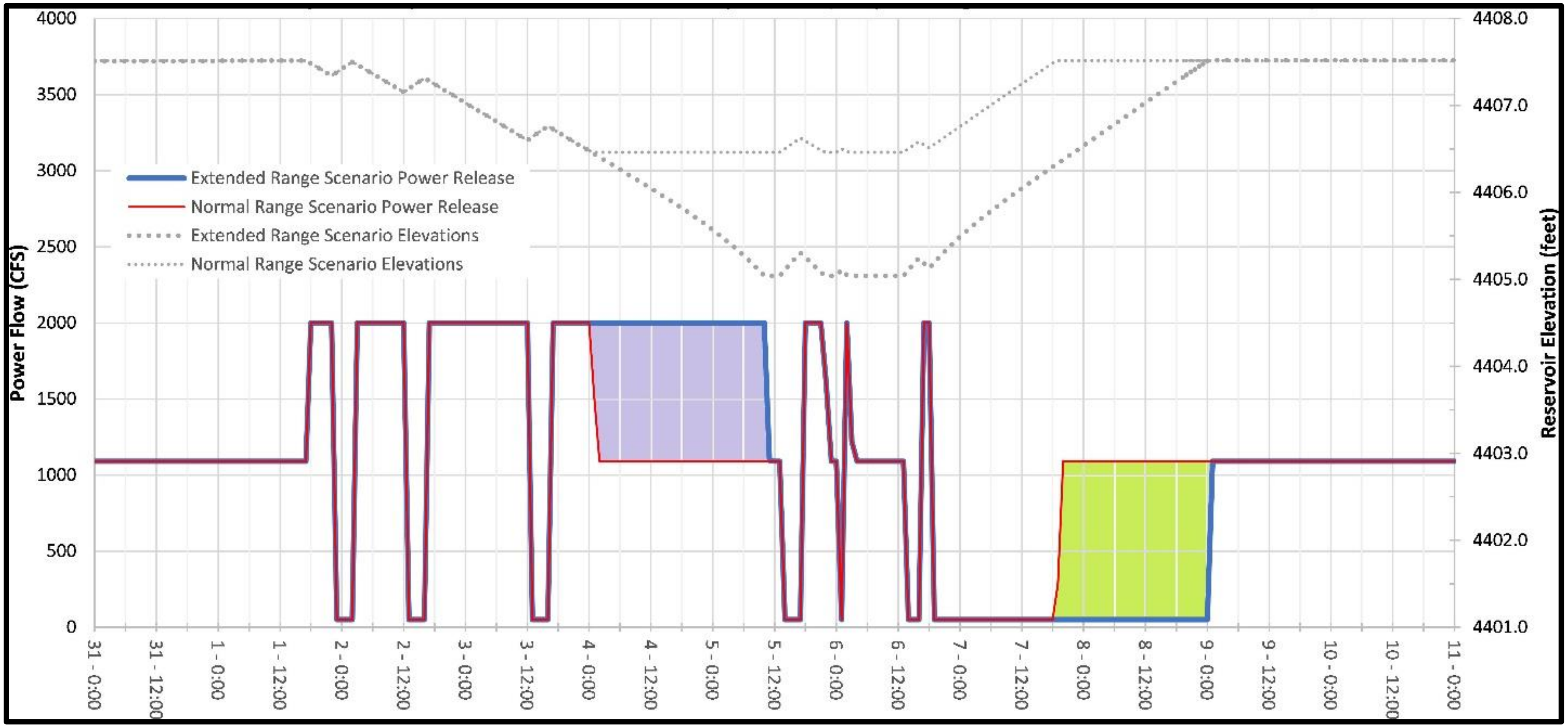


FIGURE 3-43 POWER RELEASE DIFFERENCES BETWEEN NORMAL AND PROPOSED EXTENDED OPERATIONS

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.

3.3.9.3 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 2.0 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 RMP that would incorporate and improve upon the management, monitoring, and best practices contained in the current RMP. This new RMP would be developed after the Project is granted an approved license.

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.

- Assess fence endpoints for effectiveness (including fence purpose and seasonal need for grazing or other exclusion); 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, per the determination.
- Assess existing fences for functionality; replace external (boundary) fences and internal (buffer/grazing management) fences to preserve their function as necessary.
- Continue to monitor fences for effectiveness and functionality over the new license term.
- Continue to monitor previously stabilized banks for erosion and assess stabilized banks for function and effectiveness.
- Maintain stabilized bank segments over the new license period.
- 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.

New Management Plans

PacifiCorp proposes developing and/or updating as necessary new Project management plans for the following resources relevant to land use: grazing management, shoreline management, sediment and erosion control, and weed management. These resource management plans would be part of the overall Cutler Resource Management Program and would guide Project operations to minimize impacts to land use and associated features, such as agricultural infrastructure and shoreline erosion.

3.3.9.4 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.

3.3.10 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 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.	• *Land Use Initial Study Report* (Appendix D of PacifiCorp 2021a) • Exhibit E Section 3.3.10, Aesthetics	No

3.3.10.1 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 Project Resource Management Plan (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 Project 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 3.3.8, 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 3.3.9.1, 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

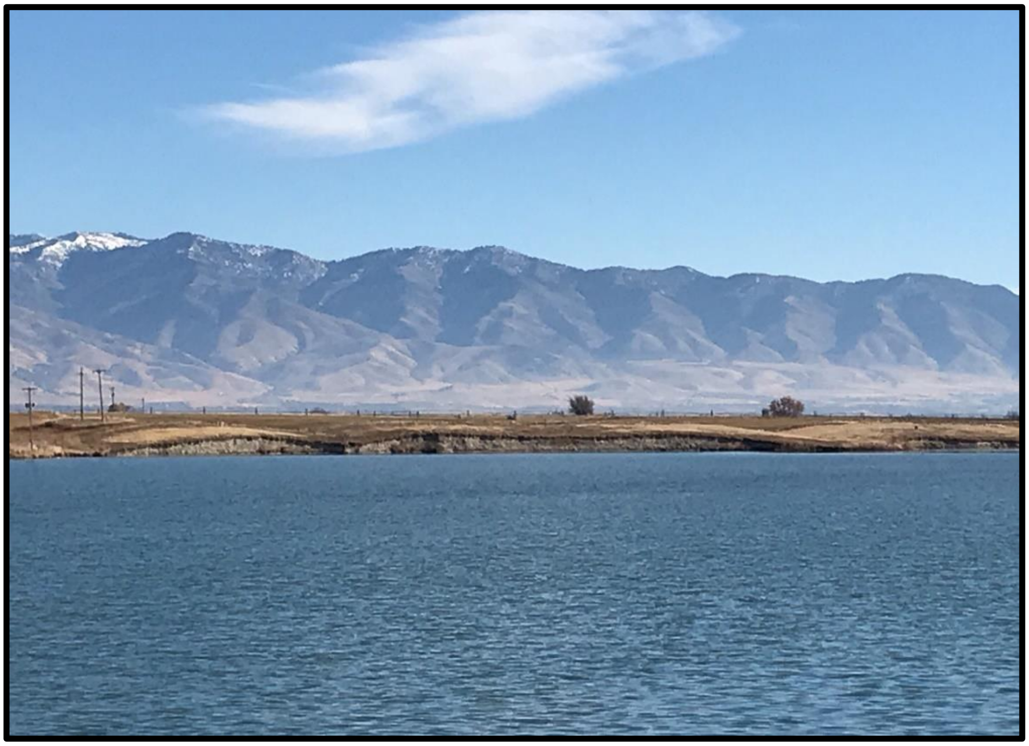


PHOTO 3-18 CUTLER RESERVOIR JUST SOUTH OF CUTLER CANYON MARINA IN THE RESERVOIR MANAGEMENT UNIT, LOOKING SOUTHEAST AT WASATCH MOUNTAINS

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 PacifiCorp's 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 PacifiCorp's 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, 2018, 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 Class[26] with the Scenic Integrity[27] 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

3.3.10.2 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 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.

[26] 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.
[27] 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 ISR[28] (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

[28] 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 effect 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

The shallow and low-gradient bathymetry in areas of Cutler Reservoir have the potential to result in large horizontal changes. Large changes in shoreline wetted perimeter could expose 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). During the proposed normal operations (which cover the same 1-foot range as existing operations), the change in open water could be up to 10.9 percent different than the upper WSE at 4,407.5 feet; during the proposed extended operations, this potential change in open water would be up to 21 percent different. However, 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 photo series was included in Appendix A of the USR (PacifiCorp 2021b), and several were also included in the meeting summary document for the *Updated Study Report and Draft License Application PM&E Measures Workshop* held on August 31, 2021 (PacifiCorp 2021e).

Further, the hydraulic model 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 AMOUNT OF OPEN WATER AND EXPOSED RESERVOIR BED UNDER THE CURRENT AND PROPOSED EXTENDED OPERATIONS

MANAGEMENT UNIT	OPEN WATER AT WSE 4,407.5 (ACRES)	PROPOSED NORMAL OPERATIONS		PROPOSED EXTENDED OPERATIONS	
		OPEN WATER AT WSE 4,406.5 (ACRES)	CHANGE IN OPEN WATER [a] (PERCENT)	OPEN WATER AT WSE 4,405.0 (ACRES)	CHANGE IN OPEN WATER [a] (PERCENT)
Cutler Canyon	183	180	1%	171	6%
Reservoir	1,185	1,060	11%	902	24%
Bear River	430	381	12%	363	16%
South Marsh	99	82	17%	70	29%
North Marsh	994	872	12%	777	22%
Totals	2,891	2,575	11%	2,283	21%

Source: These data were source from the hydraulic modeling discussed in Appendix G of PacifiCorp 2021a
WSE = Water Surface Elevation
[a] Change in open water is the percent difference of open water compared to the upper WSE of 4,407.5. Percent totals may be greater or less than 100 percent due to rounding.

