FERC/EIS-0265

ENVIRONMENTAL IMPACT STATEMENT

FOR HYDROPOWER LICENSE

Bear River Narrows Hydroelectric Project—FERC Project No. 12486-008

Idaho

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, D.C. 20426

September 2015

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FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

To the Agency or Individual Addressed:

Reference: Draft Environmental Impact Statement

Attached is the draft environmental impact statement (draft EIS) for the proposed Bear River Narrows Project (FERC Project No. 12486), located in Franklin County, Idaho.

This draft EIS document documents the view of governmental agencies, non-governmental organizations, affected Indian tribes, the public, the license applicant, and Federal Energy Regulatory Commission (Commission) staff. It contains staff evaluations of the applicant's proposal and the alternatives for licensing the Bear River Narrows Project.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The draft EIS will be part of the record from which the Commission will make its decision. The draft EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or about September 30, 2015.

Copies of the draft EIS are available for review in the Commission's Public Reference Branch, Room 2A, located at 888 First Street, N.E., Washington D.C. 20426. The draft EIS also may be viewed on the Internet at www.ferc.gov/docs-filing/elibrary.asp. Please call (202) 502-8222 for assistance.

Any comments should be filed by November 30, 2015. The Commission strongly encourages electronic filing. Please file comments using the Commission's eFiling system at http://www.ferc.gov/docs-filing/efiling.asp. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at http://www.ferc.gov/docs-filing/ecomment.asp. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support. In lieu of electronic filing, please send a paper copy to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, D.C. 20426. Please affix the project number (Project No. 12486) to all comments.

Attachment: Draft Environmental Impact Statement

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COVER SHEET

a. Title:	Environmental Impact Statement for Hydropower License, Bear River Narrows Project—FERC Project No. 12486, Idaho
b. Subject:	Draft Environmental Impact Statement
c. Lead Agency:	Federal Energy Regulatory Commission
d. Abstract:	The Bear River Narrows Project would be located on the main stem of the Bear River in Franklin County, about 9 miles northeast of the city of Preston, Idaho. It would occupy 243 acres of federal land administered by the U.S. Department of the Interior, Bureau of Land Management. Twin Lakes Canal Company (Twin Lakes) proposes to construct a 109-foot-high dam that would form a 362-acre reservoir with a total storage capacity of 12,647 acre-feet of water. The proposed powerhouse would have an installed capacity of 10 megawatts and would generate an average of 48,531 megawatt-hours of energy annually. The reservoir would also be used to provide up to 5,000 acre-feet of water to Twin Lakes' irrigation system during dry years. To accomplish this, supplemental water would be released at the dam and pumped into the irrigation system at a new pumping station located downstream of the dam. The staff's recommendation is to not license the project.
e. Contact:	Shana Murray Federal Energy Regulatory Commission Office of Energy Projects 888 First Street, N.E. Washington, D.C. 20426 (202) 502-8333
f. Transmittal:	This draft environmental impact statement on an application to construct and operate the Bear River Narrows Hydroelectric Project is being made available for public comment on or about September 30, 2015, as required by the National Environmental Policy Act of 1969[1] and the Commission's Regulations Implementing the National Environmental Policy Act (18 CFR, Part 380).

[1] National Environmental Policy Act of 1969, amended (Pub. L. 91-190, 42 U.S.C. 4321–4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

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FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)[2] and the U.S. Department of Energy Organization Act[3] is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric development subject to its jurisdiction, on the necessary conditions:

> That the project adopted…shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e)…[4]

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.[5] Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.[6]

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[2] 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Pub. L. 99-495 (1986), the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

[3] Pub. L. 95-91, 91 Stat. 556 (1977).

[4] 16 U.S.C. § 803(a).

[5] 16 U.S.C. § 803(g).

[6] 18 C.F.R. § 385.206 (2015).

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
$\mu g/m^3$	micrograms per cubic meter
ACEC	Area of Critical Environmental Concern
ADA	Americans with Disabilities Act
Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
applicant	Twin Lakes Canal Company
BCC	birds of conservation concern
BCT	Bonneville cutthroat trout
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	best management practice
BP	before present
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
Council	Northwest Power and Conservation Council
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
DO	dissolved oxygen
ECC	Environmental Coordination Committee
EIS	Environmental Impact Statement
ESA	Endangered Species Act
°F	degrees Fahrenheit
FCFGA	Franklin County Fish and Game Association
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
GWh	gigawatt-hour
GYC	Greater Yellowstone Coalition
HPMP	Historic Properties Management Plan
Idaho DEQ	Idaho Department of Environmental Quality
Idaho DWR	Idaho Department of Water Resources
Idaho Fish and Game	Idaho Department of Fish and Game
Idaho Parks and Recreation	Idaho Department of Parks and Recreation
Interior	U.S. Department of the Interior
LEESP	law enforcement and emergency services plan

LMP	land management and buffer zone plan
mg/L	milligrams per liter
MSA	Metropolitan Statistical Area
MW	megawatt
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standards
National Register	National Register of Historic Places
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act
Northwest Power Act	Pacific Northwest Power Planning and Conservation Act
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
NWPP	Northwest Power Pool
PA	Programmatic Agreement
PacifiCorp	PacifiCorp Energy
Park Service	National Park Service
PHABSIM	physical habitat simulation
PM	particulate matter
ppm	parts per million
ppt	parts per thousand
project	Bear River Narrows Hydroelectric Project, FERC Project No. 12486
RCC	roller compacted concrete
Reclamation	Bureau of Reclamation
RM	river mile
RNA	research natural area
SCORTP	State Comprehensive Outdoor Recreation and Tourism Plan
SD1	scoping document
SD2	revised scoping document
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMBWC	Southern Middle Bear Watershed Commission
TCP	traditional cultural properties
TSP	total suspended particulate
Twin Lakes	Twin Lakes Canal Company
TMDL	total maximum daily load
TP	total phosphorus
TSS	total suspended sediment
TU	Trout Unlimited
U.S.C.	United States Code
USGS	United States Geological Survey
WQC	water quality certification
WUA	weighted useable area

EXECUTIVE SUMMARY

Proposed Action

On November 27, 2013, Twin Lakes Canal Company (Twin Lakes) filed an application for an original license with the Federal Energy Regulatory Commission (Commission or FERC) for the construction, operation, and maintenance of the proposed 10-megawatt (MW) Bear River Narrows Hydroelectric Project No. 12486-008. The project would be located on the main stem of the Bear River in Franklin County, Idaho, about 9 miles northeast of the city of Preston. The project would occupy 658 acres of land, 243 acres of which is federal land administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and would generate an average of 48,531 megawatt-hours (MWh) of energy annually. The primary project purposes are water storage for irrigation and hydroelectric power generation.

Project Description and Proposed Facilities

The proposed Bear River Narrows Project would involve the construction of the following new facilities: a dam, spillway, reservoir, intake structure, penstock, powerhouse, substation, transmission line, access roads, and recreation facilities. The new, 690-foot-long, 109-foot-high, earthen dam would be constructed with an overlayment of roller compacted concrete (RCC) and a crest at elevation 4,734 feet above mean sea level.[7] A 40-foot-wide concrete open-channel spillway integral with the dam would be constructed that would have a crest at elevation of 4,718 feet and two 20-foot-wide radial gates. A 4.5-mile-long reservoir would be created by the dam with a surface area of 362 acres at the normal maximum elevation of 4,734 feet and a useable storage volume of 5,000 acre-feet between elevation 4,718 feet and elevation 4,734 feet. A 48-foot-wide, 16-foot-long, 20-foot-high concrete intake structure would be constructed in the reservoir with a bar screen trashrack with 1.5-inch clear space openings, an invert opening elevation of 4,630 feet, and a top opening elevation of 4,650 feet. A new, 600-foot-long, 14-foot-diameter, spiral, welded steel penstock would lead from the intake structure, through the dam, to the Bear River Narrows Project powerhouse. The proposed 80-foot-wide, 52-foot-long, 24-foot-high powerhouse would be constructed downstream of the dam with a concrete substructure and steel superstructure housing (a) two generating units, each with a 7,020-horsepower (5,250 kilowatt) vertical Francis-type turbine and a 5,000-kilowatt (5,555 kilovolt-amperes at a 0.86 power factor) generator; (b) one 120-inch-diameter butterfly bypass valve with a 66-inch orifice; and (c) a 48-inch-diameter cone bypass valve. A transformer substation would be located near the proposed powerhouse. A 0.74-mile-long, 46-kilovolt, three-phase transmission line would be constructed from the substation to the point of interconnection with the nearby PacifiCorp Energy (PacifiCorp) transmission line. Two paved access roads would be

[7] All elevations are provided as above sea level datum unless otherwise noted.

constructed: a reservoir access road extending 3.1 miles from Highway 36 to Oneida Narrows Road near PacifiCorp's existing Oneida powerhouse[8] and a section of roadway extending 1.1 miles from Oneida Narrows Road near the proposed Bear River Narrows Project powerhouse site to an existing access road for summer homes near the proposed reservoir.

A new, 4.1-acre, multi-use recreation facility, including a campground, day-use area, boat ramp, and hiking trail, would be constructed on the east side of the proposed reservoir to replace the existing Redpoint Campground, which would be inundated by the reservoir. A river access and boat launch with a gravel parking area would be constructed downstream of the proposed powerhouse along the Bear River. A 538-acre conservation parcel (referred to as the Ben Johnson Family Farm site), located approximately 12 miles downstream of the powerhouse, would be acquired, and a boat launch, access road, parking area, and bathroom facility would be constructed on the parcel.

Temporary features to be used during the construction period would include two borrow areas (a 25-acre "southern" site immediately adjacent to the dam site and a 33-acre "northern" site located about 0.5 mile upstream of the dam site), and two cofferdams (a 700-foot-long upstream cofferdam and a 150-foot-long downstream cofferdam).

Construction of the proposed project is expected to be complete approximately 3.5 years after issuance of a license for the project. The initial filling of the reservoir would occur in the fall and winter and is expected to be completed within 5 to 6 months. The proposed project would provide a downstream minimum flow equal to the minimum flow requirement at PacifiCorp's upstream Oneida development of 250 cubic feet per second (cfs) plus leakage from Oneida dam (estimated at 1 cfs) at all times, including during construction. Once the project is constructed, it would use unallocated water available in the Bear River during the period from October 1 to April 15 (outside of the irrigation season) to initially fill the reservoir to elevation 4,734 feet.[9]

During the irrigation season from April 16 through September 30, Twin Lakes would release up to 5,000 acre-feet of water from the project's storage into the Bear River to provide for downstream irrigation water supply, which would drop the reservoir level by as much as 16 feet. This release would be contingent on the estimated potential

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[8] PacifiCorp's Oneida powerhouse, transmission line, and a portion of the Oneida Narrows Road are included in the Oneida development for the Bear River Project (FERC Project No. 20).

[9] The proposed project would be capable of passing 175 to 700 cfs, for a total maximum discharge of 1,400 cfs through the turbine generator units to produce hydroelectric power.

loss in crop values exceeding the value of the project power that would be lost as a result of the release. Such releases would be captured at an as-yet-unconstructed pumping station on the Bear River downstream of the powerhouse and pumped into Twin Lakes' irrigation canal adjacent to the pumping station.

Each year from October 1 to April 15, Twin Lakes would attempt to refill the reservoir to elevation 4,734 feet using unallocated water after all downstream water rights are met, while meeting its downstream minimum flow requirements.

Twin Lakes' proposal would compensate for water that evaporates from the new reservoir, estimated to be 692.9 acre-feet (0.9 to 2.6 cfs per month in April through October), by releasing a comparable volume of water from Twin Lakes' diversion dam on Mink Creek, which would flow down Mink Creek into the Bear River approximately 1.2 miles downstream of the project dam.

Proposed Environmental Measures

In addition to the project design and operational measures described previously, Twin Lakes proposes the following environmental measures:

Project Construction

Geology and Soil Resources

- Finalize the draft Erosion Control Plan filed on April 1, 2014, in consultation with resource agencies, based on the final project design, to minimize construction-related effects on vegetation and water quality.

Aquatic Resources

- Consult with the owners of water right 13-969A regarding replacement of the existing diversion structure that would be inundated by the proposed reservoir.
- Maintain Bear River flows through the construction site without interruption.

Terrestrial Resources

- Implement the Revegetation and Noxious Weed Control Plan filed with the license application, which includes measures for site treatments to restore soil and drainage conditions, consultation to determine appropriate plant species and planting densities, and monitoring of revegetated sites for a minimum of 3 years, followed by additional monitoring, if necessary.
- Employ industry-standard avian protection measures on the transmission line to minimize electrocution hazards.
- Develop a final construction schedule based on final project design, in consultation with the Idaho Department of Fish and Game (Idaho Fish and

Game), to minimize disturbance to bald eagle, migratory birds, elk, and mule deer during nesting and migration periods.

Recreation Resources

- Construct a new, multi-use recreation facility that would include a campground, boat ramp, and hiking trail on the proposed reservoir to replace the campground that would be lost due to inundation.
- Construct a new river access and boat launch with parking and portable toilets immediately below the new dam to replace boating access points that would be lost due to inundation.
- Acquire the Ben Johnson Family Farm site for the restoration of riparian and wildlife habitat and riverine recreational opportunities (e.g., fishing and boating).
- Construct a new boat ramp on the Bear River within the Ben Johnson Family Farm site with parking and portable toilets pending completion of an onsite assessment of the suitability of this site.
- Construct a parking area and hiking trail with interpretive signage within the Ben Johnson Family Farm site to provide access to 4.4 miles of Bear River shoreline for fishing.

Aesthetics

- Use a powerhouse color that blends with the local environment to reduce the visual effect of the project.

<u>Project Operation/Maintenance</u>

Aquatic Resources

- Implement the Dissolved Oxygen (DO) Management Plan filed with the license application, which includes provisions to monitor and report DO and water temperature and implement corrective actions if necessary, to ensure powerhouse discharges meet state of Idaho water quality criteria for DO at all times.
- Allocate the Battle Creek water right associated with the Ben Johnson Family Farm site to instream flows to enhance aquatic habitat by increasing flows in Battle Creek and the Bear River, as mitigation for decreases in flows downstream of the proposed dam associated with reservoir refill operations.
- Form a Southern Middle Bear Watershed Commission (SMBWC) to aid in oversight of mitigation actions and evaluate future project proposals in the

project watershed using annual funding of $25,000, and establish a website and database for the watershed.

- Provide a 10-cfs minimum flow in Mink Creek downstream of Twin Lakes' Mink Creek diversion dam, which would include water to replace the water lost due to evaporation in the proposed reservoir, as needed.
- Install, operate, and maintain a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam to aid in monitoring compliance with all project flow release requirements as identified above.
- Cooperate with agencies in the development of measures designed to control non-native fish species in Mink Creek.
- Cooperate with agencies in the planning and eventual removal of fish passage barriers in Mink Creek.
- Cooperate with agencies in the planning and eventual installation of a fish screen to prevent entrainment of fish into the irrigation canal at Twin Lakes' diversion on Mink Creek and the proposed pumping station.[10]

Terrestrial Resources

- Provide a 100-foot conservation buffer extending upland from the normal high water mark (elevation 4,734 feet) of the proposed reservoir.
- Implement the Conceptual Mitigation Plan filed with the license application, which includes managing the Ben Johnson Family Farm site to benefit aquatic, wetland, riparian, wildlife, and recreational resources; enhancing 49 acres of fringe wetland habitat at the Condie and Winder reservoirs; and installation of raptor nesting platforms and nesting boxes to benefit wildlife.

Cultural Resources

- Implement the Historic Properties Management Plan (HPMP) filed with the license application and Addendum 1 filed on October 7, 2014, to protect archaeological and historic resources.

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[10] In its letter filed with the Commission on January 23, 2015, Twin Lakes clarified that, due to its unsuccessful efforts to consult with Idaho Fish and Game and stakeholders on implementation details for the three Mink Creek measures (non-native species control, fish barrier removal, and fish screen installation), it only outlines a general plan for implementing them without assigning specific responsibilities; however, it recognizes that it would bear considerable responsibility for implementing these measures should the project be licensed.

Public Involvement

Before filing its license application, Twin Lakes conducted pre-filing consultation under the Commission's Integrated Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission.

As part of the pre-filing process, we distributed a scoping document (SD1) on February 13, 2007, soliciting comments, recommendations, and information on the project. We conducted a site visit on March 13, 2007. Two scoping meetings were held in Preston, Idaho, on March 14, 2007. Based on discussions during the site visit and written comments filed with the Commission, we issued a second scoping document (SD2) on August 14, 2007. On October 17, 2014, we issued a notice that Twin Lakes' application for an original license for the Bear River Narrows Project was ready for environmental analysis and requested conditions and recommendations.

Alternatives Considered

This draft environmental impact statement (EIS) analyzes the effects of proposed project construction and operation and recommends conditions for any license that may be issued for the project. In addition to Twin Lakes' proposal, we consider three alternatives: (1) no-action, whereby the project would not be licensed and constructed (staff-recommended alternative); (2) the applicant's proposal with staff modifications (staff licensing alternative); and (3) the staff licensing alternative with mandatory conditions filed by BLM on December 15, 2014, which would add one condition to the previous alternative.

Staff-recommended Alternative

Based on a review of the anticipated environmental and economic effects of the proposed project and its alternatives, as well as the agency and public comments filed on this project, staff recommends no action (license denial) as the preferred alternative. The overall, unavoidable adverse environmental effects of both action alternatives would outweigh the power and water storage benefits of the project.

There are four Commission-licensed hydroelectric facilities located on the Bear River in Idaho with a combined installed capacity of more than 78 MW. These hydroelectric facilities provide a number of substantial beneficial public uses including hydropower generation, water supply, flatwater recreation, and protection and enhancement of fish and terrestrial resources. In providing these benefits, the hydroelectric facilities together impound more than 30 miles of the 185-mile Idaho portion of the Bear River. The proposed Bear River Narrows Project would contribute an additional 10 MW of hydroelectric capacity to the region and up to 5,000 acre-feet of water storage to help stabilize the local irrigation water supply during those times when

demand would otherwise exceed the supply, by in part, impounding an additional 4.5 miles of the Bear River in Idaho. This 4.5-mile reach supports a regionally significant riverine Bonneville cutthroat trout (BCT) recreational fishery, which is attractive due to its quality in terms of numbers and size of fish, its aesthetic setting in an undeveloped canyon, and its easy and open accessibility to the public. The reach also supports regionally significant whitewater kayaking, canoeing, and tubing opportunities for people with a wide range of boating skill levels; similar to the recreational fishery, these recreational activities are attractive because they are available in an aesthetic setting of an undeveloped canyon with easy and open accessibility. In total, the reach supports more than 55,559 recreation user days annually, drawing in about 9,500 anglers each year.

Inundation of this reach would eliminate 4.5 miles of the remaining 11 miles of the Idaho portion of the Bear River accessible to the public for trout fishing and the last remaining whitewater boating opportunity within at least 120 miles of the project site. In addition, the proposed inundation zone currently provides habitat for 48 state-designated sensitive wildlife species. Outside of the proposed project area, these habitats are rare along the Bear River floodplain in the 80-mile reach between the Soda development (part of PacifiCorp's Bear River Project) and Great Salt Lake, which is dominated by agriculture land use, such that the loss of this habitat could reduce the productivity of key wildlife populations. These losses would be an unavoidable and immitigable consequence of licensing the project.

For these reasons, we conclude that any license issued for the proposed project could not be best adapted to a comprehensive plan for improving or developing the Bear River for all of its beneficial public uses, especially its substantial public recreation use at the proposed project site. We, therefore, recommend license denial.

Staff Licensing Alternative

If the Commission decides to issue a license for the proposed Bear River Narrows Project, we make recommendations for environmental measures to be included in any license issued for the project. Under the staff licensing alternative, the project would include most of Twin Lakes' proposed measures listed above with the exception of: (1) acquisition of the Ben Johnson Family Farm site and allocation of the Battle Creek water right associated with the Ben Johnson Family Farm site for the restoration of riparian and wildlife habitat and riverine recreational opportunities: (2) formation of the SMBWC; (3) a year-round Mink Creek minimum flow of 10 cfs; (4) release of water from the Twin Lakes' Mink Creek diversion dam to compensate for evaporation in the proposed reservoir; and (5) the 100-foot conservation buffer from the normal high water mark (at elevation 4,734 feet) of the proposed reservoir.

We do not recommend the first item because development of the Ben Johnson Family Farm site would not be viable mitigation for the impacts on terrestrial and recreation resources. Substantial excavation would be required at a site that overlaps a National Historic Landmark, the Bear River Massacre Site. In addition, because of the

lack of detailed plans and site-specific data regarding this item, as well as the uncertainty on whether Twin Lakes would have suitable water rights, it is not possible to quantify any potential benefits to wildlife habitat and associated wildlife populations that the Ben Johnson Family Farm site may have. Further, the site would not provide adequate riverine recreational opportunities to mitigate for impacts on recreation resources because the distance of the proposed river access from the dam (12.7 miles) would likely be too far for most tubers to comfortably float, and the general lack of current, even with regular releases from the proposed dam, would make the reach unattractive to whitewater boaters.

We do not recommend the second item because the specific projects that would be considered by the SMBWC are not defined, and we have no basis to assess whether or not the benefits would be related to the proposed project and would be worth the associated costs.

We do not recommend the third item because the staff-recommended alternative minimum flow regime would optimize habitat for most lifestages of BCT rather than simply enhancing BCT habitat.

We do not recommend the fourth item because Twin Lakes' proposed measure would result in diminished Bear River flows from the proposed dam to the confluence of Mink Creek (because Twin Lakes would release evaporative compensation flows from the Mink Creek diversion dam), and we are recommending that project outflow, as calculated by the sum of flows at the Mink Creek gage and the staff-recommended gage downstream of the pumping station but upstream of the confluence of Mink Creek, should equal inflow at the proposed project. Under the staff alternative, evaporative compensation flows would be released from the proposed dam. Regarding the fourth item, instead of adopting the proposed 100-foot conservation buffer, we recommend Twin Lakes provide a 300-foot conservation buffer to preserve, protect, and enhance onsite habitat for sensitive wildlife species and to at least partially maintain the migration corridor habitat function lost with the inundation of the existing floodplain.

In addition, the staff licensing alternative would include the following modifications of proposed measures and additional measures:

Project Construction

Geology and Soil Resources

- Address geotechnical issues that pertain to dam stability in the final project design by including additional seismic analysis, further analysis of seepage control measures along the penstock, and the need for training walls along the left abutment and a stilling well at the toe of the dam. The final project design submitted to the Commission for approval would include the updated seismic hazard analysis and the additional analysis of measures to control seepage

along the penstock and erosion during overflow spillway operation and dam overtopping during high flow events.

- Investigate the canyon and both proposed borrow sites during final project design to identify any potential slope failure sites and needed treatment at the sites.
- Revise the proposed Erosion Control Plan to incorporate spoil storage and disposal measures and Idaho Department of Environmental Quality (Idaho DEQ) best management practice (BMP)-11, which pertains to vehicle/equipment washing and maintenance, to minimize construction-related effects on vegetation and water quality.

Aquatic Resources

- Design the proposed replacement of the existing private water diversion structure that would be rendered inoperable by the proposed reservoir so that it would be capable of delivering up to 3.46 cfs (equivalent to the existing water right) at all reservoir water levels.
- Develop a construction flow monitoring plan to ensure that Oneida development flow releases continue to be passed to the Bear River downstream of the project site during project construction and initial reservoir filling.

Terrestrial Resources

- Revise the proposed Revegetation and Noxious Weed Control Plan to: (1) include success criteria based on the existing vegetation community on reference sites with similar vegetation structure; (2) identify locations for photo points that would be used for monitoring; (3) ensure success criteria are met for two consecutive growing seasons; (4) address the need for watering plants at revegetation sites and identify water rights associated with any proposed watering of plantings; (5) include traditional, subsistence, and medicinal plants that tribal members rely upon for traditional purposes; and (6) include provisions for a site steward to oversee management of sites in the plan.
- Use the most recent Avian Power Line Interaction Committee (APLIC) guidelines (APLIC, 2006; 2012) in the final design of the proposed transmission line to ensure protection of birds.

<u>Project Operation/Maintenance</u>

Aquatic Resources

- Develop a hazardous substances management plan to protect water quality during project operation and maintenance.

- Revise the proposed DO Management Plan to provide details on how proposed potential corrective actions would ensure that water quality standards are met, and on options that would be evaluated if these actions do not result in compliance with the standards.
- Provide a 20-cfs minimum flow from Twin Lakes' Mink Creek diversion dam from April through September and 15 cfs from October through March to optimize habitat for most lifestages of BCT in Mink Creek, as mitigation for the loss of BCT habitat in the Bear River once the reservoir is filled.
- Develop an operation compliance monitoring plan to document compliance with requirements to: (1) maintain flow releases in the Bear River downstream of its confluence with Mink Creek that are equivalent to flow releases from the Oneida development, except when refilling the proposed reservoir; (2) maintain minimum flows in the Bear River downstream of Bear River Narrows dam that are at or above 251 cfs, or inflow whichever is less, when the reservoir is refilling; (3) maintain Mink Creek minimum flows to protect BCT; and (4) establish and maintain project reservoir refill rates and drawdowns so as to protect aquatic and recreational resources in the proposed reservoir.
- Develop a plan to control non-native fish species in Mink Creek (e.g., brook trout, brown trout) that provides details on the control measures to be used and how they would be consistent with Idaho Fish and Game objectives to reduce interspecific competition with and predation on BCT.
- Develop a plan to remove fish passage barriers in Mink Creek that provides details on how fish barriers would be removed to: (1) facilitate upstream BCT passage to additional BCT habitat in Mink Creek; and (2) avoid any increase in upstream passage of non-native fish species that adversely affect BCT through interspecific competition and predation.
- Develop a fish screen installation and maintenance plan that provides details on the fish screens to be installed at Twin Lakes' Mink Creek irrigation canal intake and the proposed pumping station, including their design that has been determined in consultation with the agencies, as well as protocols for regular maintenance, to prevent entrainment of fish into the canal.

Terrestrial Resources

- Develop a terrestrial mitigation plan to include the following wetland and riparian habitat measures: (1) a schedule for mitigation actions; (2) detailed wetland and riparian planting plans; (3) provisions to include riparian plantings along the entire reservoir perimeter; and (4) provisions for monitoring the success of riparian planting and restoration.

- Develop a terrestrial mitigation plan to include the following wildlife measures: (1) a description of the number and locations for raptor and landbird nesting platforms and boxes to mitigate for project effects on nesting habitat; and (2) details of fencing design to exclude cattle from the buffer zone while allowing safe passage for wildlife to mitigate for project effects on the existing riparian wildlife migration corridor.
- Provide a shoreline buffer of 300 feet from the normal high water elevation of the proposed reservoir (4,734 feet) to provide suitable area around the reservoir to promote continued use as a wildlife movement corridor and protect remaining scenic resources associated with Oneida Narrows.

Recreation Resources

- Develop a recreation plan in consultation with stakeholders, to outline the design, construction, operation and maintenance, and long-term management policies of the proposed recreation facilities and recreation use at the project to provide a process for meeting recreation needs as they change over time.

Land Use Resources

- Develop a land management plan that includes site-specific plans for any ground-disturbing activities at the project, a discussion of ongoing project effects on lands associated with the project and management measures to protect those lands, provisions for monitoring land use, and periodic consultation with agencies and stakeholders over the term of a new license.

Cultural Resources

- Revise the 2013 HPMP and 2014 Addendum to address the Commission's comments received by the parties to the Commission's Restricted Services List to ensure protection of archaeological and historic resources at the project.

Environmental Impacts and Measures of the Staff Alternatives

The primary issues associated with constructing and operating the project are effects of project construction, operation, and maintenance on instream flows and water quality; loss of fish, botanical, and wildlife habitat; loss of recreational resources; effects on aesthetics; offsite mitigation for lost habitat in the portion of the Bear River to be inundated by the proposed reservoir, including aquatic (especially BCT), terrestrial, riparian, wetland, and wildlife habitat; protection and management of federally listed and special status species; vegetation management; management of noxious weeds and invasive plants; recreation access; management and maintenance of recreation sites; and protection of cultural resources.

Under the staff-recommended alternative, which is license denial, the project would not be constructed, and there would be no associated effects on existing environmental resources in the project area.

Below we summarize the environmental effects associated with constructing and operating the project if the Commission decides to authorize the project and the staff measures recommended to mitigate those effects.

Geology and Soils Resources

Construction

Twin Lakes' preliminary design is to construct the project as a zoned embankment dam using local materials that would be compacted during construction. The downstream face of the dam would be covered with RCC to prevent erosion during floods exceeding the capacity of the service spillway. Twin Lakes is considering several measures to prevent excessive seepage at the dam and penstock.

As part of the licensing process, the Commission reviews the adequacy of proposed project facilities. After reviewing the geotechnical aspects of the preliminary design report, we conclude that, in general, the project is appropriately designed for the site. However, if the project is licensed, during final design, we recommend additional study of the effect of potential earthquakes on the proposed dam and further evaluation of the need for additional seepage control, both along the dam and the penstock.

Construction-related ground-disturbing activities have the potential to degrade water quality by causing erosion and sedimentation. Water bodies also can be affected during construction from substances introduced by improperly washed construction equipment. Twin Lakes proposes to improve the draft Erosion Control Plan by revising the plan based on a more final project design. We agree Twin Lakes would be able to improve the plan once final design is complete. However, because the draft plan does not address proper washing of construction equipment, we recommend that Twin Lakes add the measure to the final project plan.

Operation

During project operation, when the reservoir is drawn down, there could be increases in turbidity and total suspended solids from re-suspension and erosion of exposed sediments in the downstream reach. Our analysis of Twin Lakes' erosion studies shows that any such increases would be consistent with applicable water quality standards.

Aquatic Resources

Construction

Ground-disturbing activities and construction of project facilities could result in increased turbidity and sedimentation in the Bear River, while use of heavy machinery could result in unintended releases of hazardous substances (such as spills of lubricants).

Our recommendations to develop a project operation and maintenance hazardous substances management plan, using similar BMPs to those included in the draft Erosion Control Plan, would ensure protection of water quality during construction. Twin Lakes would maintain streamflows during construction equal to the outflow from the upstream Oneida development. Our recommended construction flow monitoring plan would enable immediate corrective actions to be taken if inflow is not passed downstream of the dam site during construction.