However, the generally flat topography surrounding most of the reservoir results in low-angle visual perspectives from most viewpoints (and as noted above, even the drone-created aerial photo series failed to show any significant 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 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 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 would result in an increase in the extent and visibility of vertical banks exposed in the Cutler Canyon Management Unit during the winter period. The changes to exposed vertical 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 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).

3.3.10.3 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 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 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.

3.3.10.4 UNAVOIDABLE ADVERSE IMPACTS

As discussed in the Land Use ISR (Appendix D of PacifiCorp 2021a), changes in WSE could have minimal short-term changes on scenic quality due to PacifiCorp's proposed extended range of operations during the winter period. The exposure of vertical shoreline could occur in the proposed extended range of operations. However, these changes would not be substantial enough to change the Scenic Integrity ratings from the existing conditions' ratings. Recreationists at the reservoir level may notice more exposed banks, and recreationists or motorists at higher elevation highway viewpoints may also notice more exposed banks, but these changes would not affect the Scenic Integrity ratings.

3.3.11 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 3.3.7 and Section 3.3.9, respectively.

3.3.11.1 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 BOX ELDER CACHE

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 Hydro Resource 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.

3.3.11.2 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 Project 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 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 will be necessary over time, 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.

3.3.11.3 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 management plans that would incorporate and improve upon the management, monitoring, and best practices contained in the current 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.

3.3.11.4 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]	*To be included in Final License Application.*
Relicensing implementation capital cost, $ [c]	*To be included in Final License Application.*
Relicensing cost, $ [d]	*To be included in Final License Application.*
Routine Operation and Maintenance (O&M), $/year [e]	$, 1,952,039
New and non-routine O&M, $/year [f]	*To be included in Final License Application.*
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 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.
[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, dam safety, 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 COST, 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	*To be included in Final License Application.*
Average Annual generation off-peak (MWh) [a]	38,445	*To be included in Final License Application.*
Average Annual power value ($/MWh) (on-peak/off-peak)	$25.55/21.78	$25.55/21.78
Average Annual O&M cost ($) [a]	1,952,039	*To be included in Final License Application.*
Subtotal of Nominal Levelized Cost (based of annual O&M costs ($/MWh)	$22.41	*To be included in Final License Application.*
Annual net benefit (or cost) ($)	$2,088,111	*To be included in Final License Application.*

MW = megawatt; MWh = megawatt-hour
[a] Annual averages over the most recent 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, currently valued at approximately $23.90/MWh when averaged between on-peak and off-peak generation. The average annual O&M Project cost is currently valued at approximately $1,952,039 (2016 to 2020). For the Proposed Action, an estimate of the average annual O&M Project cost will be included in the FLA. Similarly, an estimate of the annual levelized Project cost will be included in the FLA.

The FLA will also include a levelized annual net benefit (or cost) statement. 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

[This section is a placeholder that will be populated as part of the FLA, after environmental measures are finalized based on any additional stakeholder input received on environmental measures presented in the DLA.]

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 COST OF PM&E MEASURES CONSIDERED IN ASSESSING THE ENVIRONMENTAL EFFECTS OF CONTINUING TO OPERATE THE CUTLER HYDROELECTRIC PROJECT

<table>
<tr><th>PM&E MEASURE ID</th><th>MEASURE NAME</th><th>CAPITAL COST</th><th>OPERATION AND MAINTENANCE COST</th></tr>
<tr><td>GEO-1</td><td>Maintain shoreline buffers</td><td>$</td><td rowspan="10">To be included in Final License Application.</td></tr>
<tr><td>GEO-2</td><td>Bank stabilization projects</td><td>$</td></tr>
<tr><td>GEO-3</td><td>Monitor bank stabilizations measures</td><td>$</td></tr>
<tr><td>WR-1</td><td>Reservoir elevation and river flow monitoring</td><td>$</td></tr>
<tr><td>WR-2</td><td>Communicate with USFWS regarding water flows and timing downstream of Project</td><td>$</td></tr>
<tr><td>WR-3</td><td>Water quality monitoring</td><td>$</td></tr>
<tr><td>WR-4</td><td>Watershed improvement projects</td><td>$</td></tr>
<tr><td>BOT-1</td><td>Weed management and monitoring</td><td>$</td></tr>
<tr><td>BOT-2</td><td>Monitor shoreline buffer vegetation</td><td>$</td></tr>
<tr><td>WILD-1</td><td>Discuss potential for cooperative long-term avian monitoring</td><td>$</td></tr>
</table>

PM&E Measure ID	Measure Name	Capital Cost	Operation and Maintenance Cost
WILD-2	Maintain wildlife habitat improvements	$	*To be included in Final License Application.*
SS-1	Special status species management	$	
TE-1	Maintain Ute ladies'-tresses habitat; monitor the existing Ute ladies'-tresses population	$	
REC-1	Recreation site facility operations, maintenance, and monitoring	$	
REC-2	Minor recreation site improvements	$	
REC-3	Extend Cutler Canyon Marina and Benson Marina boat ramps	$	
REC-4	Maintenance needs for Benson Marina	$	
REC-5	Evaluate and improve accessibility	$	
REC-6	Carry-in boat launch access improvements at Little Bear River and Logan River access sites	$	
REC-7	Provide digital trail and property boundary maps on PacifiCorp's website revise hard copy and digital versions of wetland maze map	$	
REC-8	Review/update signage at recreation access sites	$	
REC-9	New Shoreline Management Plan	$	
REC-10	Improve public and boater safety	$	
CUL-1	Develop HPMP	$	
CUL-2	Add tribal/cultural history section to PacifiCorp Cutler Project website	$	
LU-1	Grazing management and agricultural lease programs	$	
LU-2	Monitor fences	$	
LU-3	Extend fence ends where needed	$	
LU-4	Assess fences; replace external (boundary) fences and internal (buffer/grazing management) fences as needed	$	
LU-5	Coordinate with BLM to possibly construct a single fence around PacifiCorp and BLM parcels near Cutler Dam	$	

PM&E Measure ID	Measure Name	Capital Cost	Operation and Maintenance Cost
LU-6	Evaluate irrigation pump intakes; extend where needed	$	*To be included in Final License Application.*
TOTALS		**$**	

Notes: PM&E measures are presented in Table 2-4
BLM = Bureau of Land Management; FLA = Final License Application; HPMP= Historic Properties Management Plan; OCMP= Operations Compliance 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, or would not, 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 RMPs listed below may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions.

- Bureau of Land Management. 2015. *Record of Decision and Approved Resource Management Plan for the Great Basin Region, Including the Greater Sage-Grouse Sub-*

Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. Washington, D.C. September 2015.

- U.S Forest Service. 2003. *Wasatch-Cache National Forest land and resource management plan*. Department of Agriculture, Salt Lake City, Utah. March 2003.
- U.S. Forest Service. 2003. *Uinta National Forest land and resource management plan*. Department of Agriculture, Provo, Utah. May 2003.
- U.S. Fish and Wildlife Service. 1986. *Whooping Crane Recovery Plan*. Department of the Interior, Albuquerque, New Mexico. December 23, 1986.
- U.S. Fish and Wildlife Service, Canadian Wildlife Service. 1986. *North American waterfowl management plan*. Department of the Interior. Environment Canada. May 1986.
- Utah Department of Natural Resources. 2017. *Final Bear River Comprehensive Management Plan*. October 2017.[29]
- Utah Department of Natural Resources. 2000. *Range-wide Conservation Agreement Strategy for Bonneville Cutthroat Trout* (Oncorhynchus clarki utah). Publication Number 00-19. December 2000.
- Utah Division of Wildlife Resources. 2016. Three Species Monitoring Statewide Summary. Roundtrail Chub (Gila robusta), Bluehead Sucker (Catostomus discobolus), Flannelmouth Sucker (Catostomus latipinnis). Publication Number 17-21.

[29] 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.

6.0 LITERATURE CITED

Allred, M. 2021. Email from Mike Allred (UDWQ) to Frank Shrier (SWCA). May 12, 2021.

American Trails. 2018. *National Recreation Trails Database*. Accessed: December 19, 2018. Retrieved from: http://www.nrtdatabase.org.

Armstrong, Trip. 2021. Director, BLM/USU National Aquatic Monitoring Center. Email to Frank Shrier, SWCA Environmental Consultants. July 16, 2021.

Audubon Society. No Date_a. *Important Bird Areas: Cutler Reservoir and Marsh UT08*. Accessed: June 11, 2021. Retrieved from: https://www.audubon.org/important-bird-areas/cutler-reservoir-and-marsh-ut08.

Audubon Society. No Date_b. *Wellsville Mountain Raptor Migration UT09*. Accessed: September 23, 2021. Retrieved from: https://www.audubon.org/important-bird-areas/wellsville-mountain-raptor-migration-ut09.