Operation

Project operation would likely modify water quality in project releases associated with changing water temperatures and DO as a result of reservoir stratification. Proposed project releases, however, would result in some improvement to downstream water quality in some months compared to existing conditions, with cooler outflows and higher DO levels (as predicted by modeling), particularly during the spring and early-summer period. Compared to the base case, modeling predicted that the frequency of exceeding the state water temperature standards during the summer months would be reduced under proposed project operations. Because DO could be adversely affected during some operating conditions, we also recommend that Twin Lakes revise the proposed DO Management Plan to clearly define corrective actions that would be taken if downstream DO concentrations fall below current state standards, to ensure project water quality is protected and, if needed, remedial actions are taken.

Another effect of the proposed project would be the loss of nearly half of the available riverine habitat for BCT in the Bear River from Oneida dam downstream to the Idaho/Utah border, a distance of about 39 river miles. This entire 39-mile reach of the Bear River is not suitable habitat for BCT. The most suitable BCT habitat is in the 10 river miles immediately downstream of Oneida dam. This habitat is suitable for BCT rearing but not highly suitable for spawning. Bear River mean daily water temperature currently exceeds the Idaho surface water quality standard for salmonid spawning (≤9 degrees Celsius [°C]) during most of spring/early-summer spawning period for BCT. Protecting and enhancing the habitat that remains following project construction and inundation by the proposed reservoir would reduce the adverse effects on this species caused by the loss of habitat.

Twin Lakes' proposal to match project outflow to project inflow and maintain a minimum flow of 251 cfs would ensure habitat downstream of the proposed dam site is protected. Our recommended minimum flow regime downstream of the Twin Lakes' Mink Creek diversion dam would enhance habitat for all lifestages of BCT in Mink Creek. However, even with the minimum flows to protect BCT habitat in Bear River and

enhance BCT habitat in Mink Creek, construction of the project would still reduce availability of suitable habitat for BCT relative to existing conditions.[11]

Our recommended fish screen at Twin Lakes' Mink Creek irrigation canal intake structure would prevent entrainment of BCT into the Twin Lakes' irrigation system, keep them in Mink Creek where suitable habitat exists, and enhance BCT production in Mink Creek, benefiting the Bear River BCT population.

Our recommended operation compliance monitoring plan would ensure that required minimum flows are being maintained and that the proposed reservoir would be operated in a manner so as to protect aquatic resources to the extent possible.

Our recommended fish screen at the proposed Bear River pumping station would prevent nuisance fish from being introduced to Twin Lakes' storage reservoirs, which currently support populations consisting primarily of game fish, and would prevent other Bear River native and non-native fishes from being entrained and transported into Twin Lakes' irrigation system and thus lost to the Bear River fishery.

Terrestrial Resources

Construction

Construction of the proposed project would result in the loss of 425 acres of wildlife habitat along the Bear River and alteration of additional habitat caused by project construction and operation within the 1,196-acre project boundary. Affected habitats include grass-forb dominated riparian, broadleaf riparian forest, maple, foothills grassland, and Utah juniper. The lost riparian habitats (about 90 acres) would represent approximately 25 percent of such habitats in the proposed project area. These riparian habitats are of particular importance because of their disproportionately high use by wildlife and their rarity outside of the proposed project area, with the Bear River floodplain in the 80-mile reach between the Soda development (part of PacifiCorp's Bear River Project) and Great Salt Lake largely dominated by agricultural land use. Reservoir fluctuations during project operation would affect shoreline habitat.

Proposed measures could result in the development of up to 49 acres of riparian habitat along Condie and Winder reservoirs, and 15 acres could potentially develop along the Bear River Narrows reservoir; this habitat would take 30 to 50 years to reach the quality of existing habitat. Our recommendation to require wetland plantings along the Bear River Narrows reservoir would speed the development of shoreline habitat. Development of habitat at the Ben Johnson Family Farm site, as proposed by Twin

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[11] Mink Creek could only provide about 6, 13, 15, and 77 percent of the BCT adult, juvenile, fry, and spawning habitat, respectively, that would be lost by inundation of Bear River BCT habitat.

Lakes, may offer some habitat of equivalent value to that which would be lost, but we have determined that use of this site for mitigation is not feasible (see discussion in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*. Because no alternative mitigation sites have been identified, and it is unknown whether suitable sites exist near the project or if mitigation would be feasible, we are unable to recommend specific measures to offset project effects. Therefore, the project would result in the unavoidable long-term loss of wildlife habitat for important wildlife species, including mule deer, rock squirrel, northern leopard frog, bats, bald eagle, and migratory birds.

Operation

We recommend that Twin Lakes revise its Revegetation and Noxious Weed Control Plan to provide more details regarding how to ensure success of revegetation efforts following ground disturbances. Successful revegetation would prevent erosion and therefore protect adjacent water quality.

Recreation Resources

Operation

The proposed project would eliminate four formal recreational facilities and numerous informal recreational access sites along 4.5 miles of the Bear River. The project would also replace the existing riverine angling, boating, and tubing opportunities in what would be an inundated reach of Oneida Narrows, which is currently a Class I and Class II whitewater boating and tubing resource, with lake angling and boating opportunities. Public access to the scenic Oneida Narrows would remain unchanged. Our recommendation to implement Twin Lakes' proposed recreation measures, including constructing recreational facilities at the new reservoir and immediately below the proposed dam, under the staff licensing alternative would mitigate for some of the lost recreation opportunities, but the loss of the Class I and II whitewater boating and tubing resource would be an unavoidable adverse effect. Outside of Oneida Narrows, the nearest whitewater boating experience is 120 miles away. The recreational experience at the proposed reservoir would be similar to many existing opportunities in the area,[12] and recreational opportunities downstream of the proposed dam would be focused on a relatively slow-moving reach of the river. Further, downstream from the project, the river is not a trout fishery like the reach that would be inundated, but a reach dominated by carp and suckers. The altered environment would represent a substantial difference in the types of the recreational opportunities available compared to what currently exists. Our recommended recreation plan would allow staff and the agencies to provide input on the site design, operation and maintenance, and long-term management of recreation facilities at the project.

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[12] Similar recreational reservoirs in the area include the existing Oneida dam reservoir and Twin Lakes' Condie and Winder reservoirs.

Land Use and Aesthetics

Construction

Land use and the current scenic quality of Oneida Narrows would be substantially changed with the construction of the proposed project. Land currently managed for conservation purposes by PacifiCorp (350 acres) and BLM as part of the settlement agreement under PacifiCorp's Bear River Project license would be inundated. Some of the affected land is designated by BLM as research natural area/area of critical environmental concern (89 acres within the proposed project boundary) with the purpose of protecting important plants, wildlife, and natural landscapes. The altered land use that would occur with project construction would necessitate coordination among BLM and other state and federal agencies, PacifiCorp, and private landowners that would lose conservation and agricultural land (approximately 600 acres) if the project was licensed and constructed.

Operation

The staff-recommended land management plan, which would be developed in consultation with these parties, would enable proposed project land to be managed in accordance with applicable plans, policies, and regulations within the altered landscape to maintain protection of plants and wildlife and the natural landscape surrounding the project.

Cultural Resources

Construction

The proposed project construction could potentially adversely affect cultural resources at the project. The revised HPMP would require Twin Lakes, in consultation with the Idaho State Historic Preservation Officer (Idaho SHPO), to: (1) identify all historic properties (including but not limited to traditional cultural properties); and (2) to assess the potential adverse effects of Twin Lakes' proposals on documented historic properties. The results of these studies would be used to develop and implement appropriate mitigation measures to resolve any adverse effects in accordance with the National Historic Preservation Act and its implementing regulations found at 36 Code of Federal Regulations (CFR) 800.6.

Operation

Developing a revised HPMP and revised Addendum 1, in consultation with the tribes, Idaho SHPO, Advisory Council on Historic Preservation, National Park Service, BLM, Franklin County Commissioners, Cultural Resources Working Group, and the Commission would mitigate for adverse project effects. Among other items identified by the consulting parties, the revised HPMP and Addendum would contain: (1) a clear map or maps of all lands within the project's areas of potential effects (APEs); (2) plans to identify and evaluate cultural resources within the project APEs; (3) detailed plans and mitigation measures for various activities and situations that could adversely affect

historic properties; (4) protocols for communication and consultation with the consulting parties throughout any new license term; and (5) regular review and revision of the HPMP in consultation with the Idaho SHPO and Cultural Resources Working Group.

Socioeconomic Resources

Construction

In the short term, construction of the proposed project would contribute additional employment and income to the regional economy requiring about 60 full-time jobs over the 3-year construction period.

Operation

Long-term benefits during project operation would be minor, and associated with one or two full-time operation and maintenance staff, purchasing supplies and equipment, and payment of taxes and use fees. There would likely be fewer people visiting Oneida Narrows for recreational purposes after project construction, with associated loss in revenues to local business establishments. The new reservoir would allow Twin Lakes to store and transfer water from the reservoir to its irrigation system for agricultural use during dry years. During the period between 1990 and 2010, this would have resulted in an average annual transfer of 3,110 acre-feet, which would have reduced loss of farm production during periodic drought conditions valued at about $146,170 per year.

Air Quality

Construction

During project construction, there would be air emissions from equipment exhaust and fugitive dust. The project would be located in an area that currently exceeds the National Ambient Air Quality Standards for inhalable dust emissions. We analyzed the potential air quality effects during construction to determine whether project construction would exceed the threshold for dust emissions and find that project emissions would be well below the threshold.

Conclusions

Based on our analysis, we recommend denying a license for the project. The proposed project would make an additional 5,000 acre-feet of stored water available during dry water years to serve local irrigation needs for the 236,000 acres in farming and generate 48,531 MWh of power with an installed capacity of 10 MW to help meet a projected regional need of 10,415 MW over the next 10 years. Despite the project's potential benefits, the project would result in the following significant, unavoidable adverse effects, even with proposed and recommended mitigation measures:

1. permanent loss of a 4.5-mile section of the Bear River with outstandingly remarkable recreational values, as designated by BLM in its wild and scenic eligibility report (BLM, 1995), including a regionally significant recreational

river-fishery and whitewater resource in an undeveloped canyon with easy and open accessibility to the public;

2. substantial reduction in the size of the cutthroat trout fishery, a fishery of recreational significance, because of the permanent loss of 4.5 miles of mainstem Bear River fluvial BCT habitat;
3. substantial reduction in the diversity or population of up to 48 state-designated sensitive wildlife species because of the permanent loss of about 425 acres of wildlife habitat along the Bear River riparian corridor from inundation and proposed project facilities; habitat that is seldom replicated along the 80-mile-long reach between the Soda development and Great Salt Lake;
4. permanent loss of 249 acres of designated PacifiCorp-owned conservation land that is a critical component of the Bear River Project licensing settlement agreement,[13] 202 acres of which are within the existing Bear River Project's project boundary;
5. permanent loss of 55 acres of designated Research Natural Area/Area of Critical Environmental Concern land managed by BLM and designed to protect sensitive plants (e.g., bigtooth maple, box-elder riparian, Rocky Mountain juniper, and bunchgrass) and wildlife (e.g., bald eagle and rock squirrel habitats); and
6. degradation of aesthetics via the conversion of the scenic Oneida Narrows into a hydroelectric project with a large dam, powerhouse, transmission facilities, and roads.

In section 4.2 of the EIS, we estimate the likely cost of alternative power for each of the three alternatives identified. Under the no-action alternative, which is also the staff-recommended alternative, the project would be denied a license and would not be constructed. Under the proposed action alternative, project power would cost $1,108,210, or $22.84/MWh less than the likely alternative cost of power. Under the staff-recommended alternative, which is the no-action alternative, the project would be denied a license and would not be constructed.

If the Commission decides to issue a license for the project, staff has developed a separate licensing alternative with measures that we recommend for inclusion in a license. The staff licensing alternative does not include a recommendation for one mandatory condition, which is development and implementation of a law enforcement

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[13] This comprehensive Settlement Agreement was filed by PacifiCorp on September 26, 2002, and approved by the Commission in the Order Approving Settlement Agreement and Issuing New License Issued on December 22, 2003; 105 FERC ¶62,207.

and emergency services plan. Under this alternative, our analysis indicates that project power would cost $1,082,010, or $22.30/MWh less than the likely alternative cost of power. If the Commission decides to issue a license for the project, staff has also developed a separate licensing alternative that would include measures that we recommend for inclusion in a license as well as the mandatory condition that is not recommended by staff. Under this alternative, our analysis indicates that project power would cost $1,051,800, or $21.67/MWh less than the likely alternative cost of power.

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DRAFT ENVIRONMENTAL IMPACT STATEMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, D.C.

Bear River Narrows Hydroelectric Project
FERC Project No. 12486—Idaho

1.0 INTRODUCTION

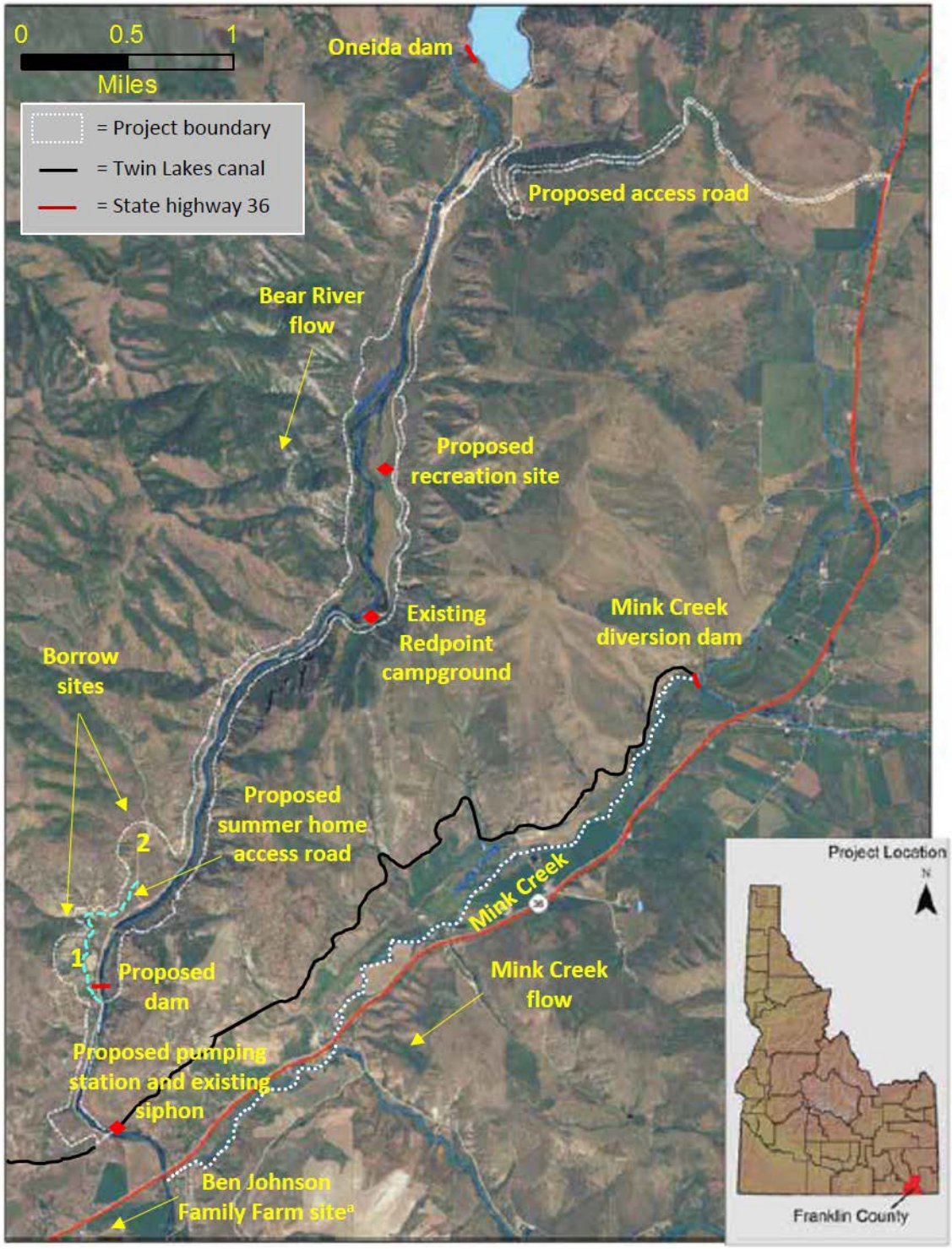
1.1 APPLICATION

On November 27, 2013, Twin Lakes Canal Company (Twin Lakes or applicant) filed an application for an original license for the Bear River Narrows Project (project) with the Federal Energy Regulatory Commission (Commission or FERC). The 10-megawatt (MW) hydropower project would be located in Franklin County in southeastern Idaho on the Bear River. It would generate about 48,531 megawatt-hours (MWh) of electricity annually. The project would be located approximately 9 miles northeast of Preston, Idaho (figure 1-1). The proposed dam would impound a new, 362-acre reservoir located directly downstream of the existing Oneida development, which is part of the Bear River Project (FERC No. 20) and inundate 4.5 miles of the Bear River. The project would occupy 243 acres of federal land managed by the U.S. Department of the Interior, Bureau of Land Management (BLM).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Bear River Narrows Project is to provide a new source of hydroelectric power and water storage for irrigation. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to Twin Lakes for the Bear River Narrows Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission 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), the Commission 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.



Note: The Ben Johnson Family Farm site is 12.7 miles downstream of the proposed dam (for details of the site, see figures 3-21 and 3-22).

Figure 1-1. Location of the Bear River Narrows Hydroelectric Project (Source: Twin Lakes, 2013, as modified by staff).

Issuing an original license for the Bear River Narrows Project would allow Twin Lakes to generate electricity at the project for the term of a license, making electrical power from a renewable resource available to its customers. The project would store up to 5,000 acre-feet of water that could be transferred to Twin Lakes' irrigation system for distribution to its shareholders in dry years when water available for irrigation is limited.

This draft environmental impact statement (EIS) assesses the effects associated with construction and operation of the project and alternatives to the proposed project. It also includes recommendations to the Commission on whether to issue an original license, and if so, includes the recommended terms and conditions to become a part of any license issued.

In this draft EIS, we assess the environmental and economic effects of constructing and operating the project: (1) as proposed by the applicant, (2) with our recommended measures, and (3) with any mandatory conditions prescribed by state and federal agencies. We also consider the effects of the no-action alternative, in which the project would not be licensed or constructed. Important issues that are addressed include effects of construction and operation on geology and soils; water quality; aquatic resources, including Bonneville cutthroat trout (BCT); vegetation and wildlife; recreation; cultural resources; land use and aesthetics; and socioeconomics.

1.2.2 Need for Power

Twin Lakes is an irrigation company that stores and provides irrigation water for agriculture. The proposed Bear River Narrows Project would be a combined water storage and hydroelectric power generation project. The purpose of the generation would be to provide revenue to fund construction of the water storage reservoir. Future revenue from power generation would be used for upgrades to the Twin Lakes water conveyance system. The project would have an installed capacity of 10 MW and generate approximately 48,531 MWh per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Bear River Narrows Project would be located in the Northwest Power Pool (NWPP) subregion of NERC's Western Electricity Coordination Council region. According to NERC's 2014 forecast, annual net internal demand requirements for the winter-peaking NWPP subregion are projected to grow at a rate of 1.36 percent from 2015 through 2024 (NERC, 2014). NERC projects resource capacity margins (generating capacity in excess of demand) will range from 18.16 percent to 17.68 percent of firm peak demand during the 10-year forecast period, including estimated new capacity additions and retirement of existing coal-fired facilities. Over the next 10 years, NWPP estimates that about 10,415 MW of additional capacity will be brought on line.

We conclude that power from the project would help Twin Lakes meet its revenue goals and also help meet a need for power in the project area in both the short and long term as additional coal-fired facilities are retired. The proposed project would provide

low-cost power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Bear River Narrows Project would be subject to numerous requirements under the FPA and other applicable statutes, as summarized below.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of the U.S. Department of Commerce or the U.S. Department of the Interior (Interior). Interior, by letter filed on December 15, 2014, requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

1.3.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation will be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. BLM filed conditions on December 15, 2014, pursuant to section 4(e) of the FPA. These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission 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. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission 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 Idaho Department of Fish and Game (Idaho Fish and Game) timely filed, on December 16, 2014, recommendations under section 10(j) as summarized in table 5-2, in section 5.4.1, *Fish and Wildlife Agency Recommendations*. In section 5.2, we also discuss how we address the agency recommendations and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On April 8, 2014, Twin Lakes applied to the Idaho Department of Environmental Quality (Idaho DEQ) for 401 water quality certification (WQC) for the Bear River Narrows Project. Idaho DEQ received this request on April 10, 2014. On January 14, 2015, Twin Lakes withdrew its WQC request and resubmitted it to Idaho DEQ. Idaho DEQ received this request on January 14, 2015. Idaho DEQ has not yet acted on the request. The WQC is due by January 14, 2016.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Although no federally listed threatened or endangered species are known to occur in the area that would be affected by the proposed project, the threatened Canada lynx (*Lynx canadensis*) is known to occur in Franklin County, in areas away from the proposed project (FWS, 2015). There is no designated critical habitat for this species in the project vicinity. Our analysis of project impacts on threatened and endangered species is presented in section 3.3.4, *Threatened and Endangered Species*.

We conclude that licensing the Bear River Narrows Project, as proposed with staff-recommended measures, would have no effect on Canada lynx because there is no suitable habitat for this species, or for snowshoe hare, its preferred prey species, in the project area.

1.3.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the construction and operation of the proposed project. The terms of the PA would ensure that the Twin Lakes addresses and treats all historic properties identified within the project's area of potential effects (APE) through the finalization of the existing draft Historic Properties Management Plan (HPMP) and its Addendum 1 addressing the Ben Johnson Family Farm mitigation land.

1.3.5 Pacific Northwest Power Planning and Conservation Act

Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act (Northwest Power Act), the Northwest Power and Conservation Council (Council) developed the Columbia River Basin Fish and Wildlife Program to protect, mitigate, and enhance the operation of the hydroelectric projects within the Columbia River Basin. Section 4(h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies shall take into account, to the fullest extent practicable, the program adopted under the Northwest Power Act.

The *Protected Areas Amendments and Response to Comments* (1988) is an adopted amendment by the Council to designate and protect critical fish and wildlife habitat. This is a formal amendment to the Columbia River Basin Fish and Wildlife Program, which covers the Columbia Basin, and the Northwest Power Plan, which covers the entire states of Idaho, Oregon, Washington, and western Montana. The authority of the Council to designate protected areas in the Columbia River Basin and other parts of the region originates from section 4(h) and section 4(e) of the Northwest Power Act, respectively. Designated protected areas are those areas afforded the single standard of protection from no new hydroelectric development. The Council has designated more than 40,000 miles of river in the Pacific Northwest region as not being suitable for hydroelectric development. This does not prohibit hydroelectric development in protected areas, but the Council calls on the Commission not to issue a license in a protected area, and calls on the Bonneville Power Administration not to acquire the power from such a project if one were to be licensed by the Commission, nor to allow access to the power grid in a way that would undermine the protected areas policy. According to the most recent list of protected areas, the proposed project reach of the Bear River, from Oneida reservoir to its confluence with Mink Creek, is protected for wildlife (Northwest Power Planning Council, undated). Other values cited for this reach include: resident fish (substantial), wildlife (outstanding), natural features (outstanding), recreation (substantial), and cultural (unknown). Therefore, we find that the proposed project would be inconsistent with the protected areas amendment, and by extension, the Northwest Power Act. Because the proposed project would be within a designated protected area, there would be no mitigative measure(s) that would adequately resolve this inconsistency.

However, if hydroelectric development proceeds, the program directs that agencies responsible for that development consult with federal and state fish and wildlife agencies, appropriate Indian tribes, and the Council during the study, design, construction, and operation of any hydroelectric development in the basin. At the time the Bear River Narrows Project license application was filed, our regulations required Twin Lakes to consult with the appropriate federal and state fish and wildlife agencies and tribes before filing, and after filing, to provide these groups with opportunities to review and comment on the application. Twin Lakes has followed this consultation

process, and the relevant federal and state fish and wildlife agencies and tribes have reviewed and commented on the application.

To mitigate harm to fish and wildlife resources, the Council has adopted specific provisions to be considered in the licensing of future hydropower projects (appendix F of the program). The specific provisions that apply to the proposed project call for: (1) full compensation for unavoidable fish losses or fish habitat losses through habitat restoration or replacement, appropriate production, or similar measures consistent with the provisions of this program; (2) assurance that the project would not degrade water quality beyond the point necessary to sustain sensitive fish species (as designated in consultation with the fish and wildlife agencies and tribes); (3) avoiding inundation of wildlife habitat, insofar as practical; (4) timing construction activities, insofar as practical, to reduce adverse effects on nesting and wintering grounds; (5) locating temporary access roads in areas to be inundated; (6) avoiding all unnecessary or premature clearing of land before filling the reservoir; (7) providing artificial nest structures when appropriate; (8) avoiding construction, insofar as practical, within 250 meters of active raptor nests; (9) avoiding critical riparian habitat (as designated in consultation with the fish and wildlife agencies and tribes) when clearing, rip-rapping, dredging, disposing of spoils and wastes, constructing diversions, and relocating structures and facilities; (10) replacing riparian vegetation if natural revegetation is inadequate; (11) regulating water levels to reduce adverse effects on wildlife during critical wildlife periods (as defined in consultation with the fish and wildlife agencies and tribes); (12) improving the wildlife capacity of undisturbed portions of new project areas (through such activities as managing vegetation, reducing disturbance, and supplying food, cover, and water) as compensation for otherwise unmitigated harm to wildlife and wildlife habitat in other parts of the project area; (13) acquiring land or management rights, such as conservation easements, where necessary to compensate for lost wildlife habitat at the same time other project land is acquired and including the associated costs in project cost estimates; (14) funding operation and management of the acquired wildlife land for the life of the project; (15) granting management easement rights on the acquired wildlife lands to appropriate management entities; and (16) collecting data needed to monitor and evaluate the results of the wildlife protection efforts.

If the Commission decides to issue a license for the Bear River Narrows Project, our recommendations in this draft EIS (section 5.2) are consistent with many of the applicable provisions of the program listed previously in this section. However, the proposed project with our recommendations would not be consistent with items (1), (3), and (9). A condition of any license issued would reserve to the Commission the authority to require future alterations in project structures and operation to take into account, to the fullest extent practicable, the applicable provisions of the program.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [CFR], section 4.38) require that applicants consult with appropriate resource agencies, tribes, and other

entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, ESA, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EIS, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on February 13, 2007. It was noticed in the F*ederal Register* on February 26, 2007. Two scoping meetings, both advertised in local newspapers, were held in Preston, Idaho, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

Commenting Entity	Date Filed
Interagency Rangewide Bonneville Cutthroat Trout Conservation Agreement Members	March 20, 2007
Idaho Sportsmen's Caucus Advisory Council	March 29, 2007
Bear Lake Watch, Inc.	April 9, 2007
U.S. Department of the Interior, National Park Service	April 9, 2007
Franklin County Fish & Game Association	April 10 and 13, 2007
U.S. Department of Agriculture, Forest Service, Intermountain Region	April 11, 2007
Idaho Rivers United	April 13, 2007
U.S. Department of the Interior, Fish and Wildlife Service	April 13, 2007
U.S. Department of the Interior, Bureau of Land Management	April 13, 2007
Idaho Department of Parks & Recreation	April 13, 2007
Greater Yellowstone Coalition	April 13, 2007
Shoshone Bannock Tribe	April 16, 2007
Trout Unlimited	April 16, 2007
Idaho Department of Fish and Game	April 16, 2007
Great Salt Lakekeeper	April 16, 2007

Commenting Entity	Date Filed
American Whitewater	April 16, 2007
Bear River Water Users Association	April 16, 2007
Idaho Department of Environmental Quality	April 16, 2007
Bridgeland Audubon Society	April 16, 2007
Riverdale Irrigation Company	April 16, 2007
PacifiCorp Energy	April 16, 2007
PacifiCorp Energy	May 5, 2007

In addition, 49 individuals filed written scoping comments with the Commission. These individuals are listed in appendix A1. A revised scoping document (SD2) addressing these comments was issued on August 14, 2007.

1.4.2 Interventions

On October 17, 2014, the Commission issued a notice that Twin Lakes had filed an application for an original license for the Bear River Narrows Project. This notice set December 16, 2014, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

Intervenor	Date Filed
Oneida Narrows Organization	October 22, 2014*
Greater Yellowstone Coalition	November 14, 2014*
Franklin County Fish and Game Association	November 20, 2014*
Yellowstone to Uintas Connection	December 5, 2014*
American Whitewater and Idaho Rivers United	December 11, 2014*
U.S. Department of Agriculture, Forest Service, Intermountain Region	December 11, 2014
Ben Johnson Family Farm	December 15, 2014*
Trout Unlimited	December 16, 2014*
PacifiCorp Energy	December 16, 2014*
State of Idaho Agencies: Idaho Department of Environmental Quality; Idaho Department of Fish and Game; Idaho Department of Parks and Recreation; Idaho State Board of Land Commissioners; Idaho Water Resource Board; Idaho Department of Water Resources	December 16, 2014

Intervenor	Date Filed
U.S. Department of the Interior	December 16, 2014
Bear Lake Watch	December 16, 2014*
Shoshone-Bannock Tribes	December 16, 2014*

* Interventions in opposition to licensing the project

On December 17, 2014, Great Salt Lakekeeper filed a late motion to intervene in opposition to the proposed project. No action has been taken on that late motion.

1.4.3 Comments on the Application

A notice requesting comments, preliminary terms and conditions, and recommendations was issued on October 17, 2014. The following entities commented:

Commenting Agency and Other Entity	Date Filed
Franklin County Fish and Game Association	November 20, 2014
Yellowstone to Uintas Connection	December 5, 2014
American Whitewater and Idaho Rivers United	December 11, 2014
Upper Snake River Tribes Foundation	December 15, 2014
U.S. Department of the Interior	December 15, 2014
U.S. Department of Agriculture, Forest Service Intermountain Region	December 16, 2014
State of Idaho Agencies: Idaho Department of Environmental Quality; Idaho Department of Fish and Game; Idaho Department of Parks and Recreation; Idaho State Board of Land Commissioners; Idaho Water Resource Board; Idaho Department of Water Resources	December 16, 2014
Greater Yellowstone Coalition	December 16, 2014
PacifiCorp Energy	December 16, 2014
U.S. Army Corps of Engineers	December 16, 2014
Trout Unlimited	December 16, 2014
Great Salt Lakekeeper	December 17, 2014
Wasatch Audubon Society	December 17, 2014
U.S. Environmental Protection Agency	December 19, 2014
Idaho Water Users Association	January 22, 2015

In addition to the entities listed above, a total of 210 individuals filed comments in response to the Commission's notice. These individuals are listed in appendix A2.

Twin Lakes filed reply comments on January 23, 2015.

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2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is license denial. Under the no-action alternative, the proposed project would not be built, and the environmental resources in the proposed project area would not be affected.

2.2 APPLICANT'S PROPOSAL

2.2.1 Project Facilities

The proposed Bear River Narrows Project would include the following new facilities: dam, spillway, reservoir, intake structure, penstock, powerhouse, substation, transmission line, access roads, and recreation facilities. A 690-foot-long, 109-foot-high, earthen dam would be constructed with an overlayment of roller compacted concrete (RCC) and a crest at elevation 4,734 feet above mean sea level.[14] A 40-foot-wide concrete open-channel spillway integral with the dam would be constructed that would have a crest at elevation of 4,718 feet and two 20-foot-wide radial gates. A 4.5-mile-long reservoir would be created by the dam with a surface area of 362 acres at the normal maximum elevation of 4,734 feet, and a useable storage volume of 5,000 acre-feet between elevation 4,718 feet and elevation 4,734 feet. A 48-foot-wide, 16-foot-long, 20-foot-high concrete intake structure would be constructed in the reservoir with a bar screen trashrack with 1.5-inch clear space openings, an invert opening elevation of 4,630 feet, and a top opening elevation of 4,650 feet. A new 600-foot-long, 14-foot-diameter spiral welded steel penstock would lead from the intake structure, through the dam, to the powerhouse. An 80-foot-wide, 52-foot-long, 24-foot-high Bear River Narrows Project powerhouse would be constructed downstream of the dam with a concrete substructure and steel superstructure housing (a) two generating units, each with a 7,020-horsepower (5,250 kilowatt) vertical Francis-type turbine and a 5,000-kilowatt (5,555-kilovolt-amperes at a 0.86 power factor) generator; (b) one 120-inch-diameter butterfly bypass valve with a 66-inch orifice; and (c) a 48-inch-diameter cone bypass valve. A transformer substation would be located near the powerhouse. A 0.74-mile-long, 46-kilovolt, three-phase transmission line would be constructed from the substation to the point of interconnection with the nearby PacifiCorp Energy (PacifiCorp) transmission line. Two paved access roads would be constructed: a reservoir access road extending 3.1 miles from Highway 36 to the existing Oneida Narrows Road near PacifiCorp's Oneida powerhouse[15] and a section of roadway extending 1.1 miles from Oneida

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[14] All elevations are provided as above sea level datum unless otherwise noted.

[15] PacifiCorp's Oneida development is part of the Bear River Project (FERC Project No. 20).

Narrows Road near the proposed Bear River Narrows powerhouse site to an existing access road for summer homes near the proposed reservoir.

A new, 4.1-acre, multi-use recreation facility, including a campground, day-use area, boat ramp, and hiking trail, would be constructed on the east side of the proposed reservoir to replace the existing Redpoint Campground that would be inundated by the reservoir. A river access and boat launch with a gravel parking area would be constructed downstream of the proposed powerhouse along the Bear River. A 538-acre conservation parcel (referred to as the Ben Johnson Family Farm site), located approximately 12 miles downstream of the powerhouse, would be acquired and a boat launch, access road, parking area, and bathroom facility would be constructed on the parcel.

Temporary features would include two borrow areas (a 25-acre "southern" site immediately adjacent to the dam site and a 33-acre "northern" site located about 0.5 mile upstream of the dam site), and two cofferdams (a 700-foot-long upstream cofferdam and a 150-foot-long downstream cofferdam).

A concrete pumping station with two 800-horsepower pumps would be installed at the Bear River 0.8 mile downstream of the powerhouse to pump water into Twin Lakes' irrigation system water canal; however, the pumping station is not proposed to be a licensed project facility. The Twin Lakes' Mink Creek diversion dam[16] is not proposed to be a licensed project facility; however, it would be used to control flow releases to Mink Creek to enhance BCT habitat and ensure that adequate flows are maintained in the Bear River downstream of the proposed pumping station.

The proposed project boundary would encompass all of the facilities listed above, including the conservation parcel, pumping station, Twin Lakes' Mink Creek diversion dam, and Mink Creek from the diversion dam to the confluence with the Bear River at a width from the high water mark on each bank of Mink Creek. The project boundary would encompass 1,196 acres of land, of which 243 acres are federal land administered by BLM.

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to

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[16] Mink Creek is a tributary to the Bear River that enters the Bear River about 1.2 miles downstream of the proposed Bear River Narrows dam. Twin Lakes' Mink Creek diversion dam is located 4.2 miles upstream of the confluence of Mink Creek with the Bear River.

Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, any license issued would require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant's safety report for Commission review.

2.2.3 Project Operation

The main project purposes would be for irrigation storage and hydroelectric power. Figure 2-1 shows a schematic of the project and non-project features and how flows would pass through them.

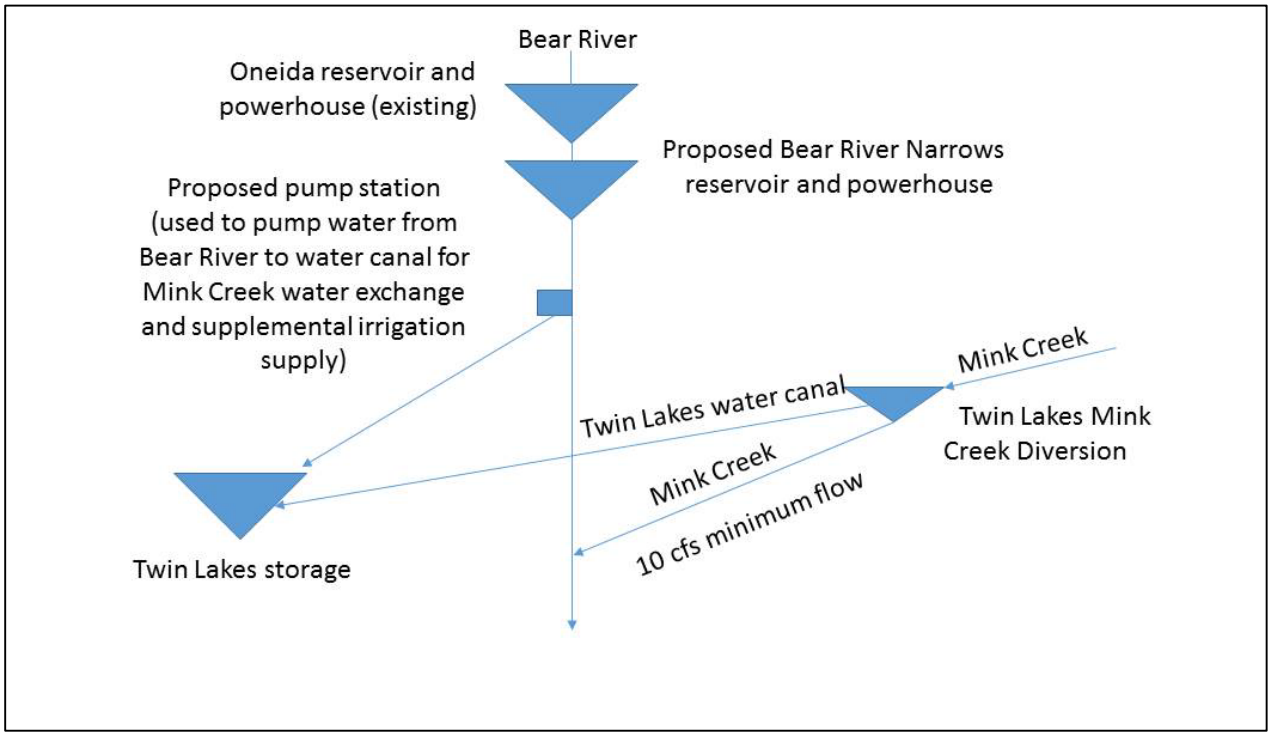

Figure 2-1. Schematic of proposed project facilities (Source: staff).

Initial Reservoir Filling

Twin Lakes proposes to initially fill the proposed reservoir outside of the irrigation season (October 1 through April 15) when unallocated Bear River water is available. The fill rate would be adjusted to maintain a minimum flow downstream of the new dam equal to the minimum flow requirement at the upstream Oneida development, which is 251 cubic feet per second (cfs) or inflow, whichever is less. If the available Bear River water is not sufficient to meet a maximum filling rate of 1 foot per day, Twin Lakes also proposes to have the option to increase the fill rate using a water exchange with Mink Creek. Under the initial reservoir filling water exchange with Mink Creek, water

normally diverted from Mink Creek at Twin Lakes' diversion dam would be allowed to flow past the diversion, down Mink Creek to the Bear River, and a corresponding amount of Bear River instream flow would be retained behind the new dam.

Reservoir Operation

Once the initial filling of the reservoir is complete, Twin Lakes states that the proposed project would be operated so that outflows would match releases made from Oneida dam located immediately upstream, and the reservoir would maintain a constant water level except during irrigation water withdrawals and reservoir refilling. To accomplish this, Twin Lakes would use head level controls that would automatically adjust flow through the turbines to match inflow into the reservoir, thus maintaining a constant reservoir water surface elevation. In the event that inflow exceeds turbine capacity or the power plant goes offline, automatic bypass gates would open to release additional water, assuring that downstream water delivery would not be interrupted. If reservoir inflow exceeded hydraulic capacity of the combined turbines and bypass, excess water would overflow the dam spillway.

During dry years, Twin Lakes would have the option to release up to 5,000 acre-feet of irrigation water from storage in the new reservoir during the summer and refill the reservoir during the winter. Whenever irrigation water was being actively stored or released the project would be operated in a manual mode. Water flow released from the reservoir would be adjusted as needed to accomplish the desired storage or withdrawal consistent with Twin Lakes' water rights. To prevent excessive reservoir drawdown due to persistent dry weather conditions over multiple years, Twin Lakes proposes a maximum drawdown limit of 5,000 acre-feet, which corresponds to a water surface elevation of 4,718 feet. During all manual operations, Twin Lakes would always maintain a minimum flow at the proposed project equal to the minimum flow requirement at the upstream Oneida development, which is 251 cfs or inflow, whichever is less.

As proposed, Twin Lakes would replenish storage in the reservoir after an irrigation drawdown and the irrigation season. Water storage would occur from October 1 through April 15 and only when water is available after all senior water rights are met. Storage rates would typically be low from October through February and would increase between March and mid-April during high spring flows. Twin Lakes proposes to refill the reservoir at a maximum rate of 1 foot per day. Refilling of the reservoir would cause river flows downstream of the confluence of the Bear River and Mink Creek to decrease because a portion of the flow entering the reservoir would be retained for storage.

Mink Creek Water Exchange

Twin Lakes proposes to release flows from its Mink Creek diversion dam such that instream flow downstream of the diversion dam would be at least 10 cfs at all times. However, any supplemental instream flow provided by Twin Lakes would still be used for irrigation purposes. Under the proposed water exchange, Twin Lakes would allow

the supplemental flow to remain in the Mink Creek channel for 4.2 miles downstream to the Bear River confluence, but would withdraw an equivalent amount of water at its pumping station located on the Bear River 0.4 mile upstream from the Mink Creek and Bear River confluence. The amount of withdrawal at the pumping station would be reduced to account for evaporative loss in the reservoir. The net effect would be that, during the months that Twin Lakes releases supplemental water into Mink Creek, the 0.4-mile reach from the pumping station to the mouth of Mink Creek would experience reduced instream flow by up to about 3 percent compared with existing conditions.

Overall, the proposed operation of the project is complex and would depend on several factors that would cause surface water levels to fluctuate, including: inflows from the Oneida development, evaporation from the proposed reservoir, Twin Lakes' irrigation needs, minimum flow requirements in the Bear River, and water rights downstream of the project on the Bear River. The proposed operation also would vary seasonally. Further discussion of proposed project operation is provided in section 3.3.2.2, *Aquatic Resources, Environmental Effects*.

Annual generation is expected to vary from 46,104 MWh in dry years, when the entire 5,000 acre-feet of irrigation storage may be used, to 48,531 MWh if no irrigation storage releases are required (i.e., full reservoir conditions).

2.2.4 Environmental Measures

Twin Lakes proposes several measures, including the following:

<u>Project Construction</u>

Geology and Soil Resources

- Finalize the draft Erosion Control Plan filed on April 1, 2014, in consultation with resource agencies, based on the final project design, to minimize construction-related effects on vegetation and water quality.

Aquatic Resources

- Consult with the owners of water right 13-969A regarding replacement of the existing diversion structure that would be inundated by the proposed reservoir.
- Pass Bear River flows through the construction site without interruption.
- Install a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam.

Terrestrial Resources

- Implement the Revegetation and Noxious Weed Control Plan filed with the license application which includes measures for site treatments to restore soil and drainage conditions, consultation to determine appropriate plant species

and planting densities, and monitoring of revegetated sites for a minimum of 3 years, followed by additional monitoring, if necessary.

- Employ industry-standard avian protection measures on the transmission line to minimize electrocution hazards.
- Develop a final construction schedule based on final project design, in consultation with Idaho Fish and Game, and minimize disturbance to bald eagle, migratory birds, elk, and mule deer during nesting and migration periods.

Recreation Resources

- Construct a new, multi-use recreation facility that would include a campground, boat ramp, and hiking trail on the proposed reservoir to replace the campground that would be lost due to inundation.
- Construct a new river access and boat launch with parking and portable toilets immediately below the new dam to replace boating access points that would be lost due to inundation.
- Acquire the Ben Johnson Family Farm site.
- Construct a new boat ramp on the Bear River within the Ben Johnson Family Farm site with parking and portable toilets pending completion of onsite assessment of the suitability of this site.
- Construct a parking area and hiking trail with interpretive signage within the Ben Johnson Family Farm site to provide access to 4.4 miles of Bear River shoreline for fishing.

Aesthetics

- Use a powerhouse color that blends with the local environment to reduce the visual effect of the project.

<u>Project Operation/Maintenance</u>

- Implement the Dissolved Oxygen (DO) Management Plan filed with the license application, which includes provisions to monitor and report DO and water temperature and implement corrective actions if necessary, to ensure powerhouse discharges meet state of Idaho water quality criteria for DO at all times.
- Allocate the Battle Creek water right associated with the Ben Johnson Family Farm site to instream flows to enhance aquatic habitat by increasing flows in Battle Creek and the Bear River, as mitigation for decreases in flows downstream of the proposed dam associated with reservoir refill operations.

- Form a Southern Middle Bear Watershed Commission (SMBWC) to aid in oversight of mitigation actions and evaluate future project proposals in the project watershed using annual funding of $25,000, and establish a website and database for the watershed.
- Operate the project with a normal maximum reservoir elevation of 4,734 feet and a reservoir drawdown limit of 5,000 acre-feet that corresponds to a minimum reservoir elevation of 4,718 feet, to protect aquatic and recreational resources by maintaining a minimum pool level within the proposed reservoir.
- Operate the project such that project releases in the Bear River downstream of its confluence with Mink Creek match releases from the upstream Oneida dam during routine operation (defined by staff as periods when the proposed reservoir is not refilling), and release a minimum flow of 251 cfs downstream of the proposed dam, or inflow, whichever is less, during operation and reservoir refilling.
- Provide a 10-cfs minimum flow in Mink Creek downstream of Twin Lakes' Mink Creek diversion dam, which would include water to replace the water lost due to evaporation in the proposed reservoir, as needed.
- Operate and maintain a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam to monitor compliance with flow release requirements.
- Cooperate with agencies in their development of measures designed to control non-native fish species in Mink Creek.
- Cooperate with agencies in the planning and eventual removal of fish passage barriers in Mink Creek.
- Cooperate with agencies in the planning and eventual installation of a fish screen to prevent entrainment of fish into the irrigation canal at Twin Lakes' diversion on Mink Creek and the proposed pumping station.[17]

Terrestrial Resources

- Provide a 100-foot conservation buffer extending upland from the normal high water mark (at elevation 4,734 feet) of the proposed reservoir.
- Implement the Conceptual Mitigation Plan filed with the license application, which includes managing the Ben Johnson Family Farm site to benefit aquatic,

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[17] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to implement the three Mink Creek measures (non-native species control, fish barrier removal, and fish screen installation).

wetland, riparian, wildlife, and recreational resources, enhancing 49 acres of fringe wetland habitat at the Condie and Winder reservoirs and installation of raptor nesting platforms and nesting boxes to benefit wildlife.

Cultural Resources

- Implement the Historic Properties Management Plan (HPMP) filed with the license application and Addendum 1 filed on October 7, 2014, to protect archaeological and historic resources.

2.2.5 Modifications to Applicant's Proposal—Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the applicant's proposal.

Preliminary Section 4(e) Land Management Conditions

We consider the following conditions provided by BLM under section 4(e) to be administrative, and, therefore, they are not analyzed in this EIS: (1) condition 1 (A-C, E, H-K), which pertains to consultation regarding BLM policies, obtaining proper permits, obtaining approval prior to changing the location of project features, developing a safety plan for any ground-disturbing activities, avoidance of survey markers, maintaining facilities to BLM standards, restoration of land prior to license surrender, and indemnification; and (2) the aspects of condition 3 that pertain to unrestricted BLM access to project roads and designing signage to BLM standards.

We consider the following conditions provided by BLM under section 4(e) to be environmental, and, therefore, they are analyzed in this EIS: (1) condition 1(D), development of site-specific plans for ground-disturbing activities on BLM-managed land for BLM approval; (2) condition 1(F), development of a spoils (waste soil and rock) disposal plan for ground-disturbing construction and maintenance activities on BLM-managed land; (3) condition 1(G), development of a hazardous substances plan that addresses storage, spill prevention, and clean-up on BLM-managed land; (4) condition 2, annually prepare, in consultation with BLM, a report documenting measures needed for continued protection and use of BLM-managed land and resources affected by the project; (5) condition 3, develop a travel and access management plan for BLM-managed land affected by the project; (6) condition 4, development of a law enforcement and emergency services plan (LEESP); and (7) condition 5, development of an HPMP.

2.3 STAFF ALTERNATIVE

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we select the no-action alternative as the preferred alternative. The overall public benefits of the no-action alternative would exceed those of Twin Lakes' proposal and the staff's licensing alternative, because of the unavoidable adverse

environmental effects of both action alternatives. Unavoidable adverse effects would include:

1. permanent loss of 4.5 miles of mainstem Bear River fluvial BCT habitat, which is nearly half of the available BCT habitat on the Bear River;
2. permanent loss of about 425 acres of wildlife habitat along the Bear River riparian corridor from inundation and proposed project facilities, with associated decreases in the diversity and abundance of wildlife species;
3. permanent loss of 249 acres of designated PacifiCorp-owned conservation land, which is a critical component of the Bear River Project licensing settlement agreement[18];
4. permanent loss of 55 acres of designated Research Natural Area/Area of Critical Environmental Concern (RNA/ACEC) land designed to protect sensitive plants and wildlife;
5. inundation of three formal recreational sites along the Bear River, numerous informal recreational sites along Oneida Narrows Road, and permanent removal of Oneida Narrows as a regionally significant recreational river-fishery and whitewater resource, as designated by BLM in its wild and scenic eligibility report (BLM, 1995), none of which would be effectively replaced by the proposed recreation facilities at the new reservoir;
6. loss of a section of the Bear River with outstandingly remarkable recreational, geologic, and wildlife values, as designated by BLM in its wild and scenic eligibility report (BLM, 1995);
7. degradation of aesthetics via the conversion of the scenic Oneida Narrows into a hydroelectric project with a large dam, powerhouse, transmission facilities, and roads;
8. construction and operation of the proposed project has the potential to adversely affect cultural resource sites within the project APE, especially at the Ben Johnson Family Farm site, where there is a designated National Historic Landmark (the Bear River Massacre Site) involving one of the largest Native American massacre sites in the country. The introduction of extensive land modifications, inundation, public access, and other factors could adversely affect aspects of the site that are related to its sensitivity and overall national, traditional, and sacred significance that may not be adequately mitigated; and

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[18] This comprehensive Settlement Agreement was filed by PacifiCorp on September 26, 2002, and approved by the Commission in the Order Approving Settlement Agreement and Issuing New License Issued on December 22, 2003; 105 FERC ¶62,207.

9. inconsistencies with 8 of 14 Commission-approved comprehensive plans that are relevant to the proposed project.

Although Twin Lakes proposes measures to mitigate some of the adverse effects described above and staff recommends additional measures to provide additional mitigation for adverse effects, those measures would not adequately offset the adverse effects of constructing and operating a new major hydroelectric project on a currently riverine scenic reach of the Bear River, which has few such remaining reaches in the state of Idaho. Consequently, we conclude that issuing a license for the proposed project would not be in the public interest.

2.4 STAFF LICENSING ALTERNATIVE

If the Commission were to decide to issue a license for the proposed Bear River Narrows Project, we make recommendations as to which environmental measures should be included in any license issued for the project. The staff licensing alternative includes all but one of BLM's 4(e) conditions. Under this alternative, the project would include the following measures:

Proposed and Staff-recommended Measures

Project Construction

- Develop a final construction schedule based on final project design in consultation with Idaho Fish and Game, and minimize disturbance to bald eagle, migratory birds, elk, and mule deer during nesting and migration periods.
- Pass Bear River flows through the construction site without interruption.
- Install a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam.

Project Operation/Maintenance

- Operate the project with a normal maximum reservoir elevation of 4,734 feet and a reservoir drawdown limit of 5,000 acre-feet that corresponds to a minimum water surface elevation of 4,718 feet, to protect aquatic and recreational resources by maintaining a minimum pool level within the proposed reservoir.
- Operate the project such that project releases in the Bear River downstream of its confluence with Mink Creek match releases from the upstream Oneida dam during routine operation (defined by staff as periods when the proposed reservoir is not refilling), and release a minimum flow of 251 cfs downstream of the proposed dam, or inflow, whichever is less, during operation and reservoir refilling.

Measures Proposed by Twin Lakes as Modified by Staff

Project Construction

Geology and Soil Resources

- Finalize the draft Erosion Control Plan filed on April 1, 2014, in consultation with Idaho Fish and Game, Idaho DEQ, BLM, and FWS based on the final project design, and incorporate spoil storage and disposal measures and Idaho DEQ BMP-11 (which pertains to vehicle/equipment washing and maintenance), into the plan where appropriate, to minimize construction-related effects on vegetation and water quality (would address 4(e) conditions 1(F) and, in part, 1(G)).
- Consult with the owners of water right 13-969A regarding replacement of the existing diversion structure that would be inundated by the proposed reservoir with a new diversion capable of delivering up to 3.46 cfs at all water levels.

Terrestrial Resources

- Revise the proposed Revegetation and Noxious Weed Control Plan filed with the license application to: (1) include success criteria based on existing vegetation community on reference sites with similar vegetation structure; (2) identify locations for photo points that would be used for monitoring; (3) ensure success criteria are met for two consecutive growing seasons; (4) address the need for water supplements at revegetation sites and identify water rights associated with any proposed watering of plantings; (5) include traditional, subsistence, and medicinal plants that tribal members rely upon for traditional purposes; and (6) identify provisions for a site steward to oversee management of sites in the plan.
- Employ industry-standard avian protection measures on the transmission line including the most recent APLIC guidelines (APLIC, 2006; 2012) to minimize electrocution hazards.

Project Operation/Maintenance

Aquatic Resources

- Revise the proposed DO Management Plan in consultation with Idaho DEQ, Idaho Fish and Game, BLM, and FWS to provide details on how proposed potential corrective actions would ensure that water quality standards are met, and on options that would be evaluated if these actions do not result in compliance with the standards.
- Provide a 20 cfs minimum flow from the Twin Lakes' Mink Creek diversion dam from April through September and 15 cfs from October through March to

provide greater BCT habitat in Mink Creek than proposed by Twin Lakes, as mitigation for the loss of BCT habitat in the Bear River once the reservoir is filled.

- Develop a plan to control non-native fish species in Mink Creek (e.g., brook trout, brown trout) that provides details on the control measures to be used and how they would be consistent with Idaho Fish and Game objectives to reduce interspecific competition with and predation on BCT.
- Develop a plan to remove fish passage barriers in Mink Creek, after consultation with the appropriate state and federal agencies, that provides details on how fish barriers would be removed to facilitate BCT upstream passage, without increasing upstream non-native fish movement into Mink Creek from Bear River to provide additional BCT habitat to mitigate for BCT habitat lost in the Bear River, while reducing interspecific competition with and predation on BCT.
- Develop a fish screen installation and maintenance plan that provides details on the fish screens to be installed at Twin Lakes' Mink Creek irrigation canal intake and the proposed pumping station to prevent entrainment of fish into the canal, including their design that has been determined in consultation with the agencies and protocols for regular maintenance.

Terrestrial Resources

- Develop a terrestrial mitigation plan to include the following wetland and riparian habitat measures: (1) a schedule for mitigation actions; (2) detailed wetland and riparian planting plans; (3) provisions to include riparian plantings along the entire reservoir perimeter; and (4) provisions for monitoring the success of riparian planting and restoration.
- Develop a terrestrial mitigation plan to include the following wildlife measures: (1) a description of the number and locations for raptor and landbird nesting platforms and boxes to mitigate for project effects on nesting habitat; and (2) details of fencing design to exclude cattle from the buffer zone while allowing safe passage for wildlife to mitigate for project effects on the existing riparian wildlife migration corridor.
- Provide a shoreline buffer of 300 feet from the normal high water elevation of the proposed reservoir (4,734 feet) to provide suitable area around the reservoir to promote continued use as a wildlife movement corridor and protect remaining scenic resources associated with Oneida Narrows.

Recreation Resources

- Develop a recreation plan in consultation with stakeholders, to outline the design, construction, operation and maintenance, and long-term management

policies of the proposed recreation facilities and recreation use at the project to provide a process for meeting recreation needs as they change over time.

Cultural Resources

- Revise the 2013 HPMP and 2014 Addendum 1 to address the Commission's comments received by the parties to the Commission's Restricted Services List (would address 4(e) condition 5) to ensure protection of archaeological and historic resources at the project .

Additional Staff-recommended Measures

Project Construction

Geology and Soil Resources

- Address geotechnical issues that pertain to dam stability in the final project design by including additional seismic analysis, further analysis of seepage control measures at the left abutment and along the penstock, and the need for training walls along the left abutment and a stilling well at the toe of the dam. The final project design submitted to the Commission for approval would include the updated seismic hazard analysis and the additional analysis of measures to control seepage along the penstock and erosion during overflow spillway operation and dam overtopping during high flow events.

Aquatic Resources

- Assess the need to provide additional protective measures in the final project design based on detailed onsite geotechnical surveys in the vicinity of the proposed dam, powerhouse, and borrow areas to prevent the risk of canyon slope failures.
- Develop a construction flow monitoring plan to ensure that Oneida development flow releases continue to be passed to the Bear River downstream of the project site during project construction and initial reservoir filling.

Project Operation/Maintenance

Aquatic Resources

- Develop a hazardous substances management plan to protect water quality during project operation and maintenance (would address, in part, 4(e) condition 1(G)).
- Develop an operation compliance monitoring plan to document compliance with requirements to: (1) maintain flow releases in the Bear River downstream of its confluence with Mink Creek that are equivalent to flow

releases from the Oneida development, except when refilling the proposed reservoir; (2) maintain minimum flows in the Bear River downstream of the Bear River Narrows dam that are at or above 251 cfs, or inflow whichever is less, when the reservoir is refilling; (3) maintain Bear River and Mink Creek minimum flows to protect BCT; and (4) maintain project reservoir refill rates and drawdowns so as to protect aquatic and recreational resources in the proposed reservoir.

Land Use Resources

- Develop a land management plan that includes site-specific plans for any ground-disturbing activities at the project, a discussion of ongoing project effects on lands associated with the project and management measures to protect those lands, provisions for monitoring land use at the project, and periodic consultation with agencies and stakeholders over the term of a new license.

2.5 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

We recognize that the Commission is required to include valid section 4(e) conditions in any license issued for the project. The staff alternative with mandatory conditions includes staff-recommended measures listed in section 2.4 along with the mandatory condition that we did not include in the staff licensing alternative, condition 4, which requires Twin Lakes to develop an LEESP that includes provisions for coordination and funding of law enforcement and emergency services personnel with jurisdiction within the proposed project.

Incorporation of this mandatory condition into a new license would not cause us to modify or eliminate any of the environmental measures that we include in the staff licensing alternative.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area. Under each resource area, historic and current conditions are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.[19]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Bear River Basin drains approximately 7,583 square miles covering parts of Utah, Wyoming, and Idaho, and has a length of about 500 miles. The river originates in the Uinta Mountains in Utah, flows north through western Wyoming, and then turns northwest into Idaho. When in Idaho, the Bear River receives major hydraulic input from Bear Lake as it passes north of the lake and meanders towards the town of Soda Springs. After flowing into Alexander reservoir (part of the Soda development of the Bear River Project, 44 miles downstream of Bear Lake), the Bear River turns south, passes through the Grace development (also part of the Bear River Project), 6 miles downstream of the Soda development, and the Oneida development (the downstream-most development of the Bear River Project), 35 miles downstream of the Grace development. The proposed project would be located on the Bear River in Franklin County, in southeastern Idaho approximately 5 miles downstream of Oneida reservoir and 9 miles northeast of Preston, Idaho. Downstream of the proposed project, the Bear River eventually enters Utah, flows through the Cutler Hydroelectric Project (FERC No. 2420), 44 miles downstream of the proposed project, and discharges into the Great Salt Lake (figure 3-1).

The Bear River Basin covers parts of five EPA-designated level III ecoregions. The eastern portion of the basin lies mostly in the Wyoming Basin region and partially in the Middle Rockies region. The proposed reservoir would lie within the Northern Basin and Range region. Terrain in this area consists of Tertiary volcanic rocks and some Paleozoic sedimentary rocks in mountains and ranges in elevation from 2,625 to 9,843 feet. Below the proposed dam, the Bear River flows into the Central Basin and Range region. Elevations in this area range from 3,346 to 13,123 feet. Important tributaries of

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[19] Unless otherwise indicated, our information is taken from the application for license for this project (Twin Lakes, 2013).