Baldwin, Connely. 2021. Email from Connely Baldwin (PacifiCorp) to Frank Shrier (SWCA). April 2, 2021.

Baldwin, Connely. 2021. Email and phone communication with Eric Duffin, Project Manager, Cirrus Ecological Solutions. May 2021.

Box Elder County. 1998. *Box Elder County General Plan*. Accessed: December 20, 2018. Retrieved from: http://media.rainpos.com/65/bec_general_plan.pdf.

Bridgerland Audubon Society (BAS). 2018. *Cutler Reservoir & Marsh Important Bird Area*. Accessed: February 18, 2021. Retrieved from: https://bridgerlandaudubon.org/our-projects/cutler-reservoir-marsh-important-bird-area/.

Budy, P., M. Baker, and S.K. Dahle. 2011. *Predicting Fish Growth Potential and Identifying Water Quality Constraints: A Spatially-Explicit Bioenergetics Approach. Environmental Management 48:691*. Accessed June 1, 2021. Available at: https://doi.org/10.1007/s00267-011-9717-1.

Budy, P., K. Dahle, and G. Thiede. 2006. *An evaluation of the fish community of Cutler Reservoir and the Bear River above the reservoir with consideration of the potential for future fisheries enhancement.* 2005 Annual Report to the Utah Department of Environmental Quality, Division of Water Quality. USGS Utah Cooperative Fish and Wildlife Research Unit, Department of Aquatic, Watershed, and Earth Resources, Utah State University, Logan, Utah.

Bureau of Reclamation (Reclamation). 2004. *Hyrum Reservoir Resource Management Plan*. U.S. Department of the Interior, Bureau of Reclamation. Accessed: December 19, 2018. Retrieved from: https://stateparks.utah.gov/stateparks/wp-content/uploads/sites/26/2015/03/2004_HLSP_RMP.pdf.

Cache County. 1998. *Cache County General Plan*. Accessed: December 20, 2018. Retrieved from: https://www.cachecounty.org/assets/department/zoning/generalplan/COMPLETE_CacheCountyCompPlan_1998.pdf.

Camporeale C., E. Perucca, L. Ridolfi, and A. Gurnell. 2013. *Modeling the Interactions Between River Morphodynamics and Riparian Vegetation*. Review of Geophysics, 51/2013.

Carmignani, J.R. 2020. Investigating the effects of winter drawdowns on the ecological character of littoral zones in Massachusetts lakes. Ph.D. dissertation. University of Massachusetts, Amherst.

Carmignani, J.R., and A.H. Roy. 2017. "Ecological effects of winter water level drawdowns on lake littoral zones: a review." *Aquatic Sciences* 79:803–824.

Clyde, Calvin G. 1953. *Sediment Movement in Bear River, Utah.* Thesis submitted for Degree of Civil Engineer, Graduate Division, University of California. Berkeley, California. June 1953.

Cornell University. 2008. *Birds of North America Online*. Accessed June 2, 2021. Available at: https://www.birds.cornell.edu/home/.

Cott, P.A., K. Sibley, W. Murray Somers, M.R. Lilly, and A.M. Gordon. 2008. "A review of water level fluctuations on aquatic biota with an emphasis on fishes in ice-covered lakes." *Journal of the American water Resources Association*. 44(2):343–359.

DataUSA. 2018. *Logan, UT*. Accessed: November 21, 2018. Retrieved from: https://datausa.io/profile/geo/logan-ut/.

_____. 2019. *Logan, UT.* Accessed: 3 May 2021. Retrieved from: https://datausa.io/profile/geo/logan-ut.

Davies, Eve. 2021a. Personal communication with Utah State University contact.

Davies, Eve. 2021b. Personal communication with Bridgerland Audubon Society contact.

Davis, Richard C. 1983. Forest History. *Encyclopedia of American Forest and Conservation History.* New York. McMillian Publishing Company for the Forest History Society. Vol. II, p. 743-788. Accessed: December 19, 2018. Retrieved from: https://foresthistory.org/wp-content/uploads/2017/01/National-Forests-of-the-U.S.pdf.

Dees, T. 2007. *Effects of wastewater treatment plant discharge on benthic invertebrate communities in Cutler Reservoir.* In: Comparison of Chemical and Biological Characteristics in Cutler Reservoir (Utah) near the Inflows of the Logan River and the Logan Waste Water Treatment Plant, edited by W.A. Wurtsbaugh and R. Lockwood. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University.

Degiorgio, J., P. McCarthy, M. S. Cross, G. Garfin, D. Gori, and J. Tuhy. 2010. *Bear River Climate Change Adaptation Workshop Summary.* May 26 and 27, 2010. Salt Lake City. Accessed: December 13, 2018. Retrieved from: https://www.researchgate.net/profile/Patrick_Mccarthy7/publication/233809533_Bear_River_Climate_Change_Adaptation_Workshop_Summary/data/0c96052b09ca97307b000000/Bear-River-Climate-Adaptation-Workshop-FINAL-Report-November-2010.pdf.

Duncan J., S. Wright, and T. Brandon. 2014. *Soil Strength and Slope Stability*. Second Edition. John Wiley and Sons, Inc., Hoboken, New Jersey.

Federal Energy Regulatory Commission (FERC). 1994. *Order Issuing New License to PacifiCorp Electric Operations, FERC Project No. 2420-001, Utah*. Issued April 29, 1994.

_____. 2002a. *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects.* May 20, 2002.

_____. 2002. *Order Modifying and Approving Project Operation Plan Per Article 401.* Issued April 30, 2002.

_____. 2008. *Preparing Environmental Documents, Guidelines for Applicants, Contractors, and Staff.* Office of Energy Projects, Division of Hydropower Licensing. September 2008.

_____. 2009. *April 3, 2009 Order Approving Revised Exhibit G Drawings*. 2009.

_____. 2018. *List of Comprehensive Plans.* Federal Energy Regulatory Commission Office of Energy Projects, Washington, DC, January 2018. Accessed: January 10, 2018. Retrieved from: https://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf.

_____. 2019a. *Scoping Document 1 for the Cutler Hydroelectric Project, P-2420-054*. May 28, 2019.

_____. 2019b. *Scoping Document 2 for the Cutler Hydroelectric Project, P-2420-054*. September 13, 2019.

_____. 2021a. *Determination on Requests for Study modifications and New Studies for the Cutler Hydroelectric Project.* Office of Energy Projects. Project No. 2420-054 – UT. June 11, 2021.

______. 2021b. *FERC e-Library*. Accessed: September 2021. Retrieved from: https://elibrary.ferc.gov/eLibrary/search

Ferrick, L. Gato, and S. Grant. 2005. *Soil Freeze-Thaw Effects on Bank Erosion and Stability: Connecticut River Field Site, Norwich, Vermont*. U.S. Army Corps of Engineers. Engineer Research and Development Center. Cold Regions Research and Engineering Laboratory. ERDC/CRREL TN-05-7.

Fertig, W., R. Black, and P. Wolken. 2005. *Rangewide Status Review of Ute Ladies'-Tresses* (Spiranthes diluvialis). Prepared for the U.S. Fish and Wildlife Service and Central Utah Water Conservancy District. September 30, 2005. Accessed: March 24, 2021. Retrieved from: https://efotg.sc.egov.usda.gov/references/public/WY/UtesRangewideStatusReview2005byFertig.pdf.

Gatto L. 1995. *Soil Freeze-Thaw Effects on Bank Erodibility and Stability.* U.S. Army Corps of Engineers. Cold Regions Research and Engineering Laboratory.

Great Salt Lake Marina (GSL Marina). 2021. *Great Salt Lake Marina.* Accessed: April 9, 2021. Retrieved from: https://www.gslmarina.com/.

HACH Support. 2020. *What is the difference between the turbidity units NTU, FNU, FTU, and FAU?* Accessed: June 2021. Retrieved from: https://support.hach.com/app/answers/answer_view/a_id/1000336/~/what-is-the-difference-between-the-turbidity-units-ntu%2C-fnu%2C-ftu%2C-and-fau%3F-what.

Hawkins, Chuck. 2021. *Watershed Sciences, Utah State University, Logan, Utah.* Email to Frank Shrier, SWCA Environmental Consultants. July 20, 2021.

Hayworth, J. 2000. *The response of wetland benthic macroinvertebrates to short-term drawdown.* Master's Non-thesis project. University of Florida, Gainesville, Florida.

Hopkins, Daniel J. 1997. *Merriam-Webster's Geographical Dictionary*. Third Edition. Springfield, MA: Merriam-Webster, Inc. Publishers. p.123.

Hovingh, P. 2004. "Intermountain freshwater mollusks, USA (Margaritifera, Anodonta, Conidea, Valvata, Ferrissia): geography, conservation, and fish management implications." *Monographs of the Western North American Naturalist* 2:109–135. Accessed May 24, 2021. Available at: https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?referer=http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjf4biXkazfAhXFMd8KHQZ4D-cQFjAAegQICBAC&url=http%3A%2F%2Fscholarsarchive.byu.edu%2Fcgi%2Fviewcontent.cgi%3Farticle%3D1010%26context%3Dmwnan&usg=AOvVaw0wB4W1t6CnuJPuKI-Fr8gs&httpsredir=1&article=1010&context=mwnan.