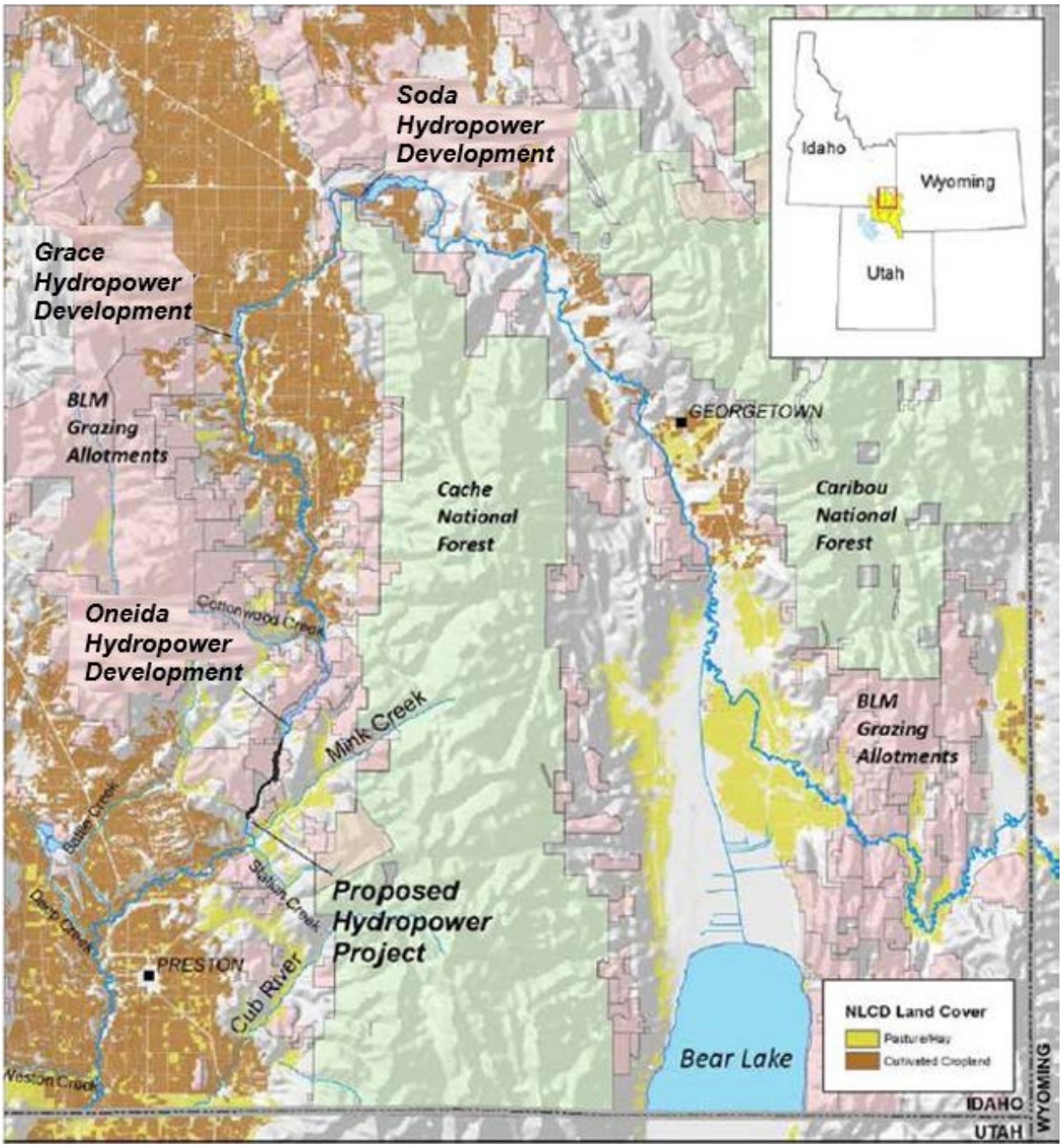

Figure 3-1. Map of the Bear River Basin in southeastern Idaho (Source: Twin Lakes, 2013, as modified by staff).

the Bear River downstream of the proposed project, including Mink Creek, and the Cub and Logan Rivers, extend into the Wasatch and Uinta Mountains region. Tertiary and Mesozoic sedimentary and igneous rocks along with some Precambrian igneous and metamorphic rocks make up the terrain of this area. Elevations in the Wasatch and Uinta Mountains are between 4,790 and 13,527 feet (Griffith, 2010).

The project area lies within a semiarid steppe climate. Summers are warm and dry, and winters are cold and occasionally severe. Average monthly temperatures range from a low of 22 degrees Fahrenheit (°F) in January to a high of 69.4°F in July. The average annual precipitation is 16.8 inches. Agriculture use is common in the area and includes crop production, livestock grazing, irrigation withdrawals, and water storage. Much of the land is also designated for conservation of sensitive plant and wildlife species. Additionally, the Bear River and particularly the proposed project area, known as Oneida Narrows, is heavily used for recreational activities including hiking, camping, wildlife viewing, fishing, and kayaking. The Bear River has been heavily regulated for hydropower by the three developments of the Bear River Project and the Cutler Project and releases from Bear Lake for irrigation purposes.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

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 impact on the environment that results from the incremental impact 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 actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities.

Based on information in the pre-application document (Twin Lakes, 2006), scoping comments, and preliminary staff analysis, we have identified geologic, aquatic (particularly BCT), and water resources as resources that could potentially be cumulatively affected by the construction, operation, and maintenance of the proposed Bear River Narrows Project and other developmental activities in the Bear River Basin, including existing dams and contamination remediation and restoration efforts.

3.2.1 Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary. We identified the scope for geologic resources to include the Bear River watershed from the upstream end of the Bear River Project's Oneida reservoir to Great Salt Lake because sediment trapped in Oneida reservoir and also entering the Bear River from tributaries has a bearing on the project effects on suspended sediment and bedload transport. We identified the geographic scope for water quantity, water quality, and aquatic resources

(including BCT) as the Bear River watershed downstream of the Oneida development to Great Salt Lake. We choose the above geographic bounds because the effects of the construction and operation of the proposed project and potential environmental measures on the identified resources in combination with other activities could extend to the mainstem of the Bear River downstream of Oneida dam, and water quantity and quality of tributaries to this reach of the Bear River influence the quality of habitat in the mainstem as well as the suitability of the tributaries for aquatic biota that also use riverine habitat in Bear River.

3.2.2 Temporal Scope

The temporal scope of our cumulative effects analysis in the EIS includes a discussion of past, present, and 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 looks 30 to 50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. The historical discussion, by necessity, is limited to the amount of available information for each resource.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific site-specific and cumulative environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EIS. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative.*

3.3.1 Geology and Soil Resources

3.3.1.1 Affected Environment

Geologic resources in the project vicinity that could be affected by the proposed actions include the dam site and canyon walls and their stability, construction areas for borrow material and staging, recreation facilities, reservoir shorelines, and geomorphology and sediment transport in the Bear River. There are no known mineral resources in the project area.

Geology

The Oneida Narrows Canyon is located on the west flank of the Bear River Range. It is a subdivision of the Wasatch Mountains, which separate the Rocky Mountain physiographic province from the deserts of the Great Plains Province. The project area consists of rounded peaks, steep hillsides, and flat valley floors. The canyon was carved by the Bear River.

The regional geologic structure consists of north-south trending faulted anticlines that had formed by the early Tertiary Period. The proposed site is on the east-dipping, western limb of a syncline, and on the eastern limb of the adjoining anticline; the axis of this anticline is just west of the site. During the late Tertiary Period, extensional faulting resulted in two sets of high-angle, normal faults: one set of faults trends northwest to southeast, the other set trends north northwest to south southeast. As a result, the area is broken up into a checkerboard pattern.

The area surrounding the proposed project consists of rocks from the Cambrian Period (limestone, shale, siltstone, with lesser amounts of quartzite) and the Tertiary Period (continental deposits, primarily conglomerates, and volcanic tuffs). The proposed dam would be located within the Cambrian bedrock units. The less-resistant Tertiary rocks occur both upstream and downstream of the Oneida Narrows Canyon, resulting in gentler topography because of their higher erodibility.

Specifically, the site for the proposed abutment of the dam consists of the east-dipping Bloomington and Noonan formations from the Cambrian Period:

- **Bloomington Formation:** This formation forms the floor of the abutment along the western side of the canyon. The formation consists of 900 feet of shale, interbedded with two major limestone members, each 70 feet thick. About three quarters of this formation consists of dense, hard, fissile, brittle shale and siltstone. The remaining quarter of the formation consists of limestone interbedded with some shale. The two major limestone members would be part of the dam's foundation.
- **Nounan Formation:** This formation forms the floor of the abutment along the eastern part of the canyon. The formation would also supply borrow material for dam construction. It consists mostly of massive, dense, hard, fractured limestone, with breccia of angular limestone fragments. This formation has two thin-bedded, hard limestone members with shaley partings in its upper third. The lower member is about 100 feet thick; the upper member is about 70 feet thick. Fracturing in the limestone unit is variable, and fractures are partially healed with calcite and iron oxide.

Talus overburden at the proposed dam site slopes varies in thickness. It is thickest on the western side where it may be up to 40 feet thick. Overburden encountered in a drill hole about 100 feet from the edge of the river consists of 85 feet of fluvial, rounded sand, gravel, cobble, and boulders, overlying fractured limestone.

The Cambrian formations in the project area are overlain by less consolidated, east-dipping units from the late Tertiary Period. These units form bedrock beneath the northern half of the proposed reservoir location. The Collinston Conglomerate is 40feet thick and also occurs at the surface about 3 miles downstream of Oneida dam. The Cache Valley Formation overlies the Collinston Conglomerate. It comprises about 1,100 feet of air-fall tuff, limestones, and sandstones. The Mink Creek Conglomerate lies on

top of the Cache Valley Formation. It extends up to within about 0.5 mile of Oneida dam. It is at least 750 feet thick and consists of cobble and pebble conglomerate beds up to 9 feet thick as well as reworked tuff beds.

Regional Faulting and Seismicity

The area in the project vicinity is part of the Intermountain Seismic Belt, a belt of modern earthquake activity that runs through Utah and north through Idaho, Wyoming, and Montana. The proposed dam site is located about 20 miles east of the active Wasatch fault, which extends from Malad City, Idaho, to Fayette, Utah (Utah Geological Survey, 1996); the Wasatch fault is the most significant fault in the region (Rollins, Brown, and Gunnell, Inc., 1988). The dam would also be sited about 4 miles west of the East Cache fault.

First motion studies on historic earthquakes in the general area show that the region is extensional in character; i.e., that normal faulting would be the most likely cause of future seismic activity. Epicenters of three historic earthquakes (1860 to 1954) with intensity values ranging from I to V on the Modified Mercalli scale[20] are within about 50 miles of the site. No large-magnitude shocks have historically occurred in the immediate area. No Holocene fault scarps have been reported such as those characterizing the Wasatch Front to the south.

The site is in seismic risk zone 3 of the 1988 Uniform Building Code map; risk zones range from 1 to 4 with zone 3 defined as 'high.' There is a 90 percent probability that intensities of Mercalli VII have not been exceeded in any 50-year period in the project area (Sprenke and Breckenridge, 1992).

The supporting design report provided in the license application indicates that a horizontal peak ground acceleration in excess of 0.5 g (acceleration of gravity) is appropriate for the design of the dam. According to United States Geological Survey (USGS) seismic design maps for various design codes, the seismic ground motion at the site is characterized by horizontal peak ground acceleration's greater than 0.4 g for the maximum credible earthquake (USGS, 2015a). The maximum credible earthquake, expressed in terms of the gravitational acceleration constant (g), is the largest earthquake magnitude that could occur along a recognized fault or within a seismotectonic province or source area. A peak ground acceleration greater than 0.4 g is generally considered a high earthquake hazard.

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[20] The Mercalli scale is a seismic scale used for measuring the intensity of an earthquake. It quantifies the effects of an earthquake on the earth's surface, humans, objects of nature, and artificial structures on a scale from I (not felt) to XII (total destruction).

Soils

The Natural Resources Conservation Service (NRCS) soil survey geographic database for Franklin County identifies more than 50 soil complexes and consociations[21]within the vicinity of the proposed project (with the exception of the Ben Johnson Family Farm site). These 50 soil complexes and consociations are further divided based on slope, creating a total of 61 potential soil types. Primary soil units consist of the Bergquist-Softback complex, 25 to 65 percent slopes; Hondodo-Ricreast complex, 4 to 20 percent slopes; Enochville silt loam, 0 to 1 percent slopes; Holmes gravelly silt loam, 0 to 2 percent slopes; Lonigan-Ricrest association, 50 to 80 percent lopes; Polumar-Sprollow-Ireland complex, 40 to 70 percent slopes; and Polumar-Ireland complex, 30 to 60 percent slopes. These soils consist of primarily of silt loam with varying contents of gravel and stones, which increase rapidly with depth.

Soils at the Ben Johnson Family Farm site consist of the Windernot-Lewnot-Stinkcreek complex, 0 to 2 percent slopes (NRCS, 2008). This soil complex is found on low stream terraces and floodplains. Soils consist of loam with varying concentrations of clay, silt, sand, and gravel.

Bedload Transport

Oneida dam captures bedload (coarse-grained sediment including gravel and pebbles) carried by the Bear River. Between Oneida dam and the proposed Bear River Narrows dam, bedload enters the river episodically from small, ephemeral tributaries that are dry throughout much of the year but flow during the spring snowmelt period and heavy rainfall events. The largest of these small tributaries flows into the Bear River about 0.25 mile upstream of the proposed dam site.

3.3.1.2 Environmental Effects

Geologic hazards during construction could be related to static and seismic stability of the dam, abutments, and borrow areas. During operation, geologic hazards that could lead to dam failure consist of static and seismic stability of the dam, excessive seepage through the dam and along the penstock, and stability of the canyon slopes. Potential environmental effects of the proposed construction on soil resources include erosion associated with ground-disturbing activities and sedimentation in project-affected waters. During project operation, drawdowns of the proposed reservoir could result in erosion of sediment exposed during the drawdowns and lead to increased turbidity and sedimentation in the reservoir and the Bear River.

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[21] A soil consociation is a map unit dominated by a soil class with permissible inclusions of dissimilar soils. These inclusions are of a similar soil type and represent less than 10 percent of the total.

Borrow Materials

Construction materials for the dam would be provided by two soil borrow sites located along the western river bank (i.e., western edge of the proposed reservoir) (see figure 1-1). Both sites contain alluvial deposits of cohesive (silty clay) and cohesionless (sand and gravel) soils. The northern borrow site has an area of 33 acres; the southern borrow site has an area of 25 acres. A maximum of about 740,000 cubic yards of borrow material would be excavated from these two sites. Information in Twin Lakes' supporting design report filed with its license application indicates that material to be extracted from these sites consists predominantly of low-plasticity clays. Also available at the borrow sites, in significantly smaller amounts, is poorly graded sandy gravel with some silt and clay and high plasticity clay. The sandy gravel is well rounded and typically contains more than 5 percent of silt and clay.

Our Analysis

Twin Lakes' preliminary design drawings indicate that the proposed dam would consist of a zoned embankment that includes a low permeability "core" constructed from silts and clays surrounded by upstream and downstream "shells" constructed from sand and gravel. A filter would also be provided on the downstream side of the core, and RCC would be placed on the downstream face of the dam. Based on our review of the supporting design report, we conclude that the low-plasticity clays from the borrow sites would be suitable for constructing the core for the proposed embankment dam. We also conclude that the sandy gravel would be suitable materials to construct the upstream and downstream shells for the embankment dam and gravel and sand from the borrow areas, if screened and crushed, would likely provide suitable materials for RCC production. However, we find that the high plasticity clay materials would not be acceptable for dam construction and would have to be stockpiled during construction and used for grading and similar uses during the final stages of construction.

Dam Stability

Slope stability failure of the dam during usual (normal) or unusual (probable maximum flood) loading conditions could occur during construction, reservoir first filling, or operation of the dam and hydroelectric facility. As a result of the high potential for large earthquakes in the area, liquefaction (i.e., a reduction in soil strength from earthquake shaking) and subsequent slope failure of the dam could occur during or after an earthquake that leads to excessive deformations resulting in a breach of the dam. Excessive seepage along the penstock, through the abutments, or through the dam or its foundation could lead to piping (transport of soil materials), which could result in an uncontrolled release of water. Any uncontrolled release of water through the dam would result in a flood wave and subsequent sediment and soil transport down the river valley.

Twin Lakes proposes to construct a zoned embankment dam using local materials that would be compacted during construction. The downstream face of the dam would be covered with RCC to prevent erosion during floods exceeding the capacity of the service

spillway. To prevent excessive seepage, the applicant proposes to grout the rock along the left abutment, extend the impermeable core 40 feet below the existing ground surface, install a slurry wall another 45 feet to bedrock, and install a 50-foot-deep grout curtain into the bedrock below the slurry wall. Finally, Twin Lakes proposes to backfill the penstock trench, which would be located within the dam's foundation, with concrete.

The foundation of the proposed dam would be the existing alluvial sandy gravel materials. Therefore, rock excavation or blasting would not be required along the foundation or at the abutments to construct the dam. However, blasting may be required to construct access roads to the facility.

Several agencies and individuals expressed concern about the stability of the dam due to geological conditions in the area, including the Franklin County Fish and Game Association (FCFGA) (November 20, 2014), the Greater Yellowstone Coalition (GYC) (December 16, 2014), the Yellowstone to Uintas Connection (December 5, 2014), Dr. Susanne Janecke from the Utah State University (December 12, 2014), Ms. Wendy K. Westerberg (December 15, 2014), and Ms. Mimi Recker (November 29, 2014). FCFGA and GYC requested additional geological investigations to fully understand the potential geological hazards in the vicinity of the dam.

Our Analysis

Based on our review of Twin Lakes' slope stability analysis in the preliminary supporting design report, we conclude that the proposed conceptual design of the dam would be adequate for both normal and earthquake loading conditions. In addition, we find that liquefaction of the compacted soil Twin Lakes proposes to use to construct the dam and the dense sand and gravel within the foundation is unlikely because compacted soils and dense sandy gravel generally do not liquefy during an earthquake. The current design as planned should also prevent excessive deformations during the design seismic event. However, performing an up-to-date seismic hazard analysis, including local fault identification and analysis, during the final design of the dam would provide assurance that the final design incorporates features that minimize any seismic hazards at the site.

We find that the proposed seepage control measures for the dam and foundation appear to be adequate. However, installation of a cut-off wall within the limestone in the right abutment in lieu of grouting may be needed to prevent excessive seepage through the limestone at the right abutment of the dam. The presence of soluble limestone at the left (east) abutment of the proposed dam as indicated in the preliminary supporting design report has the potential to form voids or channels which could result in excessive seepage. Grouting is not a permanent solution to reducing seepage if the voids or channels in the soluble limestone are filled with clay.

Our review of the conceptual design indicates that seepage in the left abutment was not adequately considered and that additional seepage control measures for the penstock may be necessary. Looking at the Exhibit F drawings for the proposed project, it is not clear what the foundation conditions would be for the penstock. For example,

Exhibit F-3 shows the penstock in a trench in rock backfilled with concrete; however, Exhibit F-1 in the license application appears to show the penstock alignment within the foundation of sand and gravel located along the western river bank. Both Exhibit F-4, which shows a depth to rock of 80 feet and geologic cross sections provided in the preliminary supporting design report show alluvial sand and gravel in the river valley. Encasing the penstock in concrete would prevent seepage along the outside wall of the steel penstock but would not prevent seepage along the interface between the soil and concrete. Therefore, if the penstock would be resting in alluvial sand and gravel, additional seepage control measures such as a diaphragm wall could be developed for the penstock in the final design or, alternatively, because rock is present along the river valley walls, Twin Lakes could relocate the penstock through a tunnel within the right (west) abutment.

The proposed conceptual design of the dam could result in erosion along the side of the spillway or at the toe of the dam on either side of the spillway during periods when spillage occurs. Note that floods exceeding the discharge capacity of the overflow spillway along the center of the dam would flow over the entire crest and downstream slope of the dam. RCC would be placed along the downstream slope to prevent erosion during large floods. Including in the final design training walls along the spillway walls and a stilling basin or other protective measures at the toe of the existing dam would prevent erosion along the side of the dam and at the toe of the dam when the dam is overtopped during high flow events. Such design features, besides preventing erosion, would serve to ensure the structural integrity of the dam.

Canyon Slope Stability

During proposed facility construction and operation, slope failures or landslides could occur along the canyon walls of the reservoir due to removal of material from the borrow sites, increased pore pressure from the reservoir, hillside runoff, heavy or frequent precipitation, roadway construction along the toe of the slope, or a seismic event. The dip of the rock along the western canyon walls is parallel to the slope, which could also be contributing to the historical slope instability at the site as indicated by the presence of colluvial soils. The supporting design report indicates that landslide deposits or colluvial soils, which are soils that have been deposited at the base of a slope by gravitational forces, are located along the river valley near the proposed dam site (the proposed borrow areas are located along the western side of the Bear River). The excavation of materials for the construction of the dam at the borrow areas could result in slope failures during construction.

Dr. Janecke comments in her letter filed on December 12, 2014, that landslides, common in the area, might cause overtopping of the reservoir and in turn destroy a dam. LeAnn S. Gilbert also expresses concern about landslides into the reservoir in her comments filed on December 12, 2014.

Our Analysis

There is currently insufficient information available to determine whether or not construction and operation of the project would be likely to result in slope failures or landslides. The likelihood of such occurrences is typically determined during detailed geotechnical studies conducted to support the final design of a project. However, there are engineering solutions that can be implemented to reduce any such potential hazards if they are determined to be present. Conducting additional geotechnical investigation and analysis, if a license were to be issued for this project, to evaluate the potential for slope instability of the proposed upstream borrow areas and canyon walls during construction and the operation of the facility would identify the degree of hazard that exists and protective measures that could be incorporated into the final design of the project. Identifying potential slope stability problems at the borrow area located adjacent to the proposed dam would be particularly important because stability issues at this location would affect the construction of the dam.

Soil Erosion and Spoils Management during Construction

Soil erosion could occur during construction of the staging areas, borrow areas, dam and power generation facilities, pumping station, recreation facilities (campground, boat launch below the dam, and at the Ben Johnson Family Farm site), access roads, power line sites, gaging stations, and the proposed permanent water quality monitoring station. Potential effects of erosion from these activities on water quality include temporary increases in turbidity, total suspended solids, and nutrient loadings from fine sediment releases. Accumulation of fine sediment in aquatic substrate and increased ambient levels of turbidity, total suspended solids, and nutrient loading would adversely affect water quality and could adversely affect fish spawning and rearing habitat and spawning success.

Construction of the various project facilities could also generate spoil materials. For example, talus overburden would be removed as necessary to create stable slopes above and below the access road. Topsoil would be removed from borrow areas and the dam site and high plasticity clay materials removed from the borrow sites would need to be stockpiled for use at a later time.

Twin Lakes proposes to implement an Erosion Control Plan that follows industry-standard erosion control, slope stabilization, and spoils management measures to minimize construction-related effects on vegetation and water quality. Twin Lakes filed a draft Erosion Control Plan on April 1, 2014, that presents general concepts for minimizing runoff and soil loss in construction areas and minimizing disturbance to vegetation. The design, installation, and maintenance of erosion controls would be in accordance with the Idaho DEQ catalog for construction BMPs (Idaho DEQ, 2005). These BMPs are included in the draft Erosion Control Plan along with the locations where specific BMPs would be implemented. At the proposed dam construction site, among the BMPs that Twin Lakes proposes to implement is BMP-9, stockpile

management. BMP-9 includes specific procedures that would be implemented to reduce or eliminate pollution from active and non-active stockpiles of soil and other construction-related material (Idaho DEQ, 2005).

The final Erosion Control Plan would be developed during final project design. Twin Lakes' final Erosion Control Plan would consider soils; vegetation; precipitation, seasons, and temperatures; topography; and scheduling. The plan would include the following components: an erosion control report that describes the strategy of the erosion control plan; site drawings of existing and proposed conditions; topographic surveys showing drainage and irrigation water conveyance system and finished grade contours; plan of proposed permanent drainage system after construction is complete; designation and classification of all erodible soils; final limits of soil disturbance; a BMP inspection and maintenance schedule; final vegetation, landscaping, and permanent stabilization measures; and turbidity monitoring specification for both construction and non-routine maintenance that entails ground-disturbing activities following the standard turbidity monitoring protocol employed by the Oregon Department of Environmental Quality. Twin Lakes would adapt the turbidity monitoring protocol, in consultation with Idaho DEQ, to meet the conditions of the project's 401 certification. Twin Lakes would coordinate with resource agencies for review and approval of the final Erosion Control Plan, although it does not specify the resource agencies with whom it would consult.

Idaho Fish and Game recommends developing the Erosion Control Plan in consultation with resource agencies and including industry-standard erosion control measures, stating further that consultation is essential. Idaho Fish and Game also recommends that Twin Lakes create a technical working group (similar to the group described in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*, for revegetation and noxious weed measures) to develop the detailed Erosion Control Plan and that members of the technical working group should, at a minimum, include Idaho DEQ, Idaho Fish and Game, BLM, and FWS.

In 4(e) condition 1(F), BLM specifies that Twin Lakes should consult with BLM for the preparation of a spoils disposal plan prior to initiating any ground-disturbing activity on BLM-administered land. Upon BLM approval, the plan would be filed with the Commission. The plan would address disposal and storage of waste soil and rock materials (spoils) generated by road maintenance, slope failures, and construction projects on BLM-managed land. Specifically, the plan would include provisions for: identifying and characterizing the nature of the spoils in accordance with applicable BLM regulations; identifying sites for the disposal or storage of spoils that prevent contamination of water by leachate and surface water runoff; and developing and implementing stabilization, slope reconfiguration, erosion control, reclamation, and rehabilitation measures.

Our Analysis

Twin Lakes included a draft Erosion Control Plan in its final license application. However, the plan was generic and lacks specificity for an assessment of environmental

effects from ground disturbances at each construction site. Commission staff requested revisions of the Erosion Control Plan in its February 27, 2014, AIR, including: a description of activities that would result in potential erosion; resources potentially affected by eroded soil; primary measures that would prevent effects on these resources; monitoring to assess the effectiveness of erosion control measures; and monitoring parameters. Twin Lakes filed the revised draft Erosion Control Plan on April 1, 2014.

We conclude that Twin Lakes' revised draft Erosion Control Plan includes the information requested by Commission staff and provides a reasonable foundation upon which to build a final Erosion Control Plan. However, developing the final Erosion Control Plan in consultation with, at a minimum, Idaho DEQ, Idaho Fish and Game, BLM, and FWS, would help to ensure the final Erosion Control Plan provides adequate protection of the natural resources potentially affected by the project after approval by the Commission.

The BLM-specified spoil disposal plan would likely be duplicative of many elements included in a final Erosion Control Plan. Integrating the spoil disposal plan with the final Erosion Control Plan would avoid such redundancy and ensure that soil and waste rock management is addressed consistently where ground-disturbing activities occur anywhere within the project boundary. Using BMP-9 as a basis for stockpile management at the dam construction site, as Twin Lakes proposes, should be effective in protecting surface water from contamination during stormwater events. Stockpiles of soil or rock may need to be located at other construction sites associated with the proposed project. Identifying such sites in the final Erosion Control Plan would ensure protection of water quality adjacent to all spoil piles.

Soil Erosion from Exposed Flats

Fluctuating water levels during periodic drawdowns of the proposed Bear River Narrows reservoir would cause vegetation loss in the drawdown zone, exposing riparian soils to erosion. In addition, sediment would be deposited on submerged parts of the flats when the reservoir is not fully drawn down. Unvegetated soil and deposited sediment would be mobilized during larger flow events in the river and transported downstream into the lower part of the reservoir and potentially past Bear River Narrows dam. The mobilized soil and sediment particles would add to the total suspended sediment (TSS) concentration and turbidity in the Bear River water discharged by Oneida dam.

Twin Lakes' revised Study 5 sediment mobilization report filed on February 7, 2014 (Stevens, 2014) estimates that 100 acres of riparian soil along the reservoir would be exposed by varying amounts when the reservoir is drawn down. Most of the exposed area would be in the flats area of the reservoir. Using the revised universal soil loss equation from the U.S. Department of Agriculture, Twin Lakes estimates a soil loss from the 100-acre area of approximately 2,500 tons/year (or 0.11 inch/year) during maximum reservoir drawdown, using highly conservative assumptions. Using more realistic

assumptions, Twin Lakes estimates a soil loss from the 100-acre area of approximately 1,050 tons/year, or 0.05 inch/year.

The flats are also susceptible to deposition of suspended particles when the reservoir is full. These suspended particles are transported by the Bear River after passing through Oneida dam. Twin Lakes estimates the suspended sediment load carried by the river as 3,650 tons/year and conservatively assumes that 594 tons/year could be deposited on the flats. Twin Lakes further estimates that, under a100-year flood event of 5,000 cfs, the eroded soil and exposed sediment mobilized from the flats could contribute a TSS concentration of 742milligrams per liter (mg/L) (conservative estimate) or 296 mg/L (more realistic estimate) to the water of the Bear River Narrows reservoir.

On January 6, 2014, BLM commented that a true "worst case" sediment release may originate from the "sloughing off" or "calving off" of multiple-year sediment deposits in the flats area while these sediments are saturated and during reservoir drawdown. BLM is concerned about water quality effects downstream of the proposed dam because of the low retention time in the proposed reservoir. GYC commented on January 6, 2014, that the use of a 100-year storm event with a yield of around 5,000 cfs as a worse-case scenario made it difficult to understand the implications of a drawdown scenario. Idaho DEQ commented on January 6, 2014, that some of the data used in the Twin Lakes sediment mobilization analysis were based on 1987 to 1996 USGS data which Idaho DEQ considered outdated; more current Idaho DEQ data from 2006 to 2013 indicate that the median sediment concentrations in the Bear River near the Idaho/Utah border were less than 25 mg/L ranging from less than 10 mg/L to about 160 mg/L. The more recent concentrations are significantly lower than the 1987 to 1996 data, likely a result of measures to reduce sediment loading to Bear River and its tributaries (see Idaho Soil Conservation Commission, 2008).

Following several stakeholder teleconferences on the issue of sediment mobilization and water quality in 2014, Idaho Fish and Game commented (State of Idaho Agencies letter filed on December 16, 2014), that during drawdown, the mobilization of soil from the 100-acre area exposed to erosion is expected to be modest, even under a 100-year flood event.

Our Analysis

Twin Lakes estimates an average annual sediment concentration and a sediment concentration from a 100-year-flood event for both mobilized and deposited sediment in the proposed reservoir. For the 100-year-flood of 5,000 cfs, the study assumes the sediment load from the proposed project occurs over a single day. Other variables such as settling of suspended sediment farther downstream in the reservoir and multiple larger rainstorms over the course of a year were not considered. To estimate the maximum potential sediment loading from storms that occurs in a typical year, we used the revised universal soil loss equation-based erosion rate of 1,050 tons/year calculated by Twin Lakes and applied the following assumptions:

- Erosion of all soil particles from the flats would occur only during storms with more than 0.5 inch of rain. There would be seven such rain storms per year on average.
- With flows at maximum hydraulic capacity of the turbines at Oneida dam (3,290 cfs), the residence time in a fully drawn-down Bear River Narrows reservoir would be 1.2 days. The corresponding residence time in a completely filled Bear River Narrows reservoir would be 1.9 days.
- Settling velocities in the water column for fine silt of 0.023 centimeters per second and for coarse silt 0.09 centimeters per second (Guerault et al., 2014) converted to 65 and 255 feet/day, respectively.