Jermalowicz-Jones, J. 2016. *Lake Level Drawdown Impacts on the Sediments, Benthos, Select Physical Properties, and Aquatic Vegetation of Maple and Ackley Lakes, Van Buren County, Michigan.* Spring Lake, Michigan: Restorative Lakes Sciences.

Kaster, J.L. 1976. *Benthic macroinvertebrates of the Big Eau Pleine, a fluctuating, central Wisconsin Reservoir.* Master's thesis. University of Wisconsin, Stevens Point.

Kaufman, K. 1996. *Lives of North American Birds.* Houghton Mifflin: New York, New York.

KnowledgeBase. 2013. *Can you identify these large mussels found in Utah? #159155*. Accessed June 1, 2021. Available at: https://ask2.extension.org/kb/faq.php?id=159155.

Korshunov A., S. Doroshenko, and A. Nevzorov. 2016. *The Impact of Freezing-thawing Process on Slope Stability of Earth Structure in Cold Climate*. Procedia Engineering. December 2016.

Leopold, L. 1994. *A View of the River.* Harvard University Press. Cambridge, Massachusetts.

McEwing, D.C., and M.G. Butler. 2010. *The effects of water-level manipulation on the benthic invertebrates of a managed reservoir.* Freshwater Biology 55:1086–1101.

Multi-Resolution Land Characteristics Consortium (MRLC). 2011. *National Land Cover Database.* Accessed: December 20, 2018. Retrieved from: https://www.mrlc.gov/data?f%5B0%5D=category%3Aland%20cover.

National Oceanic and Atmospheric Administration (NOAA). 2021. *Essential Fish Habitat Mapper.* Accessed: May 12, 2021. Available at: https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat.

National Park Service (NPS). 2018a. *National Scenic Trails.* Accessed: December 19, 2018. Retrieved from: https://www.nps.gov/subjects/nationaltrailssystem/national-scenic-trails.htm.

_____. 2018b. *National Water Trails.* Accessed: December 19, 2018. Retrieved from: https://www.nps.gov/WaterTrails/Home/About.

_____. 2018c. *National Rivers Inventory*. Accessed: December 19, 2018. Retrieved from: https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977.

_____. 2019. Memo RE: Cutler Hydroelectric Project, FERC #2420-054 regarding ADA accessibility. To: FERC, From: Hugh Osborne, IMR Hydropower Assistance Program. July 22, 2019.

_____. 2020. *America's National Trails System*. Website last updated: October 21, 2020. Accessed: April 2021. Retrieved from: https://www.nps.gov/subjects/nationaltrailssystem/index.htm.

Natural Resource Conservation Service (NRCS). 2007. *Chapter 8 Threshold Channel Design, Part 654, National Engineering Handbook*.

_____. 2009. *Ute Ladies'-Tresses,* Spiranthes diluvialis *Sheviak*. U.S. Department of Agriculture Natural Resources Conservation Service. Accessed: February 19, 2021. Retrieved from: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_043650.pdf.

_____. 2011. *Ute ladies'-tresses Fact Sheet*. April 2011. U.S. Department of Agriculture Natural Resources Conservation Service. Accessed: March 24, 2021. Retrieved from: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_051924.pdf.

_____. 2018. *Utah SNOTEL Snow/Precipitation Update Report*. U.S. Department of Agriculture. Accessed: May 13, 2021. Retrieved from: https://wcc.sc.egov.usda.gov/reports/UpdateReport.html?report=Utah

_____. 2020. *Soil Survey Geographic (SSURGO) Database for Cache County and Box Elder Counties, Utah*. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Available online. Accessed: January 2020.

NatureServe. 2009. *International Classification Standard: Terrestrial Ecological Classifications.* NatureServe Central Database. Arlington, VA, U.S.A. Data current as of February 6, 2009. Accessed: December 7, 2018. Retrieved from: http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf.

North American Electric Reliability Corporation (NERC). 2020. *2020 Long-Term Reliability Assessment.* December 2020. Accessed: September 2021. Retrieved from: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2020.pdf.

Olson, B.E., K Lindsey, and V. Hirschboeck. 2004. *Bear River Migratory Bird Refuge Habitat Management Plan.* U.S. Department of the Interior and U.S. Fish and Wildlife Service. Accessed: December 11, 2018. Retrieved from: https://www.fws.gov/uploadedFiles/BR_HMP.pdf.

Pacific Fisheries Management Council (PFMC). 2021. *Fact sheet: Habitat and essential fish habitat.* Accessed: June 1, 2021. Available at: https://www.pcouncil.org/fact-sheet-habitat-and-essential-fish-habitat/.

PacifiCorp. 1991. *Application for new License for Major Project-Existing Dam: Cutler Hydroelectric Project (FERC Project No. 2420) Exhibit E Environmental Report.* December 1991.

_____. 1995a. *Resource Management Plan for the Cutler Hydroelectric Project FERC No. 2420*. July 1995.

_____. 1995b. *Cultural Resources Management Plan, Cutler Hydroelectric Project, FERC Project No. 2420.* PacifiCorp, Salt Lake City.

_____. 1999. *3-Year Bear River Basin Study*. Cutler Hydroelectric Project FERC Project No. 2420. July 1999.

_____. 2002. *Cutler Hydro Project No. 2420 Resource Management Plan Five-Year Implementation and Monitoring Report 1995-2002. Volume 1: Report*. PacifiCorp, Salt Lake City, Utah. Accessed: November 29, 2018. Retrieved from: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Cutler/1995_2002_Cutler_Report.pdf.

_____. 2008. *Cutler Hydroelectric Project FERC Project No. 2420 Resource Management Plan Five-Year Monitoring Report 2003-2007.* PacifiCorp, Salt Lake City, Utah.

_____. 2013. *Cutler Hydroelectric Project Resource Management Plan Five-Year Monitoring Report 2008-2012: Final*. PacifiCorp, Salt Lake City, Utah.

_____. 2018. *Resource Management Plan Five-Year Monitoring Report 2013-2017*. Cutler Hydroelectric Project, FERC Project No. 2420. March 29. PacifiCorp, Salt Lake City, Utah.

_____. 2019. *Cutler Hydroelectric Project Pre-Application Document, FERC Project No. 2420*. PacifiCorp Energy, Salt Lake City, Utah. March 2019. Maps created in 2018.

_____. 2020a. *Archaeological Resources Survey for the Cutler Hydroelectric Project Relicensing, Box Elder and Cache Counties, Utah*. Prepared by SWCA Environmental Consultants, Salt Lake City and submitted to PacifiCorp.

_____. 2020b. *Cutler Hydroelectric Project, FERC No. 2420, Revised Technical Study Plans.* Electronically filed January 10, 2020.

_____. 2020c. *2018 Water Quality Analysis and Summary for Cutler Reservoir, Utah.* Prepared by SWCA Environmental Consultants, Salt Lake City and submitted to PacifiCorp. Salt Lake City, Utah. Accessed May 15, 2021. Retrieved from: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/cutler/CUT%202018%20Water%20Quality%20Analysis.pdf.

_____. 2021a. *Cutler Hydroelectric Project (FERC No. 2420) Initial Study Report*. Electronically filed March 3, 2021.

_____. 2021b. *Cutler Hydroelectric Project (FERC No. 2420) Updated Study Report.* Electronically filed August 15, 2021.

_____. 2021c. *Initial Study Report Response to Comments*. Cutler Hydroelectric Project (FERC Project No. 2420). Electronically filed May 5, 2021.

_____. 2021d. *Updated Study Report Response to Comments*. Cutler Hydroelectric Project (FERC Project No. 2420). Electronically filed October 30, 2021.

_____. 2021e. *Cutler Hydroelectric Project FERC No. 2420 Meeting Summary Updated Study Report and Draft License Application PM&E Measures Workshop*. September 15, 2021.

Penne, Chris. 2021. *Northern Utah Region Aquatics Manager, Utah DWR, Ogden, Utah*. Email to Frank Shrier, SWCA Environmental Consultants. March 25, 2021.

Richards, D. 2017. *Native Unionida Surveys, Distribution, and Metapopulation Dynamics in the Jordan River-Utah Lake Drainage, UT*. Wasatch Front Water Quality Council, Salt Lake City, Utah.

Rogers, T. 2017. *Environmental DNA Sampling of Native Utah Freshwater Mussels at Historical Locations, and Recommendations for Future eDNA Sampling.* Molecular Ecology Laboratory, Wildlife Resources Department, Utah State University.

Ruban, V., and D. Demare. 1998. Sediment phosphorus and internal phosphate flux in the hydroelectric reservoir of Bort-les Orgues, France *Oceans, Rivers and Lakes: Energy and Substance Transfers at Interfaces* (pp. 349-359): Springer.

Shipman, S.T. 1977. *Spawning biology of channel catfish Ictalurus punctatus (Rafinesque) in Willard Bay Reservoir, Utah*. Master’s thesis. Logan: Utah State University.

Sigler, W.F. and J.W. Sigler. 1996. *Fishes of Utah: A Natural History.* Salt Lake City: University of Utah Press.

Siriwardana, C., A.T. Cooray, S. S. Liyanage, and S.M. Koliyabandara. 2018. "Seasonal and Spatial Variation of Dissolved Oxygen and Nutrients in Padaviya Reservoir, Sri Lanka." *Journal of Chemistry* Vol. 2019: Article ID 5405016.