The proposed reservoir would have a maximum water depth of 100 feet. With a proposed maximum drawdown of 16 feet, the maximum water depth in the fully drawn-down reservoir would be 84 feet. Using our assumed settling velocities, we estimate that at least 80 percent of the eroded silt would settle in the reservoir (although other factors such as turbulence in the water and grain size affect particle settling as well). In other words, most soil particles eroded from the flats would settle out in a fully drawn-down reservoir before reaching the dam. Using the assumptions listed above, we calculated that the contribution of eroded soil particles to the background TSS concentration in the water of the reservoir and the Bear River being discharged by Oneida dam would average 2.9 mg/L.

An additional contribution to TSS would be provided by remobilized suspended sediment that settled on the flats when the reservoir is not fully drawn down. Using Twin Lakes' volume of 594 tons/year, we estimate that another 5.7 mg/L of TSS would be added to the reservoir water by this remobilized sediment during a high flow event. We assume conservatively that 50 percent of all sediment deposited on the flats over 1 year would be mobilized on 1 day per year. We assume that the remaining 50 percent of the settled sediment would be eroded during the year during rain storms or smaller flow events in the river, or would be lost during decomposition of organic particles (Twin Lakes states that much of the suspended solids carried by the river consist of algae rather than sediment). In addition, we assume that the sediment on the flats remains sufficiently unconsolidated to be mobilized by flows at or near the hydraulic capacity of Oneida dam (3,290 cfs), which typically occurs at least once per year.

Combining the soil loss from the flats (i.e., 2.9 mg/L) during rain storms with sediment remobilized from the flats once per year (i.e., 5.7 mg/L), and assuming that both events occur on the same day, results in a combined TSS concentration of 8.6 mg/L. This concentration corresponds to a turbidity of approximately 17 nephelometric turbidity units (NTU) (using a conversion factor of 2.0 from Holliday et al., 2003) that would contribute to the background turbidity in the water passing Bear River Narrows dam under our assumed conditions.

In summary, based on our analysis of the 100-year-flood event, the estimate by Twin Lakes might be used as an upper bound on possible sediment contribution from the project, although we consider some of the assumptions used in Twin Lakes' analysis as too conservative. Instead, for a high-flow event in a typical year, we consider the combined contribution from soil erosion and remobilization of settled sediment of 8.6 mg/L TSS, or 17 NTU turbidity, to be a reasonable estimate of the maximum TSS concentration and turbidity that would be added to the Bear River water downstream of Bear River Narrows dam.

We further consider this maximum added turbidity to the reservoir water to be comparatively small and expect that the turbidity in the Bear River is primarily a result of other sources. For example, in its letter filed on January 6, 2014, Idaho DEQ cites TSS concentrations in the Bear River at the Idaho/Utah border of up to 160 mg/L, based on measurements from 2006 to 2013. The water quality criteria for the state of Idaho specify 50 NTU above background for instantaneous conditions, and an average of 25 NTU above background for more than 10 consecutive days. Therefore, we conclude that the maximum addition of 17 NTU from soil and sediment from the Bear River flats would be within water quality standards.

Bedload Transport

Bedload entering the Bear River channel through small, ephemeral tributaries between Oneida dam and Bear River Narrows dam would be trapped in the proposed Bear River Narrows reservoir. Therefore, this bedload would no longer contribute to the bedload in the Bear River downstream of the dam. Twin Lakes studied the yearly sediment transport in the main stem of Bear River between Oneida dam and Cub River (see figure 3-1), a stretch of 51 river miles (Hardy et al., 2012a). The study concludes that the difference in sediment transport between pre- and post-project scenarios would be less than 1 percent. The study concludes further that this finding is consistent with the fact that the project would cause little change to the river's existing flow regime. Bedload is provided to the downstream stretch of Bear River between the proposed dam and Cub River by seven perennial tributaries (such as Mink Creek) and 29 ephemeral tributaries, as well as by bank erosion along stretches of the river with steep riverbanks. Twin Lakes concludes that bedload trapped in the proposed Bear River Narrows reservoir would not result in a significant change to the bedload below the proposed dam because of these downstream sediment sources.

Twin Lakes states that the proposed project would have some effects on the channel morphology and bed composition in the vicinity of the dam. Clear water releases have a higher sediment carrying capacity resulting in some scour. Twin Lakes states that effects would become smaller over time as the new stable bed profile evolves.

Stabilization would in part be caused by armoring[22] of the river bed. Twin Lakes further states that the changes in morphology and bed composition would decrease with distance downstream of the dam, but would be a function of additional sediment supply and presence of features such as bedrock outcrops or physical structures. Twin Lakes expects that armoring might result in bedload coarsening from the dam to a point approximately 7 river miles (RMs) downstream of the proposed dam; at that point in the river, the more gradual channel slopes would once again shift bed material toward finer substrates.

The U.S. Department of Agriculture, Forest Service (Forest Service), comments in its letter filed on December 11, 2014, that the proposed dam would intercept bedload contributed to the river by its tributaries between Oneida dam and the proposed dam, potentially affecting stream substrate size downstream of the proposed dam and thereby affecting habitat quality. The Upper Snake River Tribes Foundation, Inc., in its comment letter filed on December 15, 2014, states that the dam would contribute significantly to further unnatural alteration of the Bear River's hydrology and geomorphology and would alter sediment transport and patterns of channel erosion and deposition in the river system.

Our Analysis

The area of contribution of bedload to the Bear River upstream of the proposed dam is comparatively small because Oneida dam is expected to completely trap the bedload from its own watershed. In addition, there are no major tributaries supplying bedload in the stretch between Oneida dam and the proposed Bear River Narrows dam. Other tributaries exist downstream of the proposed dam that would continue to provide bedload to Bear River. Consequently, we find that the entrapment of bedload sediment in the Bear River Narrows reservoir would only have a minor effect on the substrate in the Bear River reach downstream of the dam. In addition, we find that changes to the morphology and bed composition would be minor considering that the flow regime in the river would remain similar to current conditions.

3.3.1.3 Cumulative Effects

During construction, water quality in the Bear River downstream of the proposed project would be affected by increases in total suspended solids associated with erosion and construction-related ground disturbance. Erosion control and BMP measures at the proposed project would minimize project effects on total suspended solids in the Bear River from the proposed dam site to the Great Salt Lake. Other project-related instream construction, such as habitat enhancement measures related to removal of fish passage barriers in Mink Creek, could also increase total suspended solid concentrations, but

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[22] Armoring is a hydrological process by which finer grained sediments are eroded during high flows leaving coarser sediment (gravel, pebbles, and rocks) on the surface of the stream bed, eventually protecting it from further erosion.

implementation of protective BMPs would minimize any such effects. Non-project-related irrigation withdrawals and returns in the Bear River Basin currently increase total suspended solids concentrations, so project-related construction effects could cumulatively affect total suspended solids in the Bear River, although those effects would subside once the project is completed.

Oneida dam is trapping the sediment bedload that is transported by the Bear River into Oneida reservoir during high-flow events. The proposed Bear River Narrows dam would also trap the expected small amount of bedload entering the proposed impoundment during operation, resulting in further loss of bedload to the downstream reach of the Bear River.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Use and Quantity

Hydrology

The Bear River originates in the Uinta Mountains of Utah and flows northward into Wyoming and Idaho before turning south near Soda Springs, Idaho, and returning to Utah, eventually flowing into Great Salt Lake. From source to mouth, the Bear River is approximately 500 miles long, with a drainage area of about 7,500 square miles. Flows in the river are almost completely regulated year-round to satisfy various contractual irrigation requirements; for power generation, recreation, fish and wildlife enhancement; and to provide flood protection during high spring runoff (PacifiCorp, 1999).

The primary source of irrigation water is Bear Lake, located about 74 miles upstream of the proposed Bear River Narrows dam, and it takes nearly 5 days for releases from Bear Lake to reach Cutler reservoir, about 40 miles downstream of the proposed Bear River Narrows dam.

During average or dry water years, only enough water is released from Bear Lake to meet contractual irrigation demands between Bear Lake and Cutler reservoir. Storage releases may be as much as 1,600 cfs from Bear Lake during extremely dry water years. During high water years and high Bear Lake levels, storage releases are scheduled immediately following the runoff period and usually are scheduled from July through March of the following year, depending on the Bear Lake level.

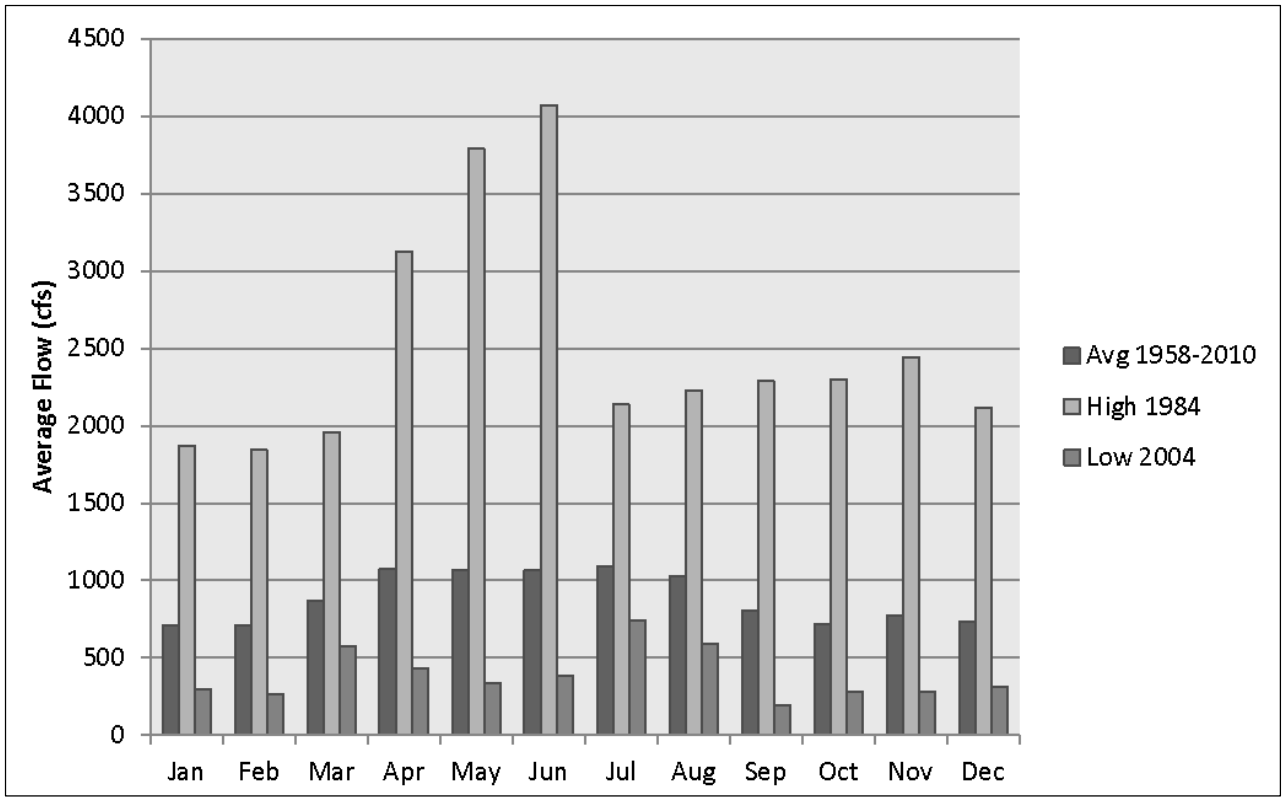
Operations of the existing PacifiCorp hydroelectric facilities on the Bear River, including the Bear River Project, which consists of the Soda, Grace, and Oneida developments, and the Cutler Project, are coordinated to regulate the water as required to satisfy the multiple water uses within the Bear River Basin.

During the irrigation season (typically from about May 1 through October 31), PacifiCorp's operation of its hydroelectric projects is primarily driven by contractual and environmental obligations imposed on the system. Some limited peaking generation occurs at Oneida and Cutler depending on available water supply or downstream demands for water. The largest irrigation withdrawal and the most stringent environmental compliance requirements are at Cutler reservoir; very little flexibility remains in the system to enhance hydroelectric power production.

Consequently, PacifiCorp typically uses the intermediate storage at Soda and Oneida reservoirs to maintain water level control in Cutler reservoir. At the same time, water is dispatched from Bear Lake, Soda reservoir, and Oneida reservoir to supplement downstream consumption. The watershed is operated to maintain a continuous water balance through the irrigation season.

Daily releases from the Oneida development vary and are based on efforts to maximize peak energy generation. Outflows from the Oneida development are now subject to the requirements established during relicensing of the Bear River Project (FERC, 2003a). Article 408 states that the Oneida development must release a continuous minimum flow of 250 cfs plus leakage, or Oneida reservoir inflow plus leakage, whichever is less. Article 412 states that the Oneida development must downramp flows on the descending arm of the hydrograph at a rate no greater than 2 feet in water surface elevation per 15 minutes in the tailrace below Oneida dam. No ramping rate restrictions are imposed on the ascending arm. Article 420 sets a "goal" flow of 900 cfs from Memorial Day to Labor Day to enhance whitewater boating. Article 415 requires an operations and compliance plan that includes the requirements to monitor the minimum flow and ramping rates described in articles 408 and 412.

Figure 3-2 shows the monthly releases from Oneida reservoir from 1958 to 2010. Table 3-1 provides monthly flow duration statistics for releases from Oneida reservoir for the period from 1958 to 2010.



Note: The values shown in this figure include all available data, including monthly flow data that reflect the new license conditions for the Oneida development that became effective in 2003. Although the new license conditions likely result in some flow changes on a daily and weekly basis, monthly flow statistics are likely similar before and after the new license became effective.

Figure 3-2. Monthly releases from Oneida reservoir, 1958–2010 (Source: Twin Lakes, 2013).

Table 3-1. Monthly flow duration statistics in cfs for releases from Oneida reservoir, 1958–2010 (Source: Twin Lakes, 2013).

Percent of Time Equaled or Exceeded	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
100	24	31	8	35	31	28	152	152	39	14	15	10
90	267	268	305	359	323	317	583	583	233	187	242	255
80	308	311	405	484	433	410	707	707	315	252	293	308
70	347	359	495	600	594	550	801	801	388	304	345	343
60	396	423	586	725	756	710	974	888	475	356	395	415
50	482	493	678	884	896	865	967	967	601	422	463	490
40	652	607	816	1,100	1,070	1,000	1,050	1,050	730	518	581	660
30	1,010	854	1,019	1,333	1,290	1,150	1,150	1,150	971	847	953	1,010
20	1,220	1,220	1,340	1,580	1,560	1,360	1,270	1,270	1,310	1,320	1,340	1,210
10	1,440	1,480	1,680	1,910	1,980	2,040	1,510	1,509	1,650	1,728	1,710	1,520
0	2,270	3,190	3,610	4,260	4,140	4,790	3,270	3,270	2,880	2,990	3,270	2,930

Mink Creek enters the Bear River 1.2 miles downstream of the proposed Bear River Narrows dam site. Mink Creek is heavily allocated for summer irrigation use and winter water storage. The largest and most downstream diversion known to be active on Mink Creek is the Twin Lakes diversion located 4.2 miles upstream of the confluence with the Bear River. It is the only diversion that operates year-round (except when the Twin Lakes siphon freezes), which results in very low flows in Mink Creek downstream of the diversion dam for much of the year. Direct historic flow measurements for lower Mink Creek (i.e., downstream of the diversion dam) are limited to April 1, 1943, through September 30, 1952, United States Geological Survey (USGS) gage data, and 2008 to 2011 spot measurements taken during the Bear River Narrows licensing Study No. 4: Mink Creek (Hardy et al., 2012b) (figure 3-3).

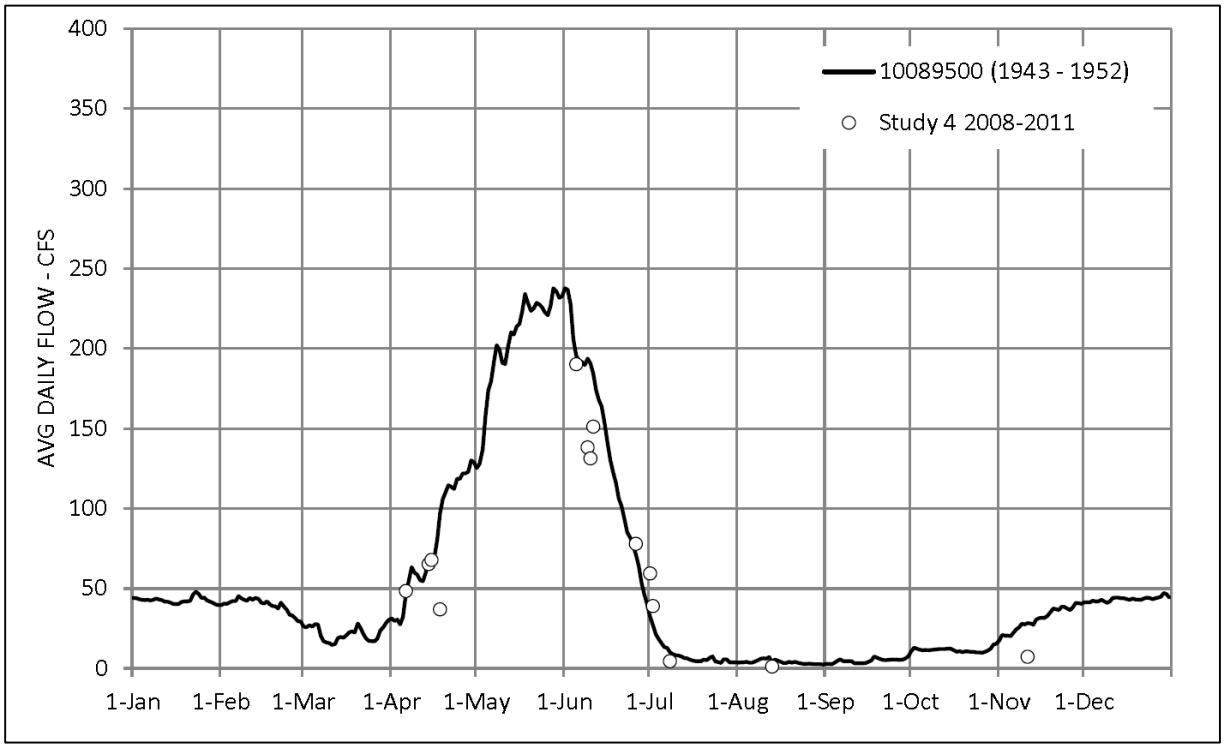


Figure 3-3. Mink Creek average daily flows for the period from April 1, 1943, through September 30, 1952, from USGS gage no. 10089500 and spot flow measurements made during the Mink Creek licensing study; study 4 (Source: Twin Lakes, 2013).

A more extensive overview of recent Mink Creek flows below the Twin Lakes diversion can be deduced from watermaster records documenting water withdrawals at the Twin Lakes diversion from 1990 to 2010. These records show that Mink Creek typically has zero flow downstream of the Twin Lakes diversion dam except during the following times (the beginning and end of these periods vary from year to year): (1) from April to July, runoff can exceed the capacity of the Twin Lakes' diversion causing flow to be bypassed into Mink Creek; and (2) from about mid-December to mid-February, the Twin Lakes siphon freezes and all water is bypassed into Mink Creek.

Although Mink Creek is often dry immediately downstream of the Twin Lakes diversion dam, the reach from the diversion dam to the Bear River confluence is overall a gaining reach. Twin Lakes' physical habitat simulation (PHABSIM)[23] study conducted in 2013 indicates that Mink Creek gains 3 to 5 cfs between the Twin Lakes diversion dam and the Bear River due to irrigation returns, spring flows, and elevated groundwater (Ecosystem Sciences, 2013, appendix C).

Water Rights

Table 3-2 specifies all existing and proposed Twin Lakes water rights on the Bear River and its tributaries. The list includes reference to the potential future water right that would permit storage and use of water in the proposed Bear River Narrows reservoir.

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[23] PHABSIM is the acronym for Physical Habitat Simulation, one of the suite of programs included within the Instream Flow Incremental Methodology (IFIM), to simulate the relationship between streamflow and physical habitat for various lifestages of a species of fish or a recreational activity.

Table 3-2. Twin Lakes Canal Company existing and potential water rights (including Mink Creek rights) (Source: Twin Lakes, 2013, appendix D).

					Individual Limitations					
No.	**Basis**	**Priority Date**	**Source**	**Beneficial Use**	**Diversion Rate (cfs)**	**Volume (acre-feet annually)**	**Irrigation Acres**	**Dates of Use**	**Point of Diversion**	**Notes**
13-896B	Decreed (Dietrich Decree)	May 1, 1882	Mink Creek	Irrigation	4 (see note)	None	None	See notes	SWSE, Sec. 1, T 14S, R 40E	Diversion rate decreases as irrigation season progresses: 4/20 to 7/25: 4.0 cfs; 7/25 to 9/1: 3.03 cfs; 9/1 to 9/30: 2.0 cfs
13-901	Decreed (Dietrich Decree)	April 1, 1901	Mink Creek	Diversion to storage, irrigation, irrigation storage	300	None	None	Diversion to storage 9/30 to 5/1; irrigation 4/20 to 9/30	SWSE, Sec. 1, T 14S, R 40E	Water right developed for both irrigation of Twin Lakes land and for storage of water in Twin Lakes reservoir
13-946B	Decreed (Dietrich Decree)	May 6, 1911	Deep Creek	Irrigation	9.95	3611.7	None	4/15 to 10/15	NENE, Sec. 26, T 14S, R 38E	
13-2289	License	August 19, 1940	Mink Creek	Irrigation from storage, irrigation storage	None	2300	12215.1	1/1 to 12/31	SWNW, Sec. 14, T 14S, R 39E	Water right developed upon construction of Condie reservoir
13-2296	License	March 25, 1956	Mink Creek	Irrigation	5.56	1900	1495.3	4/1 to 10/31	SWSE, Sec. 1, T 14S, R 40E	Water right developed upon construction of Winder reservoir
13-7481	License	December 6, 1990	Deep Creek	Diversion to storage, irrigation,	10	4040	None	Diversion to storage 10/1 to	NENENE, Sec. 26, T 14S, R	Water is diverted out of Deep Creek into Twin Lakes

No.	Basis	Priority Date	Source	Beneficial Use	Individual Limitations: Diversion Rate (cfs)	Individual Limitations: Volume (acre-feet annually)	Individual Limitations: Irrigation Acres	Dates of Use	Point of Diversion	Notes
				irrigation storage				4/30; irrigation from storage 5/1 to 9/30; irrigation storage 1/1 to 12/31	38E	
13-4326	Statutory Claim	July 11, 1923	Spring	Domestic, stockwater	0.06	None	None	1/1 to 12/31	SWSESE, Sec. 23, T 14S, R 38E	Stockwater use for about 150 farm animals
TBD	Future Application for Water Right Permit	TBD	Bear River	Storage for power head, (17,300 acre-feet), Irrigation Storage (5,000 acre-feet), and Irrigation from storage (5,000 acre-feet)	Power (1,400 cfs)	Storage for power head, (13,000 acre-feet), Irrigation Storage (5,000 acre-feet), and Irrigation from storage (5,000 acre-feet)	TBD	Storage for power head, 1/1 to 12/31, Irrigation Storage 1/1 to 12/31, Power 1/1 to 12/31, and Irrigation from storage 4/1 to 10/31	SENE and SWNE, Sec. 16, T 14S, R 40E (location of dam), NENE, Sec. 21, T 14S, R 40E (location of pumping station below dam)	This is the water right that would be sought for the proposed Bear River Narrows Project

There are many existing water rights on the Bear River downstream of the Oneida development, all of which are located downstream of the proposed dam site, except one. An existing water right diversion located about 1,500 feet upstream of the proposed dam site would be inundated by the proposed reservoir. Table 3-3 provides the details of this water right.

Table 3-3. Water rights located within the proposed reservoir area (Source: Idaho DWR, 2014).

Water Right No.	Priority Date	Owner(s)	Max Diversion (cfs)	Withdrawal Period	Purpose	Irrigated Acres
13-969A	5/1/1882	A.C. Bosen	2.75	4/20-9/30	Irrigation	119
13-969A	5/1/1882	Hyrum J. Smith	0.71	4/20-9/30	Irrigation	33
Totals			3.46			152

During refill of the reservoir, Twin Lakes proposes to use unallocated water in excess of downstream water rights in flows of 10 to 25 cfs to refill the reservoir. Table 3-4 lists the various water rights downstream of the proposed dam, which total a maximum of 421.4 cfs. As the table shows, the majority of the water rights are used during the period April 1 to October 31, although a few are year-round, some start later than April 1, and some end after October 31. As noted, water rights are listed as maximum diversion rates, and some have maximum diversion volumes.

Table 3-4. Water rights on the Bear River downstream of the proposed Bear River Narrows dam (Source: Idaho DWR, 2015; Utah Division of Water Rights, 2015; Twin Lakes, 2014).

	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
IDAHO NO.						
13-969A	A. C. Bosen Hyrum J Smith	0	05/01/1882	2.75 0.71		04/20 to 09/30
13-7631	Hyrum J. Smith	2.7	05/01/1882	0.4		04/20 to 09/30
13-7632	Robert & Olivia Boyack Living Trust	2.7	05/01/1882	1.6		04/20 to 09/30
13-970	Nelson Ditch Co.	3.0	05/01/1880	6.5		04/20 to 09/30
13-971	Riverdale Preston Irrigation Co.	3.1	06/10/1883	3.0		04/01 to 10/31
13-972A	Riverdale Preston Irrigation Co.	3.1	6/10/1902	6.4		04/20 to 09/30
13-2111	Taylor Nelson	4.2	3/29/1926	0.2		[a]
13-971	Riverdale Preston Irrigation Co.	5.4	06/10/1883	3.0		04/01 to 10/31
13-972A	Riverdale Preston Irrigation Co.	5.4	6/10/1902	6.4		04/20 to 09/30
13-973	Riverdale Irrigating Co.	5.4	05/01/1882	13.0		04/20 to 09/30
13-972B	John L. Higley	5.4	6/10/1902	0.1	28	04/20 to 09/30
13-971	Riverdale Preston Irrigation Co.	5.9	06/10/1883	3.0		04/01 to 10/31
13-972A	Riverdale Preston Irrigation Co.	5.9	6/10/1902	6.4		04/20 to 09/30
13-974	West Cache Irrigation Co.	7.0	09/12/1899	186	51,912	04/15 to 10/15
13-975	Battle Creek Irrigation Co.	7.0	07/10/1883	5		04/20 to 09/30

	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
13-7048	Rolen V. Bastian	22.7	6/21/1973	1.8		04/01 to 10/01
13-7069	Rolen V. Bastian	22.7		1.0		a
13-4107	Leanne Curry Matt Wayne Curry	24.8	6/1/1926	2.5		04/01 to 11/01
13-4304	Bruce Lamont	24.8	6/1/1926	2.9		04/01 to 11/01
13-4236	Carrol E. Whitney, Whitney Gift Trusts	25.6	5/15/1935	0.1	60	(irrigation storage) 05/15 to 11/15 (irrigation from storage) 01/01 to 12/31
13-4234	Carrol E. Whitney, Whitney Gift Trusts	25.6	7/1/1966	0.1	400	(irrigation storage) 05/15 to 11/01 (irrigation from storage) 01/01 to 12/31
13-2066	Cub River Irrigation Co.	25.9	12/11/1914	100		a
13-4234	Carrol E. Whitney, Whitney Gift Trusts	26.7	7/1/1966	0.5	400	(irrigation storage) 05/15 to 11/01 (irrigation from storage) 01/01 to 12/31

UTAH NO.	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
25-7460	Christensen Fairview Dairy	28.6	8/14/1983	3.0		04/01 to 10/31
25-8073	Cache Meadow Farms	28.6	10/25/1979	1.0		04/01 to 10/31
25-9214	Town of Cornish	30.8	4/24/1992	1.0		01/01 to 12/31
25-7162	Jackson K. & Oralie Smith Craig B. & Beckyann Smith	31.6	2/2/1977	1.1	143.6	04/01 to 10/31
25-7891	Allen Wheeler	33.2	12/1/1993	0.5	2.8	01/01 to 12/31
25-7813	Regan Wheeler	33.7	1930	2.5		04/01 to 10/31
25-7891	Allen Wheeler	33.7	12/1/1993	0.5	2.8	01/01 to 12/31
25-8723	Allan Wheeler	33.7	6/1/1919	0.6	128	04/01 to 10/31
25-8724	Allan Wheeler	33.7	3/11/1986	1.8	425.6	04/01 to 10/31
25-6083	Larry Pitcher	34.7	12/7/1973	0.5		04/01 to 10/31
25-3040	The Goodwin Family Trust Warren & Cathy Hughes Family Trust Larry B. & Linda Pitcher	34.8	5/1/1919	1.5	200	04/01 to 10/31
25-6467	The Goodwin Family Trust Warren & Cathy Hughes Family Trust Larry B. & Linda Pitcher	34.8	05/01/1894	0.5	82.7	04/01 to 10/31
25-6624	The Goodwin Family Trust Warren & Cathy Hughes Family Trust Larry B. & Linda Pitcher	34.8	5/1/1918	0.4	10.7	04/01 to 10/31

	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
25-6625	Larry Pitcher	34.8	5/1/1918	3.0		04/01 to 10/31
25-6881	Duane L. Williams	34.8	05/01/1894	0.5		04/01 to 10/31
25-6882	Duane L. Williams	34.8	5/1/1919	1.5	6.4	04/01 to 10/31
25-8147	Warren J. Hughes	34.8	4/4/1980	0.1		04/01 to 10/31
25-6625	Larry Pitcher	35.4	5/1/1918	3.0		04/01 to 10/31
25-6625	Larry Pitcher	35.4	5/1/1918	3.0		04/01 to 10/31
25-6626	PacifiCorp	35.4	5/1/1918	3.0		04/01 to 10/31
25-6627	Simmonds Brothers Dairy, LLC	35.4	5/1/1918	3.0		(irrigation) 04/01 to 10/31 (stockwater) 01/01 to 12/31 (domestic) 01/01 to 12/31
25-6628	Simmonds Brothers Dairy, LLC	35.4	5/1/1918	3.0		04/01 to 10/31
25-6923	MRC Trust	35.4	6/17/1920	2.5		04/01 to 10/31
25-6924	Allen & Dolores G. Wheeler	35.4	6/17/1920	2.5		04/01 to 10/31
25-7441	Larry Pitcher	35.4	5/1/1919	0.2		04/01 to 10/31
25-9944	Laura Simmonds Brough	35.4	5/1/1918	3.0		04/01 to 10/31
25-6925	Hill Irrigation Company	35.7	1919	4.0	700	04/01 to 10/31

	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
25-6917	Topaz Marketing Limited Partnership Willard & Seletta Pitcher Trust William E. Beckstead Dairy Farm, Inc.	36.2	6/12/1920	2.0		04/01 to 10/31
25-6852	PacifiCorp	36.3	4/16/1976	0.4		(irrigation) 04/01 to 10/31 (stockwater) 01/01 to 12/31
25-6852	PacifiCorp	36.8	4/16/1976	0.4		(irrigation) 04/01 to 10/31 (stockwater) 01/01 to 12/31
25-6852	PacifiCorp	36.8	4/16/1976	0.4		(irrigation) 04/01 to 10/31 (stockwater) 01/01 to 12/31
25-6925	Hill Irrigation Company	37.1	1919	4.0	700	04/01 to 10/31
25-3518	Charles Walter & Betty J. Wood	37.2	6/1/1920	2.2		05/01 to 09/30
25-6017	Jean S. Nelson Trust Perry Spackman Michael Spackman	41.0	7/26/1973	2.0		(irrigation) 04/01 to 10/31 (stockwater) 01/01 to 12/31
25-6838	Lloyd Buttars	41.4	3/16/1976	1.8		04/01 to 10/31
25-6890	Perry, Anne, Michael W., & Sandra Spackman	41.4	7/5/1917	4.9		04/01 to 10/31

	Owner(s)	Miles below proposed dam	Priority date	Diversion rate (cfs)	Maximum diversion volume (Acre-feet annually)	Dates of use
25-6891	Lloyd Buttars	41.4	7/5/1917	4.9	439.6	04/01 to 10/31
25-6892	Lloyd J. & Venna S. Buttars Rock Bottom Limited	41.4	7/5/1917	4.9		04/01 to 10/31
25-6893	Rock Bottom Limited	41.4	7/5/1917	4.9	391.6	04/01 to 10/31
25-8211	Lloyd J. & Venna S. Buttars Rock Bottom Limited	41.4	3/16/1976	1.8		04/01 to 10/31
25-8212	Perry, Anne, Michael W., & Sandra Spackman	41.4	3/16/1976	1.8		04/01 to 10/31
25-8213	Rock Bottom Limited	41.4	3/16/1976	1.8		04/01 to 10/31
25-6688	Wilson Kalmar Robbins Trust	42.3	10/22/1977	2.0		04/01 to 10/31

[a] This water right is listed in Twin Lakes (2014) but the period of withdrawal is not shown on the current Idaho DWR website.