Stoller, J. 2007. *Benthic invertebrate biomass and densities in Cutler Reservoir near the inflow of the Logan River and the Logan Waste Water Treatment Plant.* In Comparison of Chemical and Biological Characteristics in Cutler Reservoir (Utah) near the Inflows of the Logan River and the Logan Waste Water Treatment Plant, edited by W.A. Wurtsbaugh and R. Lockwood. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University.

Utah Department of Agriculture and Food (UDAF). 2019. *State of Utah Noxious Weed List.* Last updated on July 6, 2019. Accessed: January 2, 2019. Retrieved from: https://ag.utah.gov/farmers/plants-industry/noxious-weed-control-resources/state-of-utah-noxious-weed-list/

Utah Division of Wildlife Resources (UDWR). No Date. *Lahontan Cutthroat Trout Fact Page and Distribution Map.* State of Utah Natural Resources Division of Wildlife Resources. Accessed: March 10, 2021. Retrieved from: *https://web.archive.org/web/20201024141340/https://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=oncoclhe*.

_____. 2009. *Rangewide Conservation Agreement and Strategy for Northern Leatherside*. Publication No. 9-11. Salt Lake City, Utah: Utah Division of Wildlife Resources.

_____. 2016. *Conservation and Management Plan for Three Fish Species in Utah.* Addressing needs for Roundtail Chub (Gila robusta), Bluehead Sucker (Catostomus discobolus), and Flannelmouth Sucker (Catostomus latipinnis). Salt Lake City, Utah: Utah Division of Wildlife Resources.

_____. 2018a. *Index of Available GIS data*. Accessed: December 8, 2018. Retrieved from: https://web.archive.org/web/20171227220914/https://dwrcdc.nr.utah.gov/ucdc/DownloadGIS/disclaim.htm.

_____. 2018b. *Sage-grouse Management Areas*. Accessed: November 20, 2018. Retrieved from: http://utahdnr.maps.arcgis.com/apps/webappviewer/index.html?id=4c97e77360524278b943e54baea39afc.

_____. 2018c. *Fishing*. Accessed: December 19, 2018. Retrieved from: https://wildlife.utah.gov/fishing-in-utah.html.

_____. 2018d. *Furbearers*. Accessed: December 19, 2018. Retrieved from: https://wildlife.utah.gov/hunting-in-utah/hunting-information/furbearer.html.

_____. 2019a. *Field Report of Electrofishing Survey on the Bear River Downstream of Cutler Dam.* Ogden, Utah: Utah Division of Wildlife Resources.

_____. 2019b. *Field report of mollusk surveys during the fall 2019 drawdown of Cutler Reservoir.* Utah Division of Wildlife Resources, Ogden, Utah.

_____. 2019c. *Official Mussel Infestation Report – Utah Division of Wildlife Resources (DWR).* Last updated on March 21, 2019. Accessed: July 2021. Retrieved from: http://www.utahfishinginfo.com/dwr/mussel_status.php

_____. 2019d. *Recreation Access in Utah*. Accessed: February 1, 2019. Retrieved from: https://dwrapps.utah.gov/ram/start2.

_____. 2020a. *Waterfowl Guidebook 2020-2021*. Accessed: June 10, 2021. Retrieved from https://wildlife.utah.gov/guidebooks/2020-21_waterfowl.pdf .

_____. 2020b. *Upland Game and Turkey Guidebook 2020-2021*. Accessed: June 10, 2021. Retrieved from: https://wildlife.utah.gov/guidebooks/2020-21_upland_turkey.pdf.

_____. 2020c. *Furbearer Guidebook 2020-2021*. Accessed: June 10, 2021. Retrieved from https://wildlife.utah.gov/guidebooks/2020-21_furbearer.pdf.

_____. 2021. *Fishing*. Accessed: February 17, 2021. Available at: https://wildlife.utah.gov/fishing/main-fishing-page.html

Utah Division of Water Rights (UDWRi). 2021a. *History of the Bear River Compact.* Accessed: September 22, 2021. Retrieved from: https://waterrights.utah.gov/techinfo/bearrivc/history.html

_____. 2021b. *Searching Water Right Records*. Online Database. Accessed: September 2021. Available at: https://www.waterrights.utah.gov/wrinfo/query.asp.

Utah Division of Water Quality (UDWQ). 2000. *Little Bear River Watershed TMDL*. Utah Department of Environmental Quality, Division of Water Quality, TMDL Section. Salt Lake City, Utah.

_____. 2002a. *Lower Bear River Watershed Restoration Action Strategy*. Utah Department of Environmental Quality, Division of Water Quality. Prepared using information developed by Ecosystems Research Institute, Inc. and Bear River Water Conservancy District.

_____. 2002b. *Spring Creek TMDL*. Utah Department of Environmental Quality, Division of Water Quality, TMDL Section. Salt Lake City, Utah.

_____. 2010. *Middle Bear River and Cutler Reservoir Total Maximum Daily Load (TMDL).* Utah Department of Environmental Quality, Division of Water Quality TMDL Section. Salt Lake City, Utah. Prepared by SWCA Environmental Consultants, Salt Lake City.

_____. 2016. *Utah's final 2016 Integrated Report*. Utah Department of Environmental Quality, Division of Water Quality. Salt Lake City, Utah.

_____. 2018. *Lower Bear River Total Maximum Daily Load (TMDL)*. Unpublished. Prepared by Tetra Tech and Cirrus Ecological Solutions.

United States Army Corps of Engineers (USACE). 2021. *Navigable Waterways in the Sacramento District.* Accessed: September 2021. Retrieved from: https://www.spk.usace.army.mil/Missions/Regulatory/Jurisdiction/Navigable-Waters-of-the-US/

United States Census Bureau. 2000. *Decennial Census, Table P001*. Accessed: November 21, 2018. Retrieved from: https://data.census.gov/cedsci/table?q=population%202000&g=0500000US49003,49005&tid=DECENNIALSF32000.P001&hidePreview=true

_____. 2010. *American Community Survey Five-year Estimate, Table S0101*. Accessed: November 21, 2018. Retrieved from: https://data.census.gov/cedsci/table?g=0500000US49003,49005&tid=ACSST5Y2010.S0101&hidePreview=true

_____. 2016. *American Community Survey Five-year Estimate, Table S0101*. Accessed: November 21, 2018. Retrieved from: https://data.census.gov/cedsci/table?g=0500000US49003,49005&tid=ACSST5Y2016.S0101&hidePreview=true

_____. 2017. *American Community Survey Five-year Estimate, Table S0101*. Accessed: November 21, 2018. Retrieved from: https://data.census.gov/cedsci/table?g=0500000US49003,49005&tid=ACSST5Y2017.S0101&hidePreview=true

_____. 2019 *American Community Survey Five-year Estimate, Table DP05, DP03*. Accessed 3 May 2021. Retrieved from: https://data.census.gov/cedsci/table?q=DP05&tid=ACSDP1Y2019.DP05.

_____. 2020. *QuickFacts: Utah.* Accessed: November 12, 2020. Retrieved from: https://www.census.gov/quickfacts/UT/.

United States Department of Agriculture (USDA) 1974. *Soil Survey of Cache Valley Area, Utah*. Parts of Cache and Box Elder Counties. Soil Conservation Service and Forest Service in cooperation with Utah Agricultural Experiment Station. Accessed: December 17, 2018. Retrieved from: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/utah/cachevalleyUT1974/cachevalleyUT1974-I.pdf.

_____. 1975. *Soil Survey of Box Elder County, Utah. Eastern Part.* Soil Conservation Service and United States Department of the Interior Fish and Wildlife Service and Bureau of Land Management in cooperation with Utah Agricultural Experiment Station. Accessed: December 19, 2018. Retrieved from: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/utah/boxeldereastUT1975/boxeldereastUT1975-I.pdf.

_____. 2012a. *2012 Census of Agriculture, County Profile Cache County*. National Agricultural Statistics Service. https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Utah/cp49005.pdf. Accessed December 15, 2018.

_____. 2012b. *2012 Census of Agriculture, County Profile Box Elder County*. National Agricultural Statistics Service. https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Utah/cp49003.pdf. Accessed December 15, 2018.

_____. 2014. *2012 Census Volume 1, Chapter 2: County Level Data*. Accessed: December 14, 2018. Retrieved from: https://www.nass.usda.gov/Publications/AgCensus/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Utah/st49_2_001_001.pdf.

_____. 2017. *2017 Census of Agricultural, County Profile, Box Elder County, Utah*. U.S. Department of Agriculture, National Agriculture Statistics Service. Accessed: September 2021. Retrieved from: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Utah/cp49003.pdf

_____. 2019. *PLANTS Database*. Plant List of Accepted Nomenclature, Taxonomy, and Symbols. Accessed January 2, 2019. Retrieved from: https://plants.usda.gov/java/.

United States Department of Transportation Federal Highway Administration (US FHA). 2018. *America's Byways*. Accessed: December 10, 2018. Retrieved from: https://www.fhwa.dot.gov/byways/byways.

United States Environmental Protection Agency (USEPA). 2009. *Total Nitrogen*. U.S. Environmental Protection Agency, National Service Center for Environmental Publications. EPA Publication No. 909R09020.