Table 3-5 lists water rights for all legal diversions on Mink Creek, including the Twin Lakes diversions under water rights 13-896B, 13-901, and 13-2296. The key point for Mink Creek water rights is the potential for other water users to claim and divert all or part of the 10 cfs flow bypassed by Twin Lakes for mitigation purposes. Twin Lakes' Mink Creek bypass flows would be administered by the local watermaster. Twin Lakes states that there are no adjudicated water rights between Twin Lakes' Mink Creek diversion and Mink Creek's confluence with the Bear River, and to the best of its knowledge, there also are no active diversions. Two statutory claims totaling 0.42 cfs on Mink Creek downstream of the Twin Lakes diversion are unadjudicated allocations.

In its public comment response, Twin Lakes filed a table of existing water rights for the Ben Johnson Family Farm property based on its consultant's research in the Idaho Department of Water Resources (Idaho DWR) database (letter from C.D. Bosen, Twin Lakes, to K.D. Bose, Secretary, Commission, January 23, 2015) (table 3-6). Twin Lakes notes that the table does not include any irrigation delivery contracts that may exist or any irrigation company water shares that may apply to the property.

Based on the information in table 3-6, there is at least a water right of 12.69 to 13.39 cfs associated with the property. The water rights are all listed as either irrigation or stockwater use. No information on the record to date provides details of any water deliveries or water shares associated with the property, according to the attorneys for owners of the Ben Johnson Family Farm property (letter from J.L. Williams, Ben Johnson Family Farm, LLC, to K.D. Bose, Secretary, Commission, Washington, D.C., April 11, 2014).

Table 3-5. Diversions and associated water rights on Mink Creek (Source: Twin Lakes, 2013, appendix D).

Diversion ID	Miles Above Mouth	Water Right Number	Priority Date	Owner(s) Using Diversion	Max Diversion (cfs)	Cumulative Diversion[a] (cfs)
10	>12	13-4158	6/1/1957	Forest Service	0.02	0.0
9	10.4	13-7416	5/18/1984	Mink Creek Hydro LLC	100	0.0[b]
8	8.9	13-903	5/1/1890	Benson Ranch Properties LLC	0.78	0.8
7	8.7	13-895A	5/1/1882	Mink Creek Hydro LLC	5.67	20.1
		13-896A	5/1/1882	Mink Creek Hydro LLC	8.1	
		13-4231	7/19/1932	Mink Creek Hydro LLC	4.5	
6	8.0	13-900[c]	5/1/1888	Preston-Riverdale-Mink Creek	10	30.1
5	7.8	13-894	5/1/1882	Mink Creek Irrigation Co.	10.5	40.6
4	5.5	13-898	5/1/1882	Christina Nelson	0.6	41.2
3	4.2	13-900[c]	5/1/1888	Preston-Riverdale-Mink Creek	26	67.2
2	4.2	13-896B	5/1/1882	Twin Lakes Canal Co.	4.0	382.4
		13-899	5/1/1882	Glencoe Irrigation Co.	0.06	
		13-902	5/1/1882	Glencoe Irrigation Co.	5.58	
		13-2296	3/25/1956	Twin Lakes Canal Co.	5.56	
		13-901	4/1/1901	Twin Lakes Canal Co.	300	
1	0.1	13-4225	7/1/1922	W. Hugh Hansen	0.24	382.8
		13-4217	4/1/1925	Barbara & Gordon B. Jensen	0.18	

[a] Assumes maximum diversion rate; however, note that all diversions may not currently be active.
[b] Non-consumptive water right, i.e., no net loss of flow in Mink Creek.
[c] Water right split between multiple points-of-diversion.

Table 3-6. Existing water right inventory–Johnson Property (Source: letter from C.D. Bosen, Twin Lakes, to K.D. Bose, Secretary, FERC, January 23, 2015, as modified by staff).

No.	Name	Basis	Priority Date	Source	Beneficial Use	Individual Limitation		Combined Acre Limitation	Acres on Johnson Property	Notes
						Diversion Rate (cfs)	Acres			
13-923	S.C. Chadwick	Bear River Decree	5/1/1885	Battle Creek	Irrigation	2	320	320	0-112	These two water rights cover the same 112 acres.
13-924	S.C. Chadwick	Bear River Decree	7/11/1883	Haw Bush Spring, spring, Tank Spring	Irrigation, diversion to storage	1.6	320			
13-937	Mrs. Alonzo H. Seamons	Bear River Decree	5/1/1902	Battle Creek	Irrigation	0.7	35	NA	0-35	Twin Lakes notes that it is possible that all 35 acres are on the Johnson property. Twin Lakes notes that it is also possible that none of the 35 acres are on the Johnson property. The decree states that the point of use is 35 acres within the NE quarter. Only the east half of the NE quarter is Johnson property.
13-939	Oscar M. Seamons	Bear River Decree	5/1/1907	Battle Creek	Irrigation	0.6	182	182	109	
13-940	Oscar M. Seamons	Bear River Decree	3/3/1913	Battle Creek	Irrigation	2	182			

No.	Name	Basis	Priority Date	Source	Beneficial Use	Individual Limitation		Combined Acre Limitation	Acres on Johnson Property	Notes
						Diversion Rate (cfs)	Acres			
13-2123	Oscar M. Seamons	License	8/27/1930	Battle Creek	Irrigation	3.7	185	NA	185	
13-4000	J. Harold Manning	Statutory Claim	1/1/1945	Springs	Irrigation, stockwater	0.12 – irrigation; 0.04 stockwater	35	NA	18	
13-4018	Lloyd B. Peterson	Statutory Claim	4/1/1882	Springs	Irrigation	0.4	24	NA	12	
13-4058	L.A. Winger, Audra Mae W. Case, Bernice W. Condie, Loraine 10Darley, 11Zelma W. Hampton, Lora Jean W. Simpson, Josephine W. Sorenson, Loren D. Winger	Statutory Claim	6/1/1913	Springs	Irrigation, stockwater	0.2 irrigation; 0.01 stockwater	10	NA	10	
13-4299	Ben B. Johnson	Statutory Claim	7/11/1883	Wayland Hot Springs	Irrigation	2	233	NA	233	
Total acres on Johnson Property								567-714		

Twin Lakes Irrigation Demands

Twin Lakes provides information on its water deliveries to its customers between 1990 through 2010 in appendix D of its license application. Table 3-7 shows the contractual water demand, actual water deliveries, and any water shortages after deliveries were made.

Table 3-7. Twin Lakes' contractual water demand, deliveries, and water shortages for the period 1990–2010 (Source: Twin Lakes, 2013, as modified by staff).

Year	Contractual Water Demand(acre-feet)	Twin Lakes Deliveries(acre-feet)	Water Shortages after Deliveries (acre-feet)
1990	32,000	19,200	12,800
1991	32,000	19,200	12,800
1992	32,000	12,800	19,200
1993	32,000	32,000	0
1994	32,000	22,400	9,600
1995	32,000	16,000	16,000
1996	32,000	32,000	0
1997	32,000	32,000	0
1998	32,000	32,000	0
1999	32,000	32,000	0
2000	32,000	24,000	8,000
2001	32,000	16,000	16,000
2002	32,000	20,800	11,200
2003	32,000	25,600	6,400
2004	32,000	25,600	6,400
2005	32,000	32,000	0
2006	32,000	32,000	0
2007	32,000	19,200	12,800
2008	32,000	32,000	0
2009	32,000	28,800	3,200
2010	32,000	19,200	12,800

As table 3-7 shows, water shortages occurred in 13 of 21 years, ranging from 3,200 acre-feet to 19,200 acre-feet per year.

Water Quality

The Idaho Administrative Code designates the Bear River from Alexander dam to the Utah border, including the project reach, for multiple beneficial uses, including coldwater aquatic life, salmonid spawning, primary and secondary contact recreation, agricultural water supply, industrial water supply, wildlife habitat, and aesthetics (Idaho DEQ, 2011a). Table 3-8 summarizes the Idaho water quality standards for coldwater aquatic life, salmonid spawning, primary contact recreation, and other uses. The project reach is listed on the Idaho 303(d) list for impaired waters related to low-flow alterations, total phosphorus (TP), temperature, and total suspended solids (Idaho DEQ, 2011b). The total impaired reach extends from Alexander dam (Soda development) to the Idaho/Utah border (see figure 3-1).

Twin Lakes collected new baseline water quality data in Oneida reservoir and in the Bear River during 2009 and in Mink Creek from 2008 to 2011 to assess the potential effects of construction and operation of the proposed project on downstream water quality (Hardy et al., 2012b; Stevens and Milleson, 2014; figure 3-4).

Twin Lakes sampled four stations of varying depth (≤16 feet [5 meters], 33 feet [10 meters], 56 feet [17 meters], and 72 feet [22 meters]) in Oneida reservoir to track the formation and breakdown of the thermocline and study the water quality. Stratification began appearing by May 7, 2009, and was fully established by June 11, with a strong thermocline. Stratification remained until fall turnover, with a fully mixed reservoir evident by November 4, 2009 (figure 3-5). In early May, with slight stratification, water temperatures did not exceed the Idaho state water quality standard for coldwater aquatic life at any sampling stations. However beginning in late June until late August, temperatures at most stations exceeded the state standard for coldwater aquatic life at depths less than 33 feet (figure 3-5). In early May, DO concentrations also exhibited stratification beginning at about 23 feet deep. From early June until August, DO conditions were mostly anoxic (i.e., near 0 mg/L) at depths greater than 49 feet (figure 3-6). Total phosphorus concentrations ranged from 0.015 to 1.502 mg/L with a mean of 0.09 mg/L. Total phosphorus concentrations exceeded the Idaho water quality standard of 0.075 mg/L (table 3-9). These exceedances occurred in more than 65 percent of the samples, with exceedances occurring at all locations.

Table 3-8. Idaho numerical water quality criteria for the mainstem Bear River and its tributaries (Source: Idaho DEQ, 2011b).

Parameter	Coldwater Aquatic Life	Salmonid Spawning	Primary Contact Recreation	Water Supply, Wildlife Habitat, and Aesthetics
Temperature	≤22°C instantaneous ≤19°C maximum daily average	≤13°C instantaneous ≤9°C daily average	-	-
Water column DO	≥6 mg/L[a]	≥6 mg/L	-	Downstream of existing dams, reservoirs, or hydroelectric facilities: ≥3.5 mg/L instantaneous; ≥4.7 mg/L 7-day mean; ≥6.0 mg/L 30-day mean[b]
Intergravel DO	-	One day minimum ≥5 mg/L and 7 day average ≥6 mg/L	-	-
Total phosphorus	0.075 mg/L Target concentration at Utah-Idaho state line: 0.05 mg/L	-	-	EPA target goal: 0.025 mg/L lakes and reservoirs; 0.05 mg/L rivers entering into lakes and reservoirs; 0.10 mg/L flowing waters not discharged into a lake or reservoir

Parameter	Coldwater Aquatic Life	Salmonid Spawning	Primary Contact Recreation	Water Supply, Wildlife Habitat, and Aesthetics
pH	6.5–9.0	-	-	-
Total dissolved gas	≤110% at atmospheric pressure	-	-	-
Turbidity	≤50 NTU above background instantaneously ≤25 NTU from background for 10 days	-	-	-
Total suspended solids	80 mg/L runoff 60 mg/L base flow	-	-	-
Escherichia coli	-	-	Maximum 406 colonies/100 mL	-

Notes: –DO – dissolved oxygen, °C – Celsius, mg/L – milligrams per liter, NTU – nephelometric turbidity units, mL – milliliters.

[a] Does not apply (1) to the bottom 20 percent of the water depth in natural lakes and reservoirs where depths are 115 feet or less, (2) the bottom 23 feet where depths are greater than 115 feet, or (3) those waters of the hypolimnion in stratified lakes and reservoirs (Idaho DEQ, 2011a, section 250.02.a.i-iii).

[b] Supersedes other criteria from June 15 to October 15.

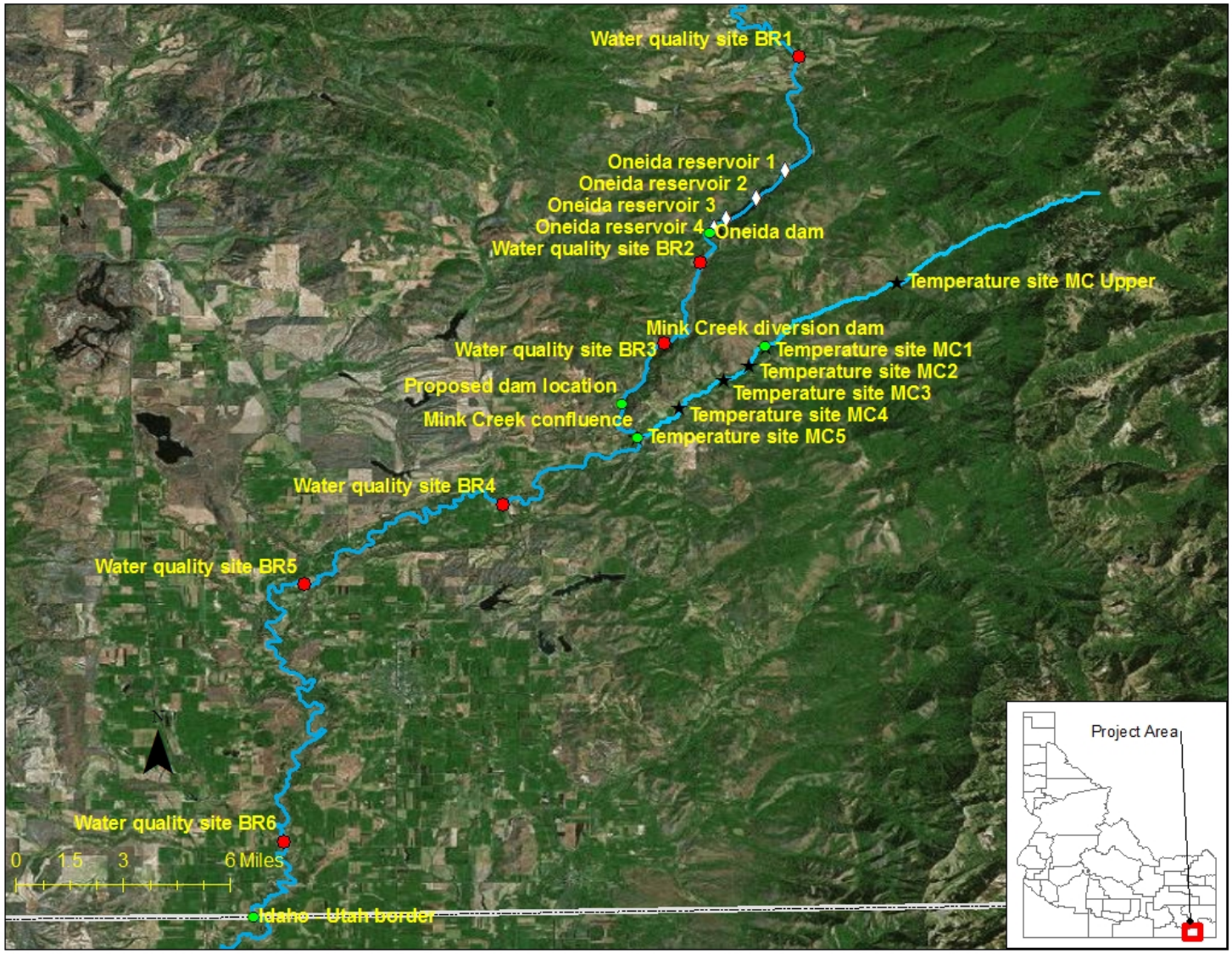


Figure 3-4. Water quality monitoring sites in Oneida reservoir, the Bear River, and Mink Creek (Source: Hardy et al., 2012b; Stevens and Milleson, 2014, as modified by staff).

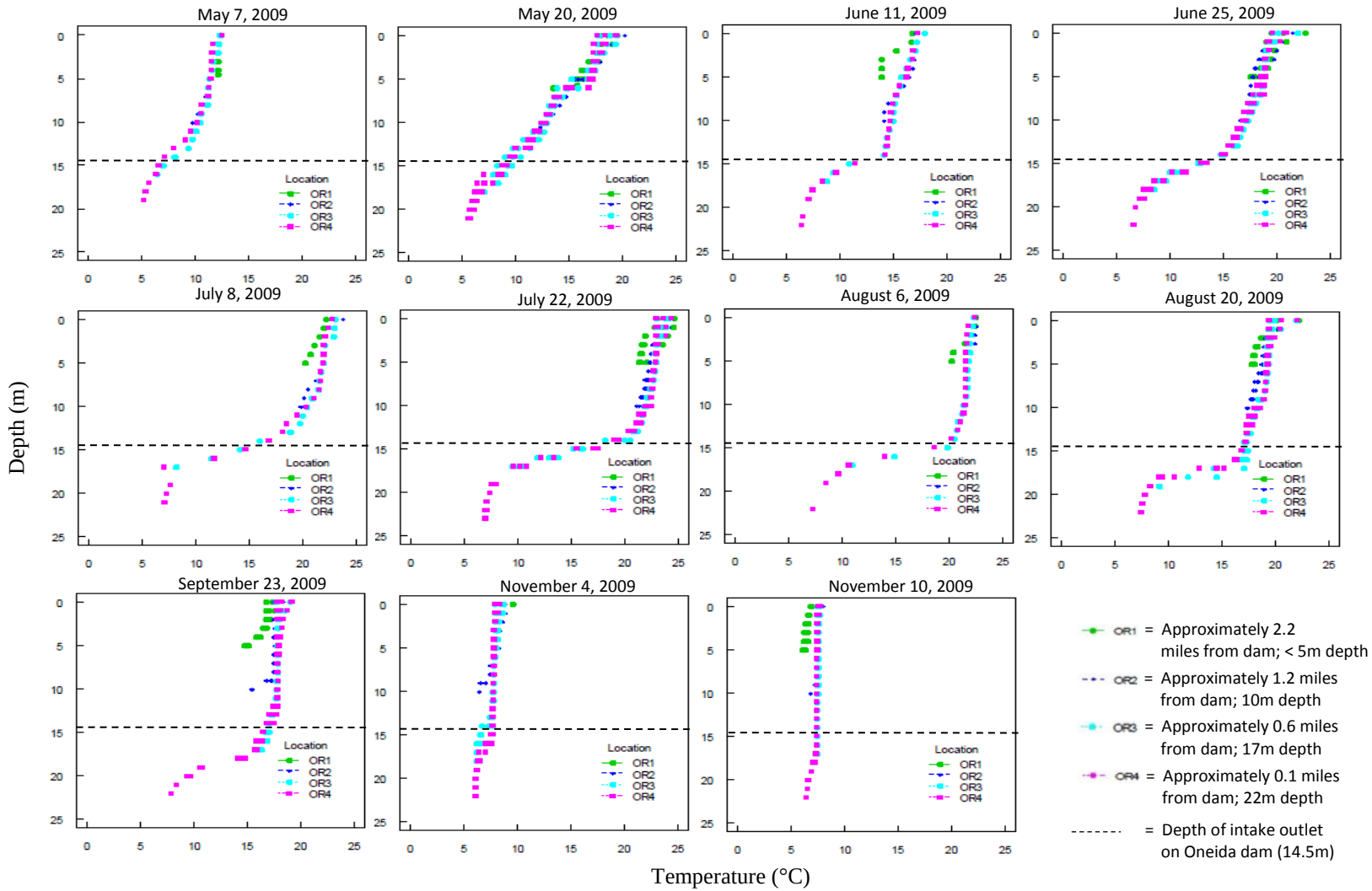


Figure 3-5. Temperature profiles for Oneida reservoir from May to November 2009 (Source: Stevens and Milleson, 2014, as modified by staff).

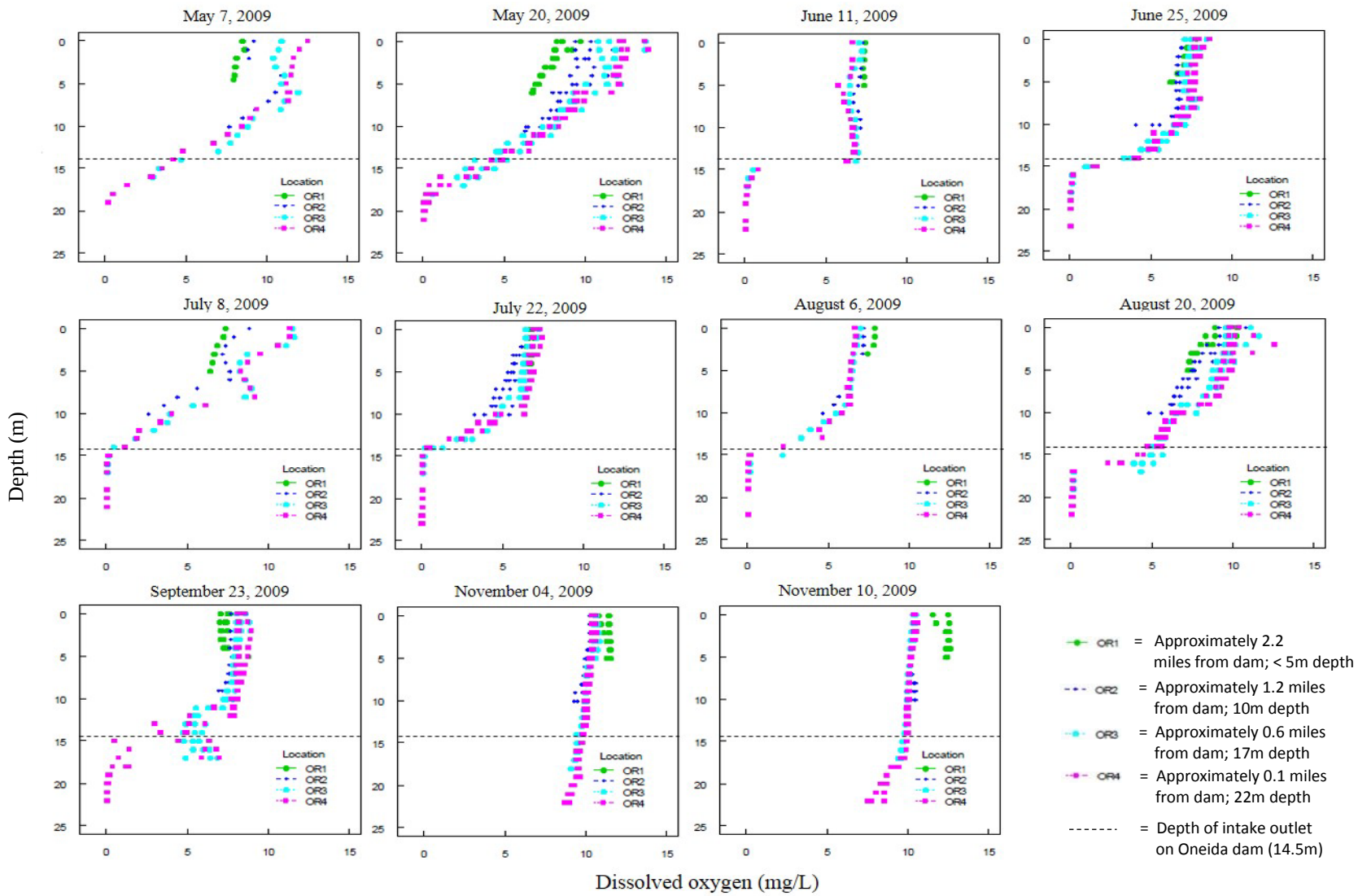


Figure 3-6. DO profiles for Oneida reservoir from May to November 2009 (Source: Stevens and Milleson, 2014, as modified by staff).

Table 3-9. Summary water quality data collected from multiple sites in the Bear River and Oneida reservoir from January to December 2009 (Source: Stevens and Milleson, 2014, as modified by staff).

Location	Minimum	Mean	Maximum	Standard Deviation
Bear River				
DO (mg/L)	7.00	10.50	14.43	1.86
Temperature (°C)	0.31	10.62	22.81	6.44
Total phosphorus (mg/L)	0.019	0.061	0.164	0.024
Total suspended solids (mg/L)	1.60	14.50	97.10	15.00
Oneida Reservoir				
DO (mg/L)	0.05	7.29	13.83	3.25
Temperature (°C)	0.39	14.13	24.60	5.93
Total phosphorus (mg/L)	0.015	0.090	1.502	0.127
Total suspended solids (mg/L)	1.00	12.95	73.60	13.47

In the Bear River, DO concentrations follow a typical annual pattern at all sites based on Twin Lakes' 2009 monitoring results, with levels starting off higher in the late winter to early spring, reaching their minimum level in the summer, and increasing again in the fall. Concentrations were consistently above the state water quality standard of 6 mg/L (figure 3-7). Temperatures were mostly below the maximum state standard of ≤22 degrees Celsius (°C), and a daily average of ≤19°C, with the exception of one sample at the farthest downstream site that exceeded the standard, at 22.8°C (figure 3-8).

Below Oneida dam, total suspended solids concentration became more variable with distance downstream during Twin Lakes' 2009 water quality monitoring. Within the first 10 miles downstream of the dam, concentrations did not vary by more than 12 mg/L. Farther downstream, concentrations varied by approximately 25 to 60 mg/L (figure 3-9). These results are generally consistent with Idaho DEQ data from 2006 to 2013, summarized in its comment letter filed on January 6, 2014, indicating that the median sediment concentrations in the Bear River near the Idaho/Utah border were less than 25 mg/L, ranging from less than 10 mg/L to about 160 mg/L.

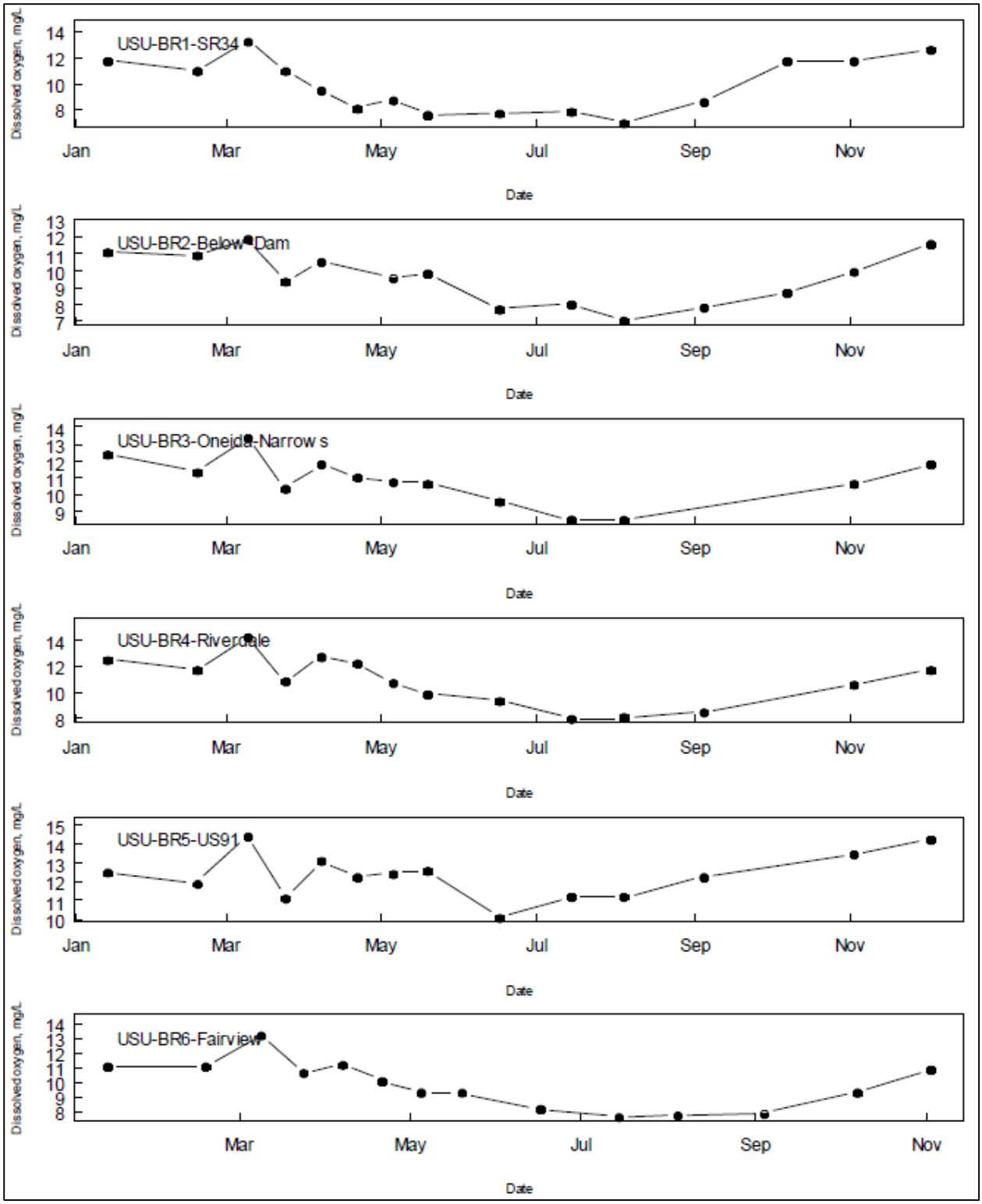


Figure 3-7. Seasonal DO concentrations (mg/L) at six monitoring sites on the Bear River, 2009 (locations are show in figure 3-4) (Source: Stevens and Milleson, 2014).

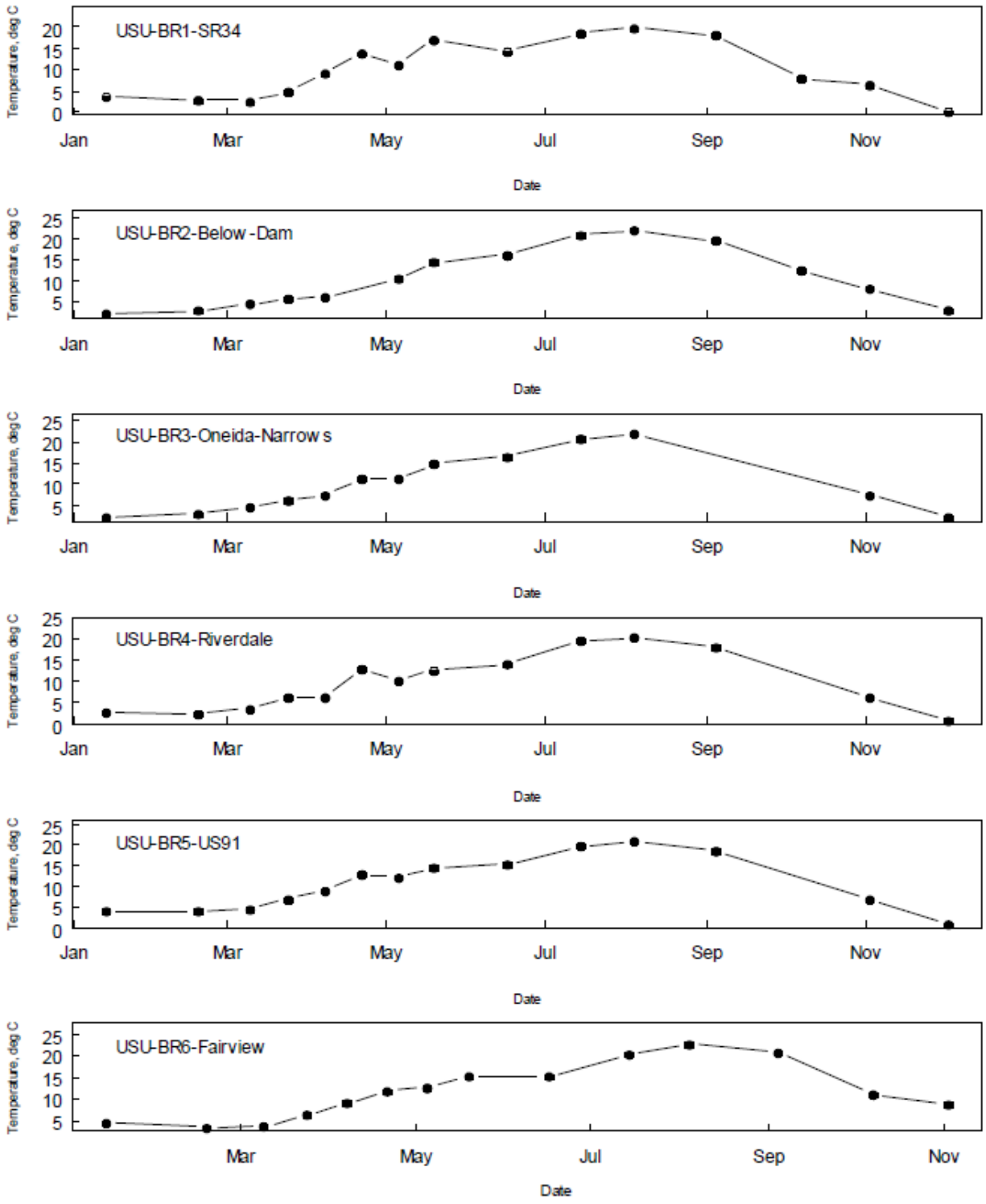


Figure 3-8. Seasonal temperatures (°C) at six monitoring sites on the Bear River, 2009 (locations are show in figure 3-4) (Source: Stevens and Milleson, 2014).

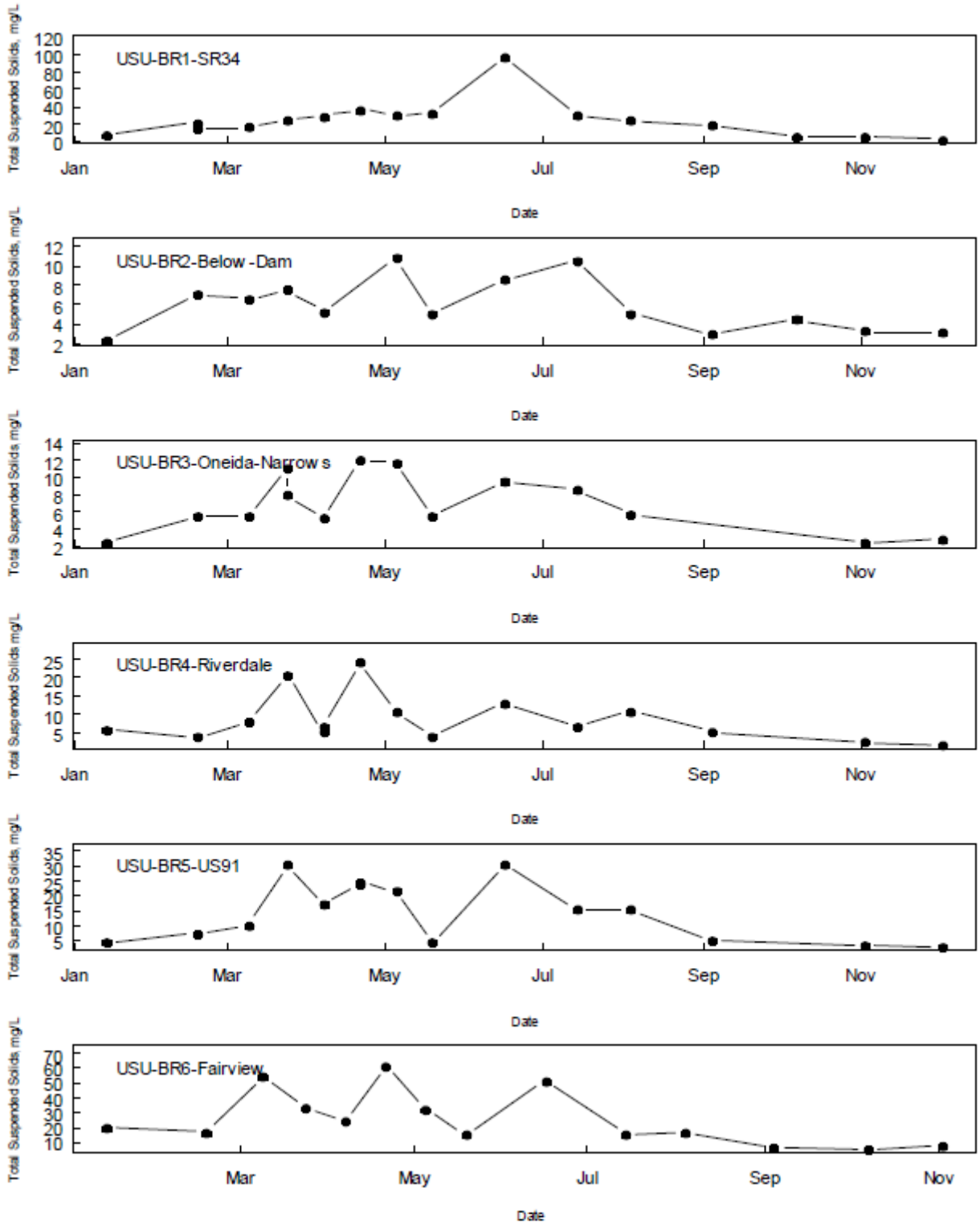


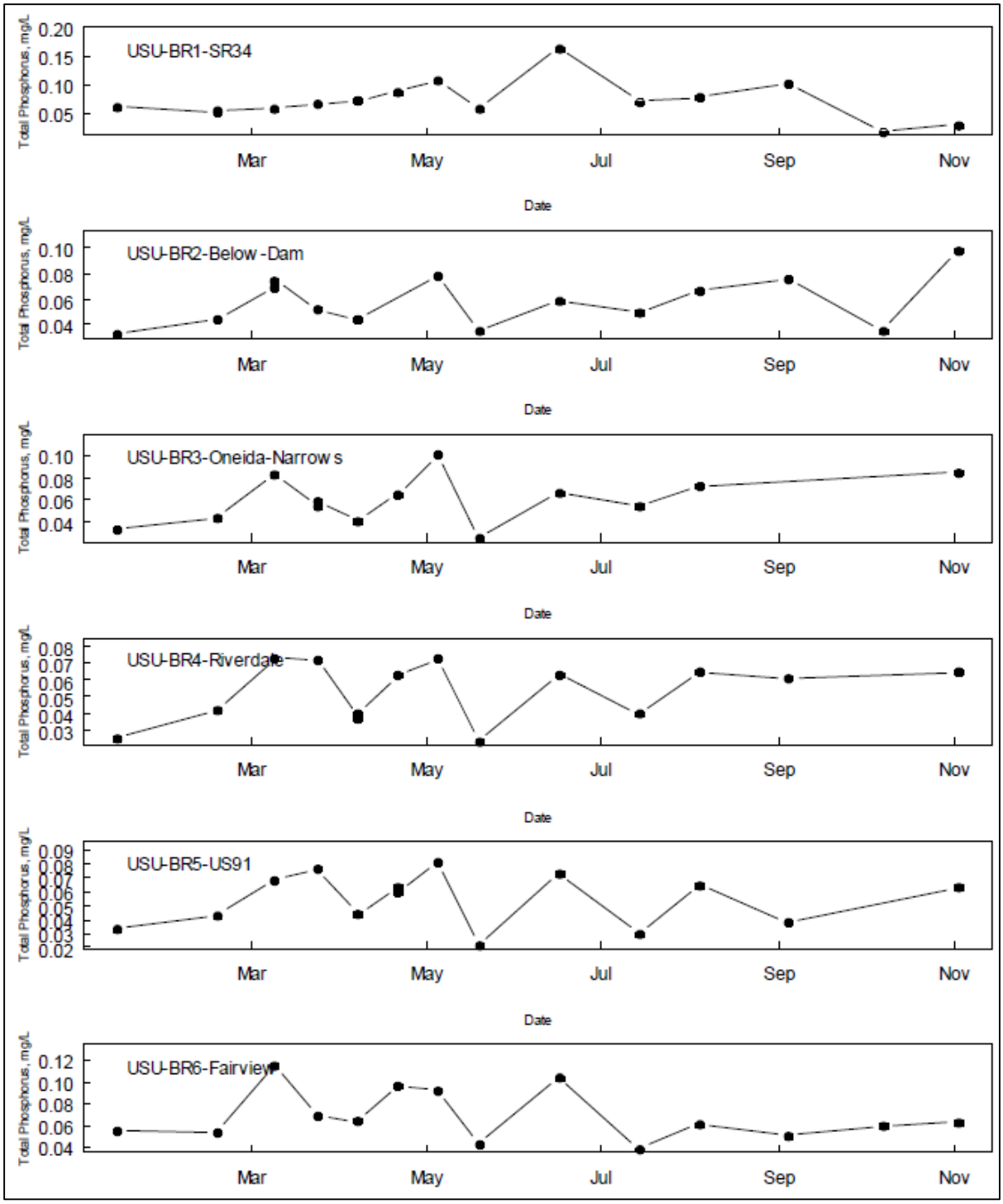
Figure 3-9. Seasonal total suspended solids concentration (mg/L) at six monitoring sites on the Bear River, 2009 (locations are show in figure 3-4) (Source: Stevens and Milleson, 2014).

Twin Lakes determined that TP concentrations immediately downstream of Oneida dam ranged from 0.03 to 0.10 mg/L during 2009, with approximately 75 percent of the observations being less than 0.075 mg/L, the state standard for project waters. TP concentrations remained relatively consistent throughout the reach downstream of Oneida dam, but showed a small increase near the Idaho/Utah border (figure 3-10). TP concentrations near the Idaho/Utah border ranged from 0.04 to 0.12 mg/L with approximately 50 percent of the observations exceeding the state standard of 0.05 mg/L (the standard at the Idaho/Utah border). The increase at the Idaho/Utah border is likely because of TP contributions from tributaries on the western side of the Bear River Basin near Weston, Idaho (Stevens and Milleson, 2014).

Twin Lakes monitored water quality in Mink Creek from March through December 2009. Mink Creek is of particular interest because it provides important habitat for BCT (Hardy et al., 2012b). DO concentrations near the confluence with the Bear River were always above 8 mg/L during the study period. In all but three samples, DO was above 96 percent saturation. Water temperatures were monitored at six locations in Mink Creek from May 2008 through April 2011 (see figure 3-4). Two locations (MC upper and MC 1) are upstream of the Mink Creek diversion dam, and the remaining four locations are downstream of the dam. Water temperatures follow a typical seasonal pattern as well as a longitudinal pattern, with summer highs increasing with distance downstream of the diversion dam (figure 3-11). Although some water temperature exceedances of the state standard of 13°C for salmonid spawning (instantaneous standard) occurred during the spring, most exceedances occurred from mid-July until early-September. This period of higher temperatures, however, is outside of the BCT spring spawning period. Total suspended solids concentration was highest from March to April, likely corresponding to high runoff, with maximum concentrations of 101.4 mg/L in late April. From May to December, total suspended solids concentration in Mink Creek was much lower. The maximum TP concentrations measured in Mink Creek exceeded the Idaho water quality criterion of 0.075 mg/L (table 3-10). These exceedances occurred in less than 50 percent of samples from Mink Creek.

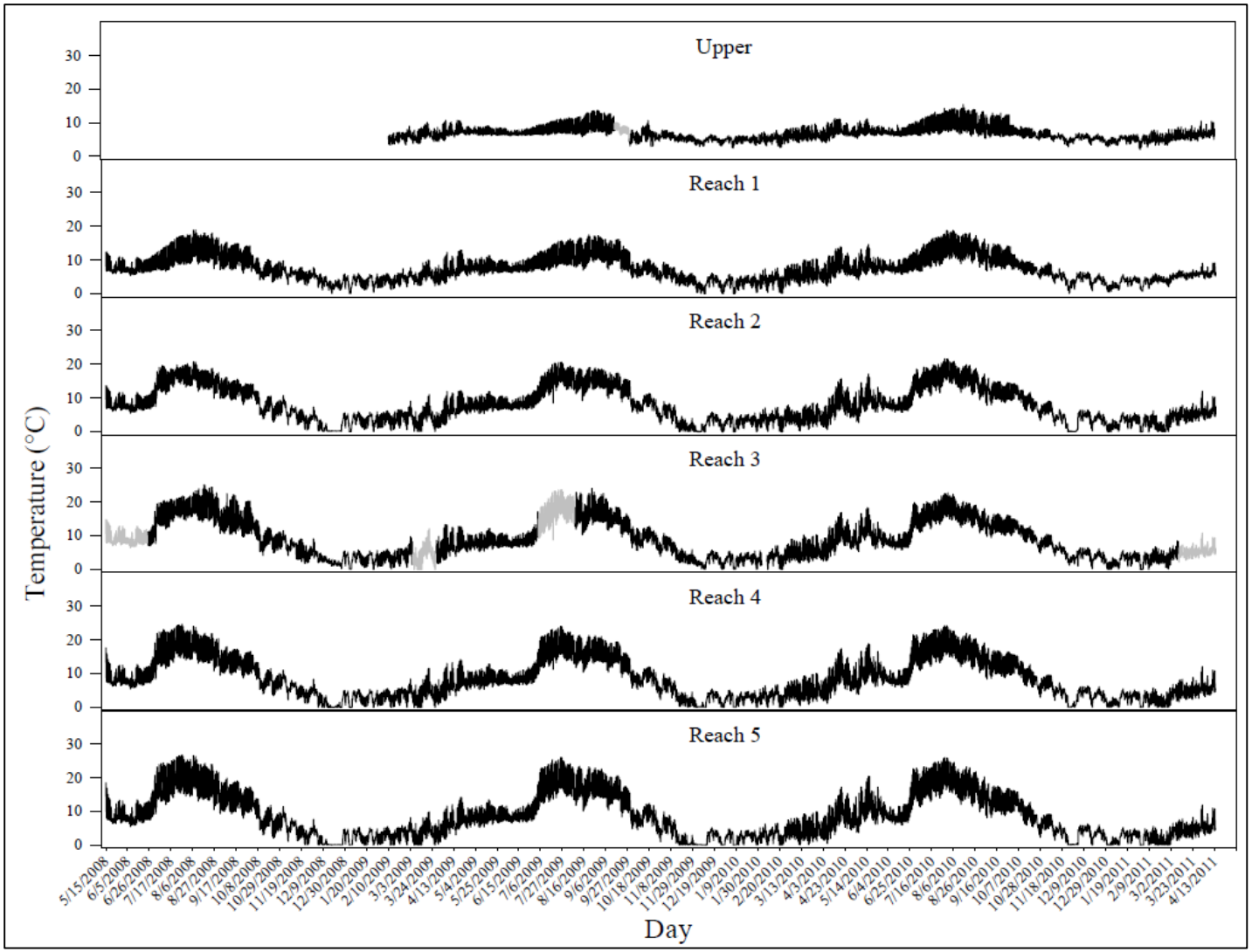
Table 3-10. Summary water quality data collected on Mink Creek at the confluence with the Bear River from March to December 2009 (Source: Stevens and Milleson, 2014, as modified by staff).

Mink Creek	**Minimum**	**Mean**	**Maximum**	**Standard Deviation**
DO (mg/L)	8.87	10.70	12.80	1.16
Temperature (°C)	0.02	8.53	15.42	4.25
Total phosphorus (mg/L)	0.026	0.074	0.156	0.045
Total suspended solids (mg/L)	1.50	28.20	101.40	36.60



Note: Locations are show in figure 3-4.

Figure 3-10. Seasonal total phosphorus concentrations (mg/L) at six monitoring sites on the Bear River in 2009 (Source: Stevens and Milleson, 2014).



Note: Reach 1 and upper are located upstream of Twin Lakes' Mink Creek diversion dam, while reaches 2 through 5 are located downstream.

Figure 3-11. Water temperatures at six locations on Mink Creek (Source: Hardy et al., 2012b).

Fishery Resources

Oneida reservoir has a surface area of 480 acres, an average depth of 28 feet, and a maximum depth of 85 feet (PacifiCorp, 1999). Table 3-11 lists fish species historically occurring in Oneida reservoir. BCT historically inhabited the reach of the Bear River that is now inundated by Oneida reservoir (Teuscher and Capurso, 2007). Surveys from 1973 to 2009 have only collected six BCT from Oneida reservoir. Non-native species, particularly common carp, smallmouth bass, walleye, and yellow perch, now comprise the majority of fishes in the reservoir (Hardy et al., 2012c). The existing fish community in Oneida reservoir may be representative of the fish community that would become established in the proposed reservoir.

The Bear River downstream of Oneida dam to the Idaho/Utah border contains a variety of habitats from faster flowing runs, riffles, and cascades, to slower flowing pools, glides, and backwater habitats. The proposed project would inundate most of the first 5 miles of the Bear River downstream of Oneida dam, and that reach currently includes all the habitat types listed above. Twin Lakes conducted electrofishing surveys in five reaches of the Bear River downstream of Oneida dam (figure 3-12). Table 3-12 lists the fish species present in the Bear River within 10 miles downstream of Oneida dam. Reaches 4 and 5 are within the proposed reservoir inundation zone. In this reach, Utah sucker, rainbow trout, and smallmouth bass are the most common species. Seven BCT were collected in this reach. Within reach 3 (downstream of the inundation zone), Utah sucker, mountain whitefish, rainbow trout, and brown trout were the most common species. Five BCT were collected in this reach. Table 3-13 lists fish species collected more than 11 miles downstream of Oneida dam. Utah sucker and common carp were the most common species in reach 2, accounting for 85 percent of the total catch. Reach 1 was dominated by common carp, which comprised approximately 90 percent of the total catch. BCT were only collected within the first 7 miles downstream of Oneida dam by Hardy et al. (2012c). Hillyard and Keeley (2009), however, did not document any BCT in the Bear River downstream of Oneida dam. Teuscher and Capurso (2007) list BCT as occurring in the mainstem Bear River downstream from the Grace dam, in Cottonwood, Williams and Mink Creeks in Idaho, and the Cub and Logan Rivers in Utah.

Table 3-11. Relative abundance of fish species (percent) collected in Oneida reservoir over time (Source: Hardy et al., 2012c, as modified by staff).

	Status[a]	1973	1978	1979	1980	1981	1982	1983	1984	1986	1987	1987	1997	2002	2008	2009
Common carp	I	0.3	0.4	0.7	1		0.1		8.7	82.4	9.5	51.4	79.6	42.6	37.6	24.8
Spottail shiner	I									4.9	0.4				1.9	3.2
Redside shiner	N									1.3	0.5					
Utah chub	N	0.4	0.6	5.5	20.7	1.5				0.2	0.2	2				
Utah sucker	N	4.2	5.2	2.6	4.1	22.6		56.7	52.2	6.2	4.2	4.3			3	4.1
Channel catfish	I										0.02					0.8
Bonneville cutthroat trout	N									0.03	0.1					
Rainbow trout	I									0.02	0.1	0.2			0.2	0.8
Mountain whitefish	N	0.3	0.2							0.2	0.5	4.6				
Blugill	I	2.7										0.2				0.2
Green sunfish	I									0.6	0.4			22.6	2.8	6.9
Smallmouth Bass	I													8.6	23.5	12.1
Yellow perch	I	92.2	93.5	90.9	63.7	73.7	98.6	40	34.8	3.7	83.5	34.1	4.9	13.7	11	12
Walleye	I		0.1	0.2	10.4	2.3	1.2	3.3	4.3	0.4	0.6	3.3	15.4	12.4	19.7	35.1
Tilapia	I														0.2	

Notes: I= introduced species, and N= native species.

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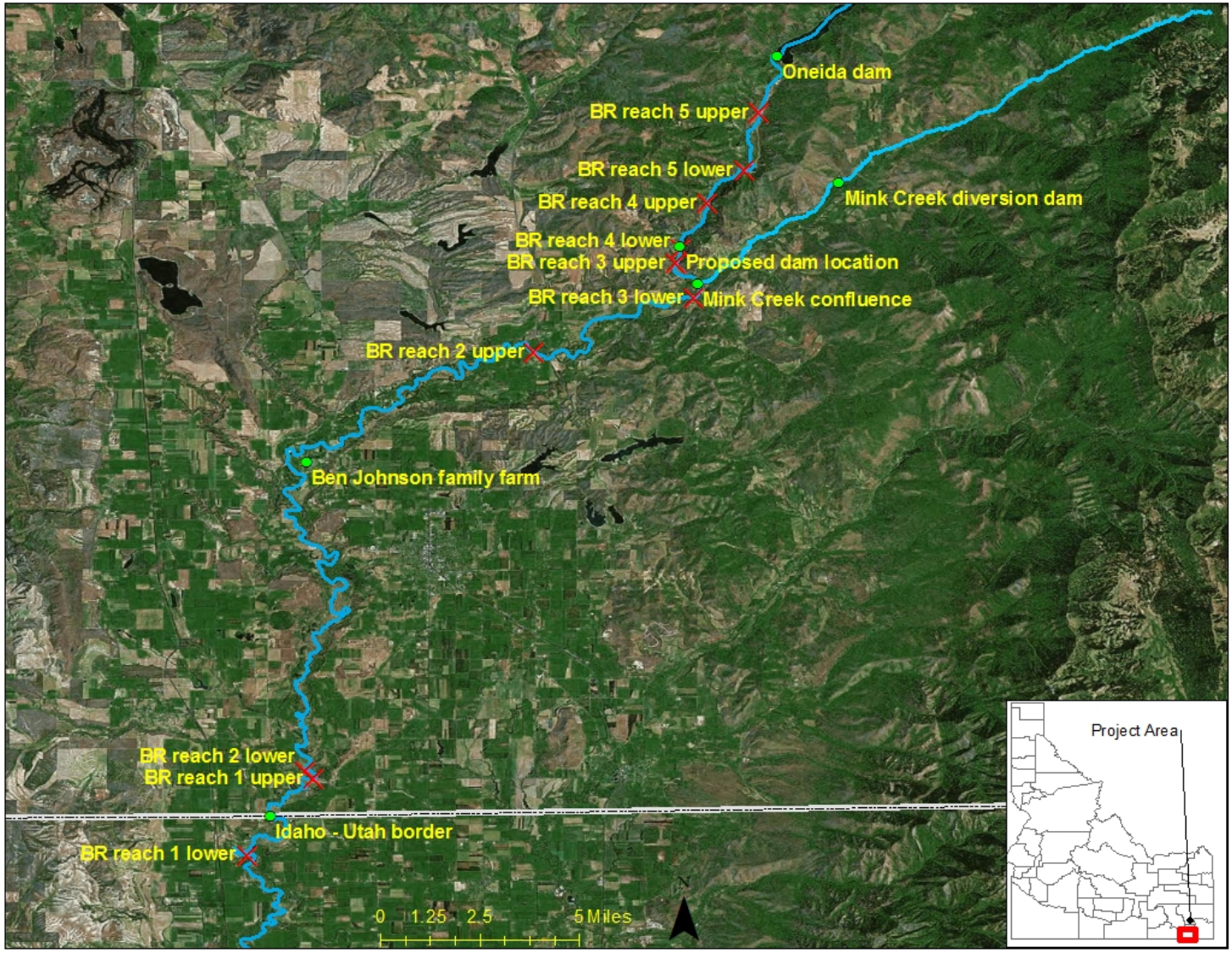

Figure 3-12. Boundaries for fishery survey reaches on the Bear River (Source: Hardy et al., 2012c, as modified by staff).

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Table 3-12. Relative abundance of fishes (numbers) collected by electrofishing within the first 10 miles of the Bear River downstream of Oneida dam. Reach locations are shown on figure 3-12 (Source: Hardy et al., 2012c, as modified by staff).

		2008		2009		
Species	**Status[a]**	**Fall**	**Spring**	**Summer**	**Fall**	**Total**
Reach 4/5						
Common carp	I	33	33	34	41	141
Speckled dace	N	4		4		8
Utah sucker	N	205		174	398	777
Bluehead sucker	N		2	4	2	8
Channel catfish	I				1	1
Bonneville cutthroat trout	N	2	1	1	3	7
Rainbow trout	I	43	209	237	196	685
Brown trout	I	15	54	33	54	156
Mountain whitefish	N	2	92	16	75	185
Smallmouth bass	I	67	7	105	147	326
Mottled sculpin	N	28	1	12	10	51
Yellow perch	I				1	1
Walleye	I		1		3	4
Total sample size		399	400	620	931	2,350
Reach 3						
Common carp	I	16	57	15	42	130
Utah sucker	N	22	133	214	145	514
Bluehead sucker	N		2	5		7
Bonneville cutthroat trout	N		3	1	1	5
Rainbow trout	I	7	52	62	53	174
Brown trout	I	22	51	20	50	143
Mountain whitefish	N	16	55	40	110	221
Smallmouth bass	I	6	1	35	43	85
Mottled sculpin	N	11		3	19	33
Total sample size		100	354	395	463	1,312

Notes: I = introduced species; N = native species.

Table 3-13. Relative abundance of fishes (numbers) collected by electrofishing in the Bear River from about 11 to 50 miles downstream of Oneida dam. Reach locations are shown on figure 3-12 (Source: Hardy et al., 2012c, as modified by staff).

		2008		2009		
Species	**Status[a]**	**Fall**	**Spring**	**Summer**	**Fall**	**Total**
Reach 2						
Common carp	I	30	76	33	68	207
Utah sucker	N	8	120	123	109	360
Channel catfish	I	1		2	1	4
Rainbow trout	I	1	5	5	1	12
Brown trout	I		1	4	10	15
Brook trout	I		1			1
Mountain whitefish	N		6	3	7	16
Smallmouth bass	I	8		5	7	20
Mottled sculpin	N	9			13	22
Yellow perch	I	2			2	4
Walleye	I	1		1		2
Total sample size		60	209	176	218	663
Reach 1						
Common carp	I	65	276	60	136	537
Utah sucker	N		1		3	4
Black bullhead	I				1	1
Channel catfish	I	2	10	1	2	15
Rainbow trout	I		1			1
Green sunfish	I				1	1
Bluegill	I	3	1			4
Smallmouth bass	I	4		4	2	10
Black crappie	I	9				9
Walleye	I	1	15	1		17
Total sample size		84	304	66	145	599

Notes: I = introduced species; N = native species.