_____. 2017. *Level III & IV Ecoregions by State- Region 8.* Accessed: December 6, 2018. Retrieved from: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-8#pane-42.

United States Forest Service (USFS). 1995. *Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook 701*. USDA Forest Service.

_____. 2012. *Land Areas of the National Forest System*. As of September 30, 2011. U.S. Department of Agriculture, Forest Service, WO, Lands. FS-383. Accessed: December 19, 2018. Retrieved from: https://www.fs.fed.us/land/staff/lar/LAR2011/LAR2011_Book_A5.pdf.

_____. No date. *Uinta-Wasatch-Cache National Forest, Wellsville Mountains*. U.S. Department of Agriculture. Accessed: May 2021. Retrieved from: https://www.fs.usda.gov/detail/uwcnf/recreation/wintersports/?cid=fsem_035479

United States Fish and Wildlife Service (USFWS). 1995. *Ute Ladies' Tresses Recovery Plan*. USFWS, Denver, Colorado. Accessed: March 10, 2021. Retrieved from: https://ecos.fws.gov/docs/recovery_plan/950921.pdf.

_____. 2001. *Status Review for Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*).* U.S. Fish and Wildlife Service Regions 1 and 6, Portland, Oregon, and Denver, Colorado.

_____. 2013. Land Protection Plan Bear River Watershed Conservation Area. Lakewood, CO: U.S. Department of the Interior, U.S. Fish and Wildlife Service, Regions 1 and 6. Retrieved from: https://www.fws.gov/mountain-prairie/refuges/lpp_brr.php. Accessed July 2021.

_____. 2018. *National Wetland Inventory (NWI).* Accessed December 7, 2018. Retrieved from: https://www.fws.gov/wetlands/.

_____. 2019. *Common Carp* (Cyprinus carpio) - Ecological Risk Screening Summary. U.S. Fish and Wildlife publication.

_____. 2021. *Information for Planning and Conservation.* Accessed: February 19, 2021. Retrieved from: https://ecos.fws.govipac/location/LU7Q4I54IZBBHDVEJ4MG2JPV7M/resources#endangered-species.

United States Geological Survey (USGS). 2006. *Water Quality in the Bear River Basin of Utah, Idaho and Wyoming Prior to and Following Snowmelt Runoff in 2001*. National Water Quality Assessment Program. Scientific Investigations Report 2006-5292. Accessed: November 21, 2018. Retrieved from: https://pubs.usgs.gov/sir/2006/5292/PDF/SIR2006_5292.pdf.

_____. 2018. *Feature Detail Report for: Bear River*. Accessed: December 11, 2018. Retrieved from: https://geonames.usgs.gov/apex/f?p=gnispq:3:0::NO::P3_FID:1438485.

_____. 2019. *USGS 1011800 Bear River Near Collinston, UT.* Retrieved from: https://nwis.waterdata.usgs.gov/ut/nwis/inventory/?agency_cd=USGS&site_no=10118000. Accessed February 12, 2021.

_____. 2021. *Non-Indigenous Aquatic Species (NAS*). Accessed July 7, 2021. Retrieved from: https://nas.er.usgs.gov/.

Utah Bureau of Land Management (Utah BLM). 2018. *Utah Bureau of Land Management Sensitive Wildlife Species List.* Accessed: March 29, 2021. Available at: https://www.blm.gov/sites/blm.gov/files/Utah%20BLM%20Sensitive%20Wildlife%20Species%20List.pdf.

Utah Division of Water Resources (UDWR). 1992. *Utah State Water Plan: Bear River Basin*. January 1992. Accessed: March 2021. Retrieved from: https://bearriverinfo.org/files-ou/pub__1162616.pdf

_____. 2017. *Water Related Land Use*. Accessed December 20, 2018. Retrieved from: https://gis.utah.gov/data/planning/water-related-land/.

Utah Department of Natural Resources (Utah DNR). 2007. *Great Salt Lake State Marina Resource Management Plan.* Division of Utah State Parks and Recreation. Accessed: December 19, 2018. Retrieved from: https://stateparks.utah.gov/stateparks/wp-content/uploads/sites/26/2015/03/GSLPlan.pdf.

_____. 2009. *Antelope Island State Park Resource Management Plan 2009*. Division of Utah State Parks and Recreation. Accessed: December 19, 2018.Retrieved from: :https://stateparks.utah.gov/stateparks/wp-content/uploads/sites/26/2015/03/RMP_AISP09.pdf.

_____. 2010. *2010 Utah Boating Program Strategic Plan.* Division of Utah State Parks and Recreation. Accessed: December 19, 2018. Retrieved from: https://stateparks.utah.gov/stateparks/wp-content/uploads/sites/26/2015/03/BoatingStrategicPlan2010.pdf.

_____. 2013. 2014 *Utah's Statewide Comprehensive Outdoor Recreation Plan*. Division of Utah State Parks and Recreation. Accessed: December 19, 2018. Retrieved from: http://static.stateparks.utah.gov/docs/SCORP2014.pdf.

_____. 2017a. *Water Related Land Use.* Division of Water Resources. Accessed: December 20, 2018. Retrieved from: https://gis.utah.gov/data/planning/water-related-land/.

_____. 2017b. *Final Bear River Comprehensive Management Plan*. Accessed: May 13, 2021. Retrieved from: https://ffsl.utah.gov/wp-content/uploads/BRCMP_and_ROD_FINAL_October_2017-Opt.pdf.

_____. 2019. *Utah's Outdoor Recreation Plan - 2019*: *Utah's Statewide Comprehensive Outdoor Recreation Plan 2019-2023*. Division of Utah State Parks and Recreation. Accessed: April 9, 2021. Retrieved from: https://site.utah.gov/stateparks/wp-content/uploads/sites/13/2019/01/UtahsOutdoorRecreationPlanSCORP2019.pdf.

_____. 2021. *Draft Bear Lake Comprehensive Management Plan*. Utah Department of Natural Resources, Division of Forestry, Fire & State Lands. Prepared by SWCA Environmental Consultants, CRSA, C. Conder, and River Sciences Institute, Inc. Accessed: September 24, 2021. Retrieved from: https://ffsl.utah.gov/wp-content/uploads/Draft-Bear-Lake-CMP-Full-Res.pdf

_____. No Date_a. *Utah Division of Forestry, Fire & State Lands: About State Lands*. Accessed: May 13, 2021. Retrieved from: https://ffsl.utah.gov/state-lands/about-state-lands/.

_____. No Date_b. *Utah Division of Forestry, Fire & State Lands: Bear Lake Plans*. Accessed: May 13, 2021. Retrieved from: https://ffsl.utah.gov/state-lands/bear-lake/bear-lake-plans/.

Utah Geological Survey. 1996. *The Wasatch Fault.* Public Information Series 40. University of Utah, Salt Lake City, Utah. Accessed December 19, 2018. Retrieved from: https://ugspub.nr.utah.gov/publications/public_information/pi-40.pdf.

Utah State Parks 2019. *Willard Bay State Park*. Website. Accessed: February 1, 2019. Retrieved from: https://stateparks.utah.gov/parks/willard-bay/

Utah.com. 2021. *Pineview Reservoir Boating*. Accessed: June 10, 2021. Retrieved from: https://utah.com/boating/pineview-reservoir.

Utah State University (USU). 2007. "Bear River Watershed Description." In *Bear River Fact Sheets – Bear Lake Metric Units*. Accessed: November 21, 2018. Retrieved from: https://www.bearriverinfo.org/files-ou/bearriverwatershedpdf.pdf.

_____. 2018. *Watershed Science Annual Class Reports on the Fishery in Cutler Reservoir*. Utah State University, Logan City, Utah. Shared spreadsheet.

_____. 2019. *Peter Sinks Temperature Monitoring*. Accessed: January 30, 2019. Retrieved from: https://climate.usu.edu/PeterSinks/index.php.

_____. 2021. *Utah Climate Center*. Cache Junction Temperature Data 2018 through 2021. Accessed: September 2021. Retrieved from: https://climate.usu.edu/mchd/index.php.

Visit Utah. 2018. *Utah's Scenic Byways*. Accessed December 20, 2018. Retrieved from: https://www.visitutah.com/things-to-do/road-trips/scenic-byways/.

Wang, L., D.M. Robertson, and P.J. Garrison. 2007. "Linkages between nutrients and assemblages of macroinvertebrates and fish in wadeable streams: implication to nutrient criteria development." *Environmental Management* 39:194–212. Accessed: February 17,2021. Available at: https://doi.org/10.1007/s00267-006-0135-8.

Western Electricity Coordinating Council (WECC). 2021. *Western Interconnection*. Accessed: September 2021. Retrieved from: https://www.wecc.org/epubs/StateOfTheInterconnection/Pages/Western-Interconnection.aspx

Wetzel, R.G. 2001. *Limnology: Lake and River Ecosystems.* 3rd ed. San Diego, California: Academic Press.

Wild & Scenic Rivers Council. No Date. *Explore Designated Rivers*. Online map search. Accessed: March 2019. Retrieved from: https://www.rivers.gov/map.php.

Wilderness.net. 2018. *Wilderness Connect.* Accessed: December 19, 2018.Retrieved from: https://www.wilderness.net/NWPS/wildView?WID=636.

Woods, A.J., Lammers, D.A., Bryce, S.A., Omernik, J.M., Denton, R.L., Domeier, M., and Comstock, J.A. 2001. *Ecoregions of Utah*. Reston, Virginia, U.S. Geological Survey (map scale 1:1,175,000).

Wurtsbaugh, W.A. and R. Lockwood (eds). 2007. *Comparison of Limnological Characteristics in Cutler Reservoir (Utah) near the Inflows of the Logan River and the Logan Waste Water Treatment Plant.* Aquatic Ecology Practicum Class Report. Logan: College of Natural Resources, Utah State University, Logan, Utah.

Wurtsbaugh, Wayne. 2021. Emeritus Professor, Utah State University, Logan, Utah. Email to Frank Shrier, SWCA Environmental Consultants. June 22, 2021.

7.0 LIST OF PREPARERS

PacifiCorp team list of preparers are outlined in Table 7-1:

TABLE 7-1 EXHIBIT E LIST OF PREPARERS

PREPARERS	TITLE
Eve Davies	Relicensing Project Manager, PacifiCorp
Todd Olson	Director of Compliance, PacifiCorp
Connely Baldwin	Senior Water Resources Engineer, PacifiCorp
Chris Raeburn	Senior Dam Safety Engineer, PacifiCorp
Stewart Edwards	Area Engineer, PacifiCorp
Chuck Lewis	Senior GIS Analyst, PacifiCorp
Michael Ichisaka	Senior Environmental Scientist, Exhibit G Specialist, PacifiCorp
Stewart Edwards	Project Engineer, PacifiCorp
John Gangemi	Recreation Resources Lead, River Science Institute
Nuria Holmes	Regulatory and Licensing Project Manager, Kleinschmidt Associates
Ben Cary	Hydraulic Modeling Engineer, Kleinschmidt Associates
Sebastian Ferraro	Staff Hydraulic Engineer, Kleinschmidt Associates
Matthew Harper	Project Scientist and GIS Technical Lead, Kleinschmidt Associates
Charles Aquilina	Staff Engineer (Water Resources), GIS, Kleinschmidt Associates
Frank Shrier	Fisheries Biologist and Water Quality Technical Lead, SWCA
Leah Candland	Fisheries Biologist, SWCA
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

FERC will produce a list of preparers that contributed to their EA.

8.0 CONSULTATION DOCUMENTATION

Consultation that has occurred prior to the filing of this DLA is included as Appendix A to this DLA. 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 DLA, 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 complete consultation log of all consultation, including comments provided on this Exhibit E, will be provided with the FLA.

DRAFT LICENSE APPLICATION

EXHIBIT F (PUBLIC)

DESIGN DRAWINGS

CUTLER HYDROELECTRIC PROJECT (FERC NO. 2420)

Prepared for:

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY
Salt Lake City, UT

Prepared by:

Kleinschmidt

NOVEMBER 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

APPLICATION FOR NEW LICENSE FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT F (PUBLIC)
DESIGN DRAWINGS

TABLE OF CONTENTS

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, 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 draft 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).

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.

Draft License Application

Exhibit G

Project Boundary Maps

Cutler Hydroelectric Project

(FERC No. 2420)

Prepared for:

PacifiCorp

A Berkshire Hathaway Energy Company

Salt Lake City, UT

Prepared by:

Meridian Engineering, Inc.

Kleinschmidt

November 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT G
PROJECT MAPS

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 PROJECT WORKS & FEATURES

The 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 FERC on March 19, 1998. Since 1998, additional property transactions occurred over a period of several years, as part of implementation of the 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 was approved by FERC on April 3, 2009. The existing Exhibit G contains eight sheets listed below, which define the location of the Project Boundary, and the Project's principal features:

SHEET NO.	TITLE
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

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 existing and proposed Project Boundaries.

2.0 PROJECT BOUNDARY MAP

The existing Project Boundary occupies a total of 9,192 acres, of which approximately 77 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 (2021)
PacifiCorp Owned Land	9,115	9,196.4
State Land	9	4.4
County Land	2	0
Private (Non-PacifiCorp) Land	66	73.1
TOTAL ACREAGE WITHIN THE FERC PROJECT BOUNDARY:	**9,192**	**9,273.9**

Source: PacifiCorp 2009

PacifiCorp proposes to revise the Project Boundary to include additional areas needed for operation and maintenance and exclude areas outside of or with no Project influence. The revised 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 proposed 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 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 filing of the FLA for the Project, and the resultant changes are included in the proposed Project Boundary (Table 2-2, Item I). The other small Project Boundary 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 (item F), to align with maintenance and protection of existing Project mitigation lands. Attachment G-1 shows the proposed Project Boundary with red areas that indicate Project Boundary additions and removals, as outlined in Table 2-2.

TABLE 2-2 SIGNIFICANT PROJECT BOUNDARY CHANGES PROPOSED BETWEEN CURRENT (2009) AND REVISED (2021) EXHIBIT G

LETTER	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	75.95
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	2.37
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	4.81
F	G-4	Access easement added to boundary.	Add	0.65
G	G-4	County road removed. Underlying land not owned by PacifiCorp.	Remove	3.44
H	G-4	Existing flooding easements added to boundary.	Add	11.9
I	G-6	UDOT highway and bridge widening project	Remove	22.97
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.	Net addition	16.0

Source: PacifiCorp 2021

As outlined above in Table 2-1, a total of 113.1 acres are proposed to be added to the existing Project Boundary and 31.2 acres are proposed to be removed from the Project Boundary, for a net change of an additional 81.9 acres added to the Property Boundary compared to the existing Project Boundary. 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 16 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 Project Boundary updated data for the Cutler Hydroelectric Project under P-2420.

ATTACHMENT G-1

CURRENT AND PROPOSED EXHIBIT G PROJECT MAPS

Project Boundary	
Water Body	
County	
PLSS-Township	
City	
Road	
Railroad	
Map Sheet	

Map Projection: UTM Zone 12, NAD 83, meters

PROJECT BOUNDARY ACREAGE

1) ACREAGE WITHIN PROJECT BOUNDARY	9273.8	ACRES
2) PACIFICORP LAND	9196.4	ACRES
3) STATE LAND	4.4	ACRES
4) PRIVATE (NON-PACIFICORP LAND)	73.1	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. 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 possible exception of one parcel that is still under review.

*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).

PLS NO. 4938744 MICHAEL W. VADEAL STATE OF UTAH

PACIFICORP

This Document is Considered Public Information.

NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-28	Draft License Application of November 1, 2021
2	4/3/09	P-2420-23	Incorporates land acquisition pursuant to Article 402

Exhibit G - 1 **Rev. 3a**

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary - Location Map

Original Drawing Dated December, 2007

Scale as shown

1 0.5 0 1 Miles

N

FERC Drawing No. P-2420-28

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
Proposed Changes

* Reference points are in Geographic Coordinate System WGS 1984.
** Under development - 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 8)
- E# = Easement (see Sheet 8)
- STATE = State owned land
- COUNTY = County owned land
- PRIVATE = Non-PacifiCorp land

PLS NO. 4938744 MICHAEL W. NADEAU STATE OF UTAH

PACIFICORP

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PROJECT BOUNDARY ACREAGE

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-29	Draft License Application of November 1, 2021
2	4/3/09	P-2420-24	Incorporates land acquisition pursuant to Article 402

Exhibit G - 2 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown
1,000 500 0 1,000 Feet

N

FERC Drawing No. P-2420-29

Legend	
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
	Proposed Changes

MAP TEXT ABBREVIATIONS:
- A# = Access Road (see Sheet 8)
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PACIFICORP

This Document is Considered Public Information.

* Reference points are in Geographic Coordinate System WGS 1984.
** Under development - Boundary point numbers correspond to the boundary description table.
Map Projection: UTM Zone 12, NAD 83, meters

NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-30	Draft License Application of November 1, 2021
2	4/3/09	P-2420-25	Incorporates land acquisition pursuant to Article 402

Exhibit G - 3 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

N

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	Proposed Changes	

* Reference points are in Geographic Coordinate System WGS 1984.
** Under development - Boundary point numbers correspond to the boundary description table.
Map Projection: UTM Zone 12, NAD 83, meters

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PLS NO. 4938744 MICHAEL W. NADEAU STATE OF UTAH

PACIFICORP

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-31	Draft License Application of November 1, 2021
2	4/3/09	P-2420-25	Incorporates land acquisition pursuant to Article 402

Exhibit G - 4 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

N

FERC Drawing No. P-2420-31

- 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
- Proposed Changes

* Reference points are in Geographic Coordinate System WGS 1984.
** Under development - 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 8)
- E# = Easement (see Sheet 8)
- STATE = State owned land
- COUNTY = County owned land
- PRIVATE = Non-PacifiCorp land

PLS NO. 4938744 MICHAEL W. NADEAU STATE OF UTAH

PACIFICORP

This Document is Considered Public Information.

PROJECT BOUNDARY ACREAGE

1) ACREAGE WITHIN PROJECT BOUNDARY	9273.8	ACRES
2) PACIFICORP LAND	9196.4	ACRES
3) STATE LAND	4.4	ACRES
4) PRIVATE (NON-PACIFICORP LAND)	73.1	ACRES

ABOVE VALUES ARE APPROXIMATE DERIVED FROM VARIOUS GIS DATASETS

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-32	Draft License Application of November 1, 2021
2	4/3/09	P-2420-26	Incorporates land acquisition pursuant to Article 402

Exhibit G - 5 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

N

FERC Drawing No. P-2420-32

- Project Boundary
- PacifiCorp Ownership
- Non-PacifiCorp Ownership
- Easement
- PacifiCorp Facility
- Water Body
- County
- PLSS-Section
- Area Not in FERC Boundary
- Reference Point *
- Boundary Point **
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- PacifiCorp Water Conveyance
- Road
- Railroad
- Stream
- Proposed Changes

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-33	Draft License Application of November 1, 2021
2	4/3/09	P-2420-26	Incorporates land acquisition pursuant to Article 402

Exhibit G - 6 **Rev. 3a**

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

N

FERC Drawing No. P-2420-33

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
Proposed Changes

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Map Projection: UTM Zone 12, NAD 83, meters

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- A# = Access Road (see Sheet 8)
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PLS NO. 4938744 MICHAEL W. VADCAL STATE OF UTAH

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-34	Draft License Application of November 1, 2021
2	4/3/09	P-2420-26	Incorporates land acquisition pursuant to Article 402

Exhibit G - 7 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Map

Original Drawing Dated December, 2007

Scale as shown

1,000 500 0 1,000 Feet

N

FERC Drawing No. P-2420-34

BOUNDARY DESCRIPTION

UNDER DEVELOPMENT

Easement Reference Table

Map #	Description	Cache Co. Recorder Number
E = Easement in Project Boundary		
E1	Cardon Flooding Easement	
E2	Cardon Access Easement	
E3	Falslev Flooding Easement	
E4	Falslev Flooding Easement	
E5	Watterson Flooding Easement	803495
E6	Watterson Conservation Easement	803494
E7	Wildflower Ranch Flooding Easement	803489
E8	Wildflower Ranch Flooding Easement	803490
E9	Watterson Flooding Easement	578248
E10	Maughn Flooding Easement	
E11	Kunzler Conservation Easement	863961
E12	Lundberg Conservation Easement	
E13	Utah DNR Access Easement	656421
E14	Hardman Lease Exchange	
E15	PacifiCorp Interest Lands - under review	
A = Access Road Easement outside Project Boundary		
A1	Allen Access Easement	
A2	Ballard Access Easement	
A3	Ballard Access Easement	
A4	Ballard Access Easement	
A5	Benson Access Easement	
A6	CC Ranch Access Easement	
A7	Harold Falslev Access Easement	
A8	Larry Falslev Access Easement	
A9	Hibbard Access Easement	
A10	Larsen Access Easement	
A11	Lundberg Access Easement	
A12	Maurer Access Easement	
A13	Jay Rigby Access Easement	
A14	Mark Rigby Access Easement	
A15	Watterson Access Easement	
A16	Willmore Access Easement	575999

Notes:

1) Information in table is based on GIS derived coordinates and measurements and is not intended to represent station points and measurements established by ground surveys.

2) Project is located in the state of Utah, Salt Lake Meridian.

3) Reference points are in Geographic Coordinate System WGS 1984.

3) Coordinates are in UTM Zone 12, NAD 83, feet.

PROJECT BOUNDARY ACREAGE

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PACIFICORP

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NO.	DATE	OLD FERC NO.	DESCRIPTION
3a	11/1/21	P-2420-35	Draft License Application of November 1, 2021
2	4/3/09	P-2420-27	Incorporates land acquisition pursuant to Article 402

Exhibit G - 8 Rev. 3a

Cutler Hydroelectric Project, FERC No. P-2420
Draft License Application of November 1, 2021

Project Boundary Description

Original Drawing Dated December, 2007

FERC Drawing No. P-2420-35

Draft License Application

Exhibit H

Project Management and Need for Power

Cutler Hydroelectric Project

(FERC No. 2420)

Prepared for:

A BERKSHIRE HATHAWAY ENERGY COMPANY

Salt Lake City, UT

Prepared by:

November 2021

CUTLER HYDROELECTRIC PROJECT
(FERC NO. 2420)

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT H
PROJECT MANAGEMENT AND NEED FOR POWER

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION

PacifiCorp is seeking a new license for the Cutler Hydroelectric Project, which is an existing 30 MW generating facility owned and operated by PacifiCorp and licensed by the FERC (Project No. 2420). The existing 9,192-acre Project Boundary is located in both Cache (primarily) 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 Exhibit E of the DLA), 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 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 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 potential decommissioning) but is not the owner or operator of the other six developments.

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 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 (2020); and NorthWestern Energy, Los Angeles Department of Water and Power, Public Service Company of New Mexico, and Turlock Irrigation District (2021). Additionally, other balancing authorities in the west have indicated interest or are pursuing participation (WEIM 2021). PacifiCorp continues to work with the 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

[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.).

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 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 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,

[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).

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-bar[3] 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 (including only O&M costs; capital costs will be included in the FLA) has been approximately $1.95 million, or approximately $22.41 per MWh, for the most recent 5-year period of 2016 to 2020. Based on an average annual consumption of 9,600 kWhs 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.

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

[3] The power plant bus or bus-bar is that point beyond the generator but prior to voltage transformation point in the plant switchyard.

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% and based on the September 2021 Palo Verde flat-price official forward price curve,[4] the net present value of replacement power from April 2024 through March 2064 is $25.6 million. In addition, the January 2022 present value of spinning reserves from April 2024 through March 2064 is $19.7 million. Relying on the wholesale power market to replace the Project's generation exposes PacifiCorp to increased financial 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 most recent five-year period. 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 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.

[4] The last year of the September 2021 official forward price curve is 2044. Projected costs for years beyond 2044 were inflated based on a 2.155% inflation rate.

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 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 4405.0, from the current lower reservoir elevation range of 4406.5 to 4406.0. The potential costs and benefits of the proposed future operating plan will be included in the 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 (Exhibit E, Section 5).

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 project 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 Federal Power Act, including, a statement of the applicant's record of encouraging or assisting its customers to conserve electricity and 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 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
Chairman Darren Parry
Brigham Tribal Office
707 North Main Street
Brigham City, Utah 84302
435-734-2286
dparry@arrowpoint.us

Shoshone-Bannock Tribes
Chairman Nathan Small
P.O. Box 306
Fort Hall, Idaho 83203
208-478-3700
publicaffairs@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 constrains 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, included as part of the CEII-Protected Exhibit F of this DLA.

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 (2) 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 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. 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 is scheduled to be filed in November or December 2021; the most recent previous version was filed in 2018. 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 1 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 DLA.

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 DLA, 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 MOST RECENT 5-YEAR PERIOD (2016-2020)

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.[5]

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.	Occurred 08/22/2021 – 08/29/2021. 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. No response from FERC has been received to date.

[5] A complete table of incidents that resulted in reservoir fluctuation deviations will be provided in the FLA.

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 during this period occurred due to patchy, but intense, rainfall events over the watershed above Cutler Reservoir.	Occurred 07/06/2021 – 07/10/2021 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. No response from FERC has been received to date.
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.
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, none were considered violations of the operational plan.

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
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. By letter dated 08/03/2009, FERC wrote that the reported deviation was not considered a violation of 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 8/28/2004 – 09/03/2004 Per FERC issuance dated 10/20/2004, the events were not considered a violation of 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 releases, a 0.8” rainfall event occurred on May 22 and 23, which raised the reservoir level by 0.72 inches.	Occurred 05/26/2004 – 05/27/2004 Per FERC issuance dated 7/21/2004, the event was not considered a violation of Article 401.

DATE OF REPORT	RELEVANT LICENSE ARTICLE	BRIEF DESCRIPTION OF REPORT OR VIOLATION/DEVIATION	INCIDENT DESCRIPTION/FERC RESOLUTION
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 By FERC issuance dated 12/09/2003, the September events were not considered a violation of 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 FERC issuance dated 12/09/2003; the June-July event was not considered a violation of Article 401

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

Northwest Power and Conservation Council (NWPCC). 2016. Seventh Northwest Conservation and Electric Power Plan. Document 2016-02. February 25, 2016. https://www.nwcouncil.org/sites/default/files/7thplanfinal_allchapters_1.pdf. Accessed October 12, 2021.

PacifiCorp. 2019. PacifiCorp Conservation Potential Assessment for 2019-2038. Volume 1: Executive Summary and Introduction June 30, 2019. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/2019-final-study/PacifiCorp_DSM_Potential_Vol_1_Executive_Summary_Final_2019-6-30.pdf. Accessed October 12, 2021.

PacifiCorp. 2021. 2021 Integrated Resource Plan Volume I | September 1, 2021. https://www.pacificorp.com/energy/integrated-resource-plan.html. Accessed October 12, 2021.

Western Energy Imbalance Market (WEIM) 2021. About. Available online: https://www.westerneim.com/Pages/About/default.aspx. Accessed September 27, 2021.

WECC n.d. Overview of System Operations. Available online: https://www.wecc.org/Administrative/06-Balancing%20Authority%20Overview.pdf. Accessed September 27, 2021.

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	*Voluntary*	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	*Voluntary*	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
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
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
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	*Voluntary*	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	*Voluntary*	PacifiCorp voluntary hosts a PM&E Workshop with stakeholders.	Posters