Mink Creek, which joins the Bear River 1.2 miles downstream of the proposed project dam, is the only Idaho tributary downstream of Oneida dam known to support BCT. Hardy et al. (2012c) studied the fish, aquatic invertebrates, general habitat, and vegetation of Mink Creek between summer 2008 and spring 2010. The creek can be divided into two sections by the Mink Creek diversion dam, located 4.2 miles upstream of the Mink Creek confluence with the Bear River. The area downstream of the diversion dam consists primarily of low-gradient riffles (62 percent), runs and pools (15 percent each), and the area upstream of the dam consists primarily of low-gradient riffles (64 percent), pools, and pocket water mixed with riffles (11 percent each). Flows in the lower section of Mink Creek range from almost 0 cfs to nearly 250 cfs depending on season (see table 3-2 and related discussion), and in the upper section were approximately 38 cfs from December 8 to December 9, 2008. Average creek width and depth in the lower section ranged from 3 to 32 feet and 0.3 to 1.8 feet, respectively, and 4 to 40 feet wide and 0.2 to 3 feet deep in the upper section of the creek.

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Twin Lakes conducted fish surveys at eight sites in Mink Creek during fall 2008 and 2009 (figure 3-13; table 3-14). Overall, salmonid species made up 51 percent of the fish assemblage in 2008 and 52 percent of the assemblage in 2009. With the exception of rainbow trout and largemouth bass, all species exhibited multiple age classes within Mink Creek, which suggests well-established breeding populations (Hardy et al., 2012c). BCT were collected at all sites and were proportionally more common upstream of the Mink Creek diversion dam than downstream.

Hardy et al. (2012c) also performed a radiotelemetry study in the Bear River below Oneida dam to better understand BCT distribution and spawning migrations. Reach locations are the same as in the fish abundance survey and shown in figure 3-12. Field investigators tagged most of the BCT (44 percent) from the first 5 miles downstream of Oneida dam in the Bear River, with most of the remainder tagged in the downstream portion of Mink Creek (34 percent of the total BCT). BCT exhibited a seasonal distribution. In the winter, BCT were mostly in Bear River reach 2. In the spring, BCT were most common in Bear River reaches 4/5, the proposed project inundation zone. In the summer, Bear River reaches 4/5, reach 3, and the lower portion of Mink Creek were preferred by roughly the same percentage of tagged BCT. In the fall, BCT were most common in Bear River reach 3 (figure 3-14). BCT mostly preferred runs and pools throughout the year with depths ≤4 feet, current velocities ≤2 feet per second, and boulder and cobble substrates. In both 2009 and 2010, 38 percent of BCT tagged before and during the spawning season moved into Mink Creek (Hardy et al., 2012c).[24]

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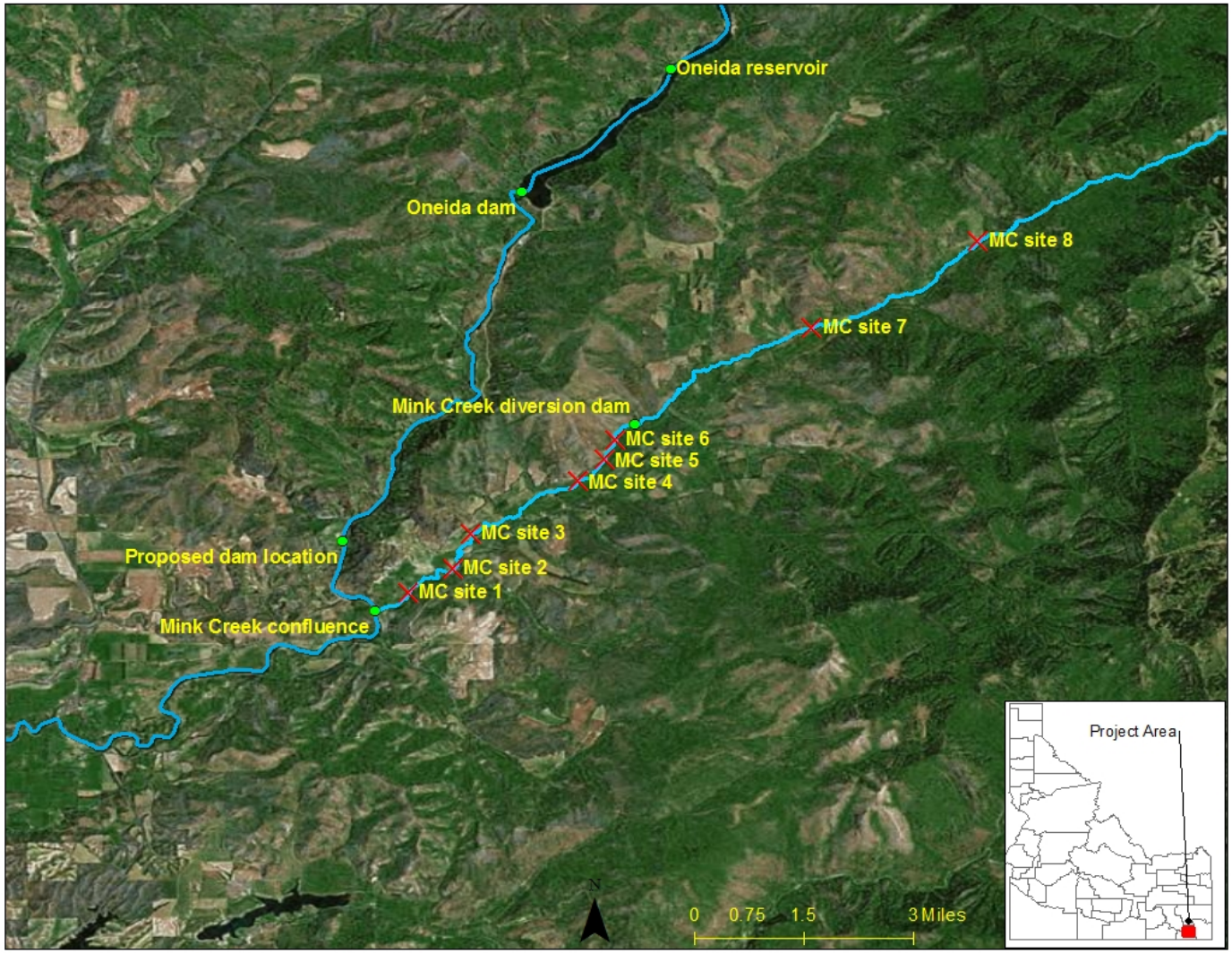
[24] One tagged fish was also found in lower Twin Lakes' reservoir, indicating that some BCT are able to enter the Twin Lakes irrigation system via Mink Creek.



Note: Sites 1–6 are below the Twin Lakes diversion dam, and sites 7-8 are above the dam.

Figure 3-13. Electrofishing sites on Mink Creek surveyed during fall 2008 and 2009 (Source: Hardy et al., 2012c, as modified by staff).

Table 3-14. Relative abundance of fish species (percent) collected in Mink Creek during fall 2008 and 2009. Vertical line between sites 6 and 7 represents the location of Twin Lakes' diversion dam (Source: Hardy et al., 2012c, as modified by staff).

	Site 1	**Site 2**		**Site 3**		**Site 4**		**Site 5**		**Site 6**	**Site 7**	**Site 8**
Species	**2008**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2009**
Speckled dace	5.3	11.8	18.9	25.2	50.5	45.5	26.3		2.5	6.5		
Unidentified minnows	21.1	5.9										
Mountain sucker	50.9		7.5	18.4	16.1					4.8		
Bonneville cutthroat trout	5.3	14.7	3.8	1.9	2.2		5.3	5.3	22.5	4.8	33.3	7
Brook trout	1.8	2.9	7.5	28.2	10.8	45.5	26.3	47.4	35	51.6	18.2	46.5
Brown trout	10.5	58.8	54.7	25.2	20.4		10.5	2.6	2.5			
Rainbow trout	3.5		3.8				21.1		2.5			
Largemouth bass				1								
Mottled sculpin	1.8	5.9	3.8			9.1	10.5	44.7	35	32.3	48.5	46.5
Total sample size	57	34	53	103	93	11	19	38	40	62	66	71

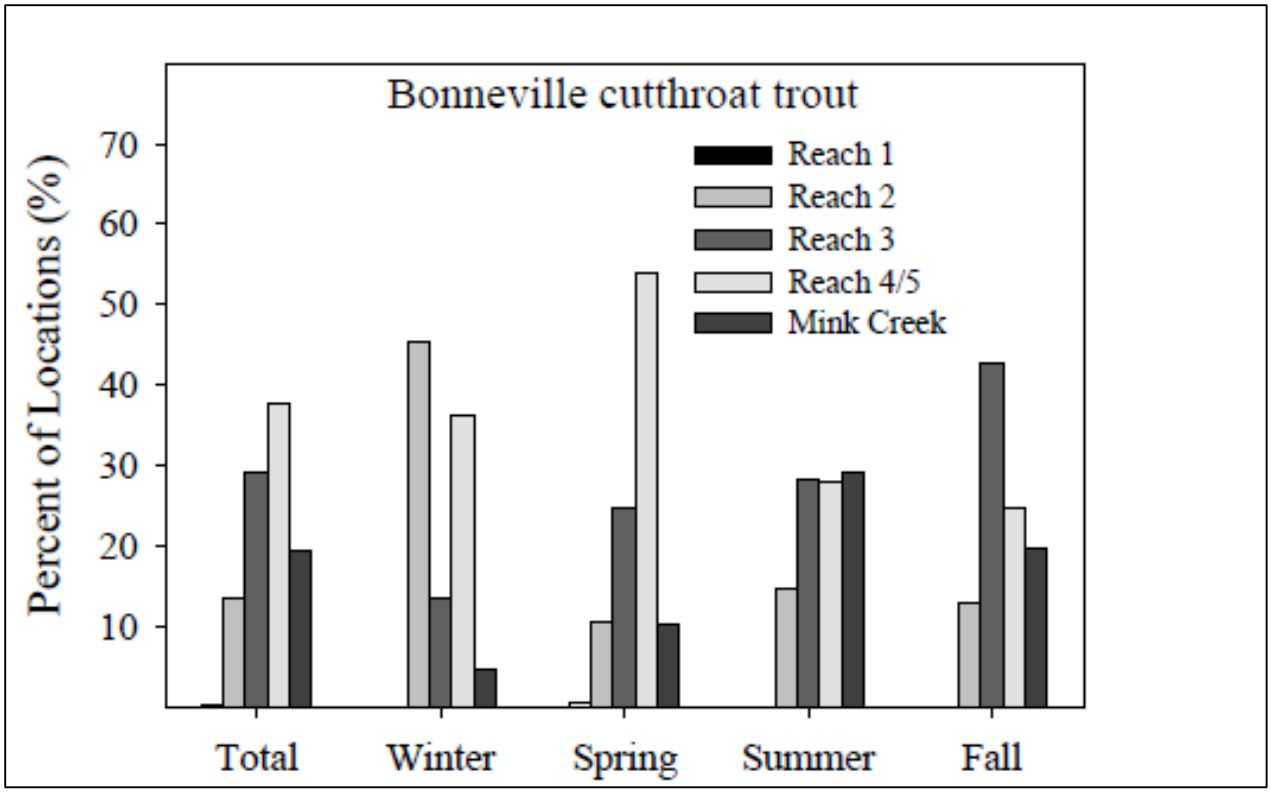


Figure 3-14. Percent of locations for radiotagged Bonneville cutthroat trout in the Bear River downstream of Oneida dam and in Mink Creek (Source: Hardy et al., 2012c).

Hardy et al. (2012c) also studied the spatial and temporal patterns of aquatic macroinvertebrates in the Bear River. Benthic and subsurface drift samples were taken from each of the five electrofishing reaches shown in figure 3-12 in late spring, summer, and fall 2009 and early spring 2010. Benthic sampling involved both kick-sampling and subsurface drift samples using stationary nets placed in the water column just below the surface. Twenty-eight families were collected from each sample type. Combining the results of the kick-sampling and drift samples, Chironomidae was the dominant family representing from 23 to 59 percent of samples. Hydropsychidae was the second-most dominant family, representing from 14 to 52 percent of samples. Chironomid larvae often make up more than 50 percent of benthic macroinvertebrate communities in both lentic and lotic waters (Rufer and Ferrington, 2007), indicating a typical macroinvertebrate community in the Bear River.

PacifiCorp BCT Restoration Activities

On December 22, 2003, the Commission approved a settlement agreement and issued a new 30-year license to PacifiCorp for the Bear River Project. The settlement agreement and new license requires the provision of recreation enhancements, minimum instream flows to benefit aquatic resources, funds to conserve and benefit natural

resources within a defined action area, and other measures related to land management, protection of cultural resources, and restoration of BCT. The three PacifiCorp BCT restoration activities include preparation of: (1) a BCT Restoration Study Plan; (2) a Conservation Hatchery Plan; and (3) a Habitat Restoration Plan. PacifiCorp completed the Restoration Study Plan in late 2004, which included study plans for genetic sample analysis, irrigation diversion/barrier mapping and aerial photography, telemetry studies, and broodstock development. PacifiCorp completed most studies by 2009 and provided funding for broodstock development to Idaho Fish and Game from 2008 to 2010. Idaho Fish and Game focused its broodstock program on fish from the Thatcher reach of the Bear River, between Grace dam and Oneida reservoir, and is using the state's Grace Fish Hatchery near Grace, Idaho, to rear broodstock. Idaho Fish and Game also produced 19,000 BCT fingerlings at the Grace Hatchery during 2010. On April 20, 2011, Idaho Fish and Game released the first BCT produced at the hatchery at the site of the Kackley Springs reroute project, located in the Thatcher reach. Idaho Fish and Game also stocked 8,000 BCT in 2012; 19,544 in 2013; 27,623 in 2014; and plans to stock 32,738 BCT in 2015. PacifiCorp plans to annually fund BCT production at the Grace Hatchery through the term of its license (PacifiCorp, 2015). To date, all BCT releases have been in the Thatcher reach of the Bear River, but future releases will be expanded to the Bear River downstream of Oneida dam, including the proposed Bear River Narrows Project reach.

The final component of PacifiCorp's BCT program is the Habitat Restoration Plan. This plan describes the use of funding for actions that benefit and restore aquatic and riparian habitat for BCT, as well as other fish and wildlife. Action items implemented by the Habitat Restoration Program are decided upon and prioritized by the Environmental Coordination Committee (ECC). These actions are scheduled and implemented by the ECC on an annual basis. In 2014, PacifiCorp provided funding for the following restoration projects (PacifiCorp, 2015):

- BCT broodstock pond development by Idaho Fish and Game for holding and spawning BCT for restoring BCT populations to streams and sections of the Bear River with limited or no BCT;
- Idaho Fish and Game renovation of a spring located on the Laurie Harris property to improve stream habitat for BCT near the former Cove dam site;
- PacifiCorp restoration and reconnection plans (improvement of fish passage and BCT habitat) at Dead Horse and Cove Springs, which are located on PacifiCorp lands near the former Cove dam site;
- Trout Unlimited (TU) completion of fish screening projects previously funded by the ECC for the Davis and Treasureton diversions on Cottonwood Creek, to prevent fish entrainment in the irrigation canals;
- FWS installation of a new rotary drum fish screen to prevent fish entrainment at a North Hoops Creek diversion on private property owned by Lawrence Fox;

Idaho Fish and Game has identified North Hoops Creek as being one of the few remaining genetically pure strains of BCT;

- Private landowner John Sweer installation of 0.62 mile of fencing along the Bear River to exclude livestock from a 30- foot-wide buffer, provide an off-stream water source, and install a 0.31-mile cross fence to divide the pasture, to stabilize the streambank, establish riparian vegetation, and improve grazing management;
- Forest Service installation of a bridge at a trail ford crossing of Co-op Creek, improve trail crossings near Beaver Creek headwaters, and reroute the trail near South Stauffer Creek headwaters, to improve aquatic habitat in Co-op Creek, considered a stronghold for BCT on the Caribou-Targhee National Forest;
- Idaho Fish and Game installation of an open-bottom culvert on Stauffer Creek, a tributary of the Bear River near Georgetown, Idaho, to improve fish passage in the creek;
- Idaho Fish and Game employee responsible for monitoring and maintenance of all fish screens on irrigation diversions within the action area of the license, Bear River drainage, Idaho; and
- BLM improvement of a non-motorized boater take-out on the Oneida Narrows portion of the Bear River by delineating and partially hardening the area, to reduce the area of impact within the riparian zone at the take-out and promote use of one take-out by users rather than multiple locations along the shoreline.

Although PacifiCorp's program has been in existence for more than 10 years, many of the action items have only been implemented within the past 6 to 7 years, with the first BCT stocking not occurring until 2011. As a result, the full effect of PacifiCorp's program has not yet been realized. PacifiCorp reports that its Conservation Hatchery Program has been highly successful in restoring BCT to an upstream reach of Bear River between the Oneida and Grace developments, and as a result Idaho Fish and Game no longer stocks that reach of the Bear River with non-native hatchery fish. Only BCT from native broodstock are now stocked. PacifiCorp also reports that the ECC is planning a similar stocking program for the reach downstream of Oneida dam within the proposed project area, along with a suite of other improvements associated with its Habitat Restoration Program. Current plans are to start collecting wild BCT from the Bear River Narrows reach for development of the Riverdale broodstock in 2015. Once this broodstock is developed, the plan would be to replenish native populations of BCT by stocking of hatchery-reared BCT within PacifiCorp's license-prescribed action area from Oneida dam downstream to the Idaho/Utah border (letter from PacifiCorp comment on the Twin Lakes' application, filed December 15, 2014).

3.3.2.2 Environmental Effects

Water Rights

Twin Lakes applied to Idaho DWR for the future water right associated with the proposed project on March 8, 2007, and amended its application on June 18, 2010, and August 13, 2010. Idaho DWR denied the water right application on October 18, 2012, stating that the application failed to establish elements (a) and (e) of Idaho Code 42-203A(5) in that the project would reduce the quantity of water under the existing water rights and conflicts with the local public interest. Twin Lakes interprets the order as denying its application without prejudice, which would allow Twin Lakes to apply again for another water right. Twin Lakes anticipates that, if the Commission issues a license for the project, the license, along with the supporting documentation used by the Commission to make its decision to issue the license, would provide sufficient support for Idaho DWR to issue the necessary water rights needed for the project. Several commenters note that Twin Lakes does not currently hold the necessary water rights for the project to move forward.

According to Twin Lakes, any water released by Twin Lakes past its Mink Creek diversion dam is allocated to Twin Lakes under its water rights and would be supervised by the Twin Lakes' watermaster to ensure that it reaches the Bear River. Twin Lakes states that the water passing the Mink Creek diversion dam is not "naturally flowing" water because it would be allocated for specific purposes and therefore cannot be diverted by any water user between the diversion dam and the confluence with the Bear River.

Twin Lakes proposes to acquire the 538-acre Ben Johnson Family Farm site, including any water rights associated with the parcel, to enhance wetlands, riparian habitat, and recreation. It also proposes to provide a minimum flow of 2 to 3 cfs in Battle Creek to at least partially compensate for the reduced Bear River flows during the initial filling of the reservoir (see discussion below) if it is proven to not interfere with other water rights. In its license application, Twin Lakes states that the property has water rights totaling approximately 20 cfs. Attorneys for the landowners state that any water rights associated with the property are actually a combination of water rights, irrigation shares, and water contracts (letter from J.L. Williams, Ben Johnson Family Farm, LLC, to K.D. Bose, Secretary, Commission, Washington, D.C., April 11, 2014). They state that some of the rights cannot be quantified in terms of flow rates, the rights cannot be transferred to an instream flow right, and they can only be used for irrigation purposes on the Johnson property. The specifics of these water rights, irrigation shares, and water contracts have not been provided in detail by the owners.

In response to the filing by the attorneys for the landowners, Twin Lakes filed in its January 23,2015, reply comments, a table of water rights that it believes are associated with the property based on research in the Idaho DWR database (see table 3-6 in section 3.3.2.1). As noted in the filing, the listed rights do not include any potential irrigation

deliveries or water shares that may be associated with the property. The information filed shows that the known water rights (excluding irrigation deliveries and contracted water) total 12.69 to 13.39 cfs.

Our Analysis

There are still unknowns about the various water rights, water contracts, and water shares associated with the Ben Johnson Family Farm site. The 12.69 to 13.39 cfs that Twin Lakes associates with the property is short of the stated 20 cfs in rights that Twin Lakes identifies in its license application. Also, it is not certain if Twin Lakes can acquire the property and any associated water rights, and to date, there is nothing in the project record to indicate that the owner of the Ben Johnson Family Farm parcel has entered into any agreements with Twin Lakes regarding purchase of the property.

Because the subject of water rights is largely a legal matter, any further discussion of water rights for the project proposal, if such discussion is necessary, is more appropriately addressed in a Commission order on the license proposal.

Inundation of Water Diversion within the Proposed Reservoir

One existing water diversion on the Bear River is located upstream of the proposed dam site and would be inundated by the proposed reservoir (letter from, L.S. Gilbert, to K.D. Bose, Secretary, Commission, November 12, 2014). The diversion consists of rock placed across the river channel diagonally from the east shore to the west shore about 1,500 feet upstream of the proposed dam site. The filling of the proposed reservoir would render the existing diversion inoperable. According to the current owner of a portion of the water right, Twin Lakes has acknowledged the potential effect on the diversion and have stated that they would improve the diversion point, although Twin Lakes provided no details.

Our Analysis

If Twin Lakes replaces the diversion with the necessary facilities to allow the continued diversion of water at the diversion point under all proposed water levels of the new reservoir, the potential effect on the diverter would be temporary, limited to the initial filling period until the water level is high enough for the diversion to begin operation. Affirming Twin Lakes' commitment to replace the diversion structure, as needed, in any license that may be issued for this project would assure that the water diversion at the diversion point would be minimally affected. Given that the initial fill would likely occur when the diversion is not withdrawing water for irrigation (between September 30 and April 20), there may not be any effect if the new diversion facilities are operational by April 20.

Protection of Water from Contaminants during Construction and Operation

Construction of proposed project facilities and operation and maintenance of the proposed project, including public use at project recreational facilities, could affect water

quality if pollutants (e.g., fuels, lubricants, herbicides, pesticides, and other hazardous materials) and other contaminants (e.g., human waste) are discharged into project waterways.

In its draft Erosion Control Plan, discussed in section 3.3.1.2, *Geology and Soil Resources, Environmental Effects*, and filed on April 1, 2014, Twin Lakes proposes to implement BMPs included in Idaho DEQ (2005) that would protect water quality from contaminants during the construction of specific project facilities. BMPs specified in Twin Lakes draft plan that do not directly pertain to erosion control include: BMP-10, spill prevention and control, which focuses on containing potential spills by using contaminant diking, curbing, and drip pans; BMP-12, waste management, which focuses on methods to handle and store hazardous materials on-site in a clean and orderly manner; BMP-13, which focuses on reducing and preventing discharges of pollutants from concrete waste by conducting offsite washout, performing onsite washout in a designated area, and training employees and subcontractors; and BMP-14, sanitary/septic waste management, which focuses on providing convenient, well-maintained facilities and arranging for regular service and disposal.

In condition1(G), BLM specifies that Twin Lakes file a hazardous substances plan for oil and hazardous substance storage, spill prevention, and clean up with the Commission prior to planning, construction, or maintenance that may affect BLM administered land. At a minimum, the plan would include procedures for reporting and responding to releases of hazardous substances and provisions for maintaining a cache of spill cleanup equipment sufficient to contain any spill from the project.

Our Analysis

Twin Lakes' revised draft Erosion Control Plan generally provides for implementing appropriate BMPs during construction of various proposed project features that, if incorporated into the final design of those features, should protect surface waters from contaminants. However, one BMP included in Idaho DEQ (2005) that would be applicable for construction of at least some of the major project features, but not yet included in the revised draft Erosion Control Plan, is BMP-11, vehicle/equipment washing and maintenance. This BMP is applicable for projects where the soil is silty or heavy in clay and has the likelihood of transporting dirt and mud off site. Candidate projects are those that would take place over the course of the rainy season. At such projects, an offsite or onsite contained wash-down area is used to prevent sediment and contaminants from entering surface water. Including BMP-11, in addition to the other BMPs proposed to be used by Twin Lakes, in the final Erosion Control Plan, with details about where each BMP would be applied at each site where construction is proposed would be appropriate. As discussed in section 3.3.1.2, *Geology and Soil Resources, Environmental Effects*, developing the final Erosion Control Plan in consultation with Idaho DEQ, Idaho Fish and Game, FWS, and BLM would help to ensure the final plan provides adequate protection of the natural resources potentially affected by the project.

It would also enable BLM to provide input regarding consistency of the final plan with its condition 1(G) for measures associated with planning and construction.

Twin Lakes does not propose any measures pertaining to prevention of contaminants entering surface waters during routine and non-routine project operation and maintenance. Operation and maintenance of project facilities, including recreation facilities, would entail the use of hazardous materials associated with vehicles, equipment, and maintenance (e.g., cleaning, human waste handling, lubrication, and hydraulic fluids). Many of the BMPs that Twin Lakes proposes for construction activities would also be applicable for post-construction operation and maintenance. Specifically, implementation of BMP 10, spill prevention and control, would likely address the portions of BLM condition 1(G) that pertain to project maintenance. Developing a separate hazardous substances plan, as BLM specifies, that proactively addresses post-construction management, including storage, spill prevention, and clean-up of contaminants, as needed, for the term of a license, if one were to be issued, would protect adjacent water quality. This measure would not only benefit BLM-managed lands, but the water resources of Bear River and Mink Creek in all areas that may be affected by the project.

Effects of Project Operation on Dissolved Oxygen and Temperature

Under existing conditions, DO concentrations in the mainstem of the Bear River consistently meet or exceed state water quality standards, and water temperatures are mostly below the maximum state standard (Stevens and Milleson, 2014; see figures 3-7 and 3-8). Construction of the project would transform 4.5 miles of Bear River mainstem riverine habitat to a reservoir that would have characteristics similar to the upstream Oneida reservoir. During late-spring, summer and early-fall, temperature and DO stratification would likely develop in the new reservoir with a relatively high temperature and DO concentration in the upper layers of the reservoir (epilimnion) and relatively low temperature and DO concentration in the lower layers (hypolimnion).[25] As proposed, the intake structure would have an invert elevation of 4,630 feet, or about 100 feet deep at the normal maximum reservoir elevation of 4,734 feet. Water at this depth would at times likely be of low temperature and DO concentration. Release of low DO or anoxic waters through the powerhouse would be detrimental to downstream biota and could result in DO levels lower than state water quality standards downstream of the proposed dam and powerhouse. Similarly, releases of cool, hypolimnetic waters when the proposed reservoir is stratified would result in a cooler temperature regime in downstream reaches

[25] The dense, bottom layer of water in a thermally stratified body of water is known as the hypolimnion. The upper layer is known as the epilimnion. Separating the two layers is the thermocline, which is also known as the metalimnion. The hypolimnion is usually the coldest layer in the waterbody during the summer months.

and would benefit coldwater fauna such as trout. These effects would occur when the hypolimnion is at or above the intake structure, which, as proposed, would have an invert elevation of 4,630 feet, or about 100 feet deep at the normal maximum reservoir elevation of 4,734 feet.

Twin Lakes proposes to implement a DO Management Plan to ensure that the DO concentration of the powerhouse discharge is continuously maintained at levels that meet state water quality criteria for DO. In the plan, Twin Lakes proposes to install a permanent device 0.25 mile downstream of the powerhouse that would continuously monitor DO. In the event DO levels fall below state standards at the monitoring station, aspiration tubes fitted to the turbine draft tubes would be opened to inject air into the discharge. If aspiration does not increase DO levels to above state standards, a bypass valve in the penstock upstream of the powerhouse would be opened to release jetted water at 100-percent oxygen saturation. The amount of jetted water would be adjusted until the state standard for DO is met at the proposed monitoring location 0.25 mile downstream of the powerhouse. The plan also includes provisions for reporting and adaptive management, which would require Idaho DEQ approval if changes to the plan are necessary. The plan does not propose any measures to mitigate temperature effects.

Both Idaho Fish and Game, in its 10(j) recommendation, and Idaho DEQ recommend Twin Lakes further consult with Idaho DEQ regarding finalization of the DO Management Plan. Idaho Fish and Game also comments on Twin Lakes modeling of water quality effects of the project, and concludes that the modeling does not accurately predict project effects on critical biological parameters for fish (i.e., DO and water temperature). Idaho Fish and Game disagrees with the model's conclusion that water released from the proposed project would be colder than current releases from Oneida reservoir, and instead would be warmer. They base this conclusion on empirical observation of upriver Bear River reservoirs, specifically Soda and Oneida reservoirs. Idaho Fish and Game states that: (1) it is unlikely that thermal stratification would be established in the proposed reservoir because of a presumed fast flushing rate and a bottom intake that would quickly withdraw cooler water; (2) Soda reservoir has a bottom intake and does not stratify, while Oneida reservoir has a mid-level intake, allowing cooler water to settle into the hypolimnion and stratify; and (3) both Soda and Oneida reservoirs receive cooler water from upstream riverine reaches that experience night-time cooling, while the proposed reservoir would only receive water from the immediately upstream Oneida reservoir. Idaho Fish and Game, however, makes no specific recommendation for mitigating their predicted warmer water temperatures from the proposed reservoir.

Our Analysis

The proposed reservoir would have a maximum storage capacity of 12,647 acre-feet with a surface area of 362 acres, and a maximum and average depth of 100 feet and 50 feet, respectively. Oneida reservoir, when full, has a maximum storage capacity of 10,880 acre-feet, a water surface area of 480 acres, and a maximum and average depth of

85 feet and 28 feet, respectively (PacifiCorp, 1999). Thus, the proposed reservoir would be more similar in depth and area to Oneida reservoir than to the shallower, 1,100-acre Soda reservoir. Figure 2 of the Idaho Fish and Game letter shows that the maximum depth of Soda reservoir is about 55 feet, and based on FERC (2003b), the average depth of Soda reservoir is about 15 feet. The relatively shallow depth and greater surface area of Soda reservoir, allowing more mixing due to greater exposure to wind, may be the primary reason that it does not stratify, not simply because it has a bottom intake. Figure 2 of the Idaho Fish and Game letter also shows that the bottom intake at Soda reservoir is only at about 49 feet, compared to the bottom intake for the proposed project which would be at a depth of 84 to 104 feet at the normal maximum operating elevation. During periods of maximum reservoir drawdown (to elevation 4,718 feet) the depth of the proposed intake would be 68 to 88 feet below the water surface.

Based on the above comparison, we conclude that DO and temperature profiles within the proposed reservoir would be more similar to that of PacifiCorp's Oneida reservoir. Although the proposed reservoir would have a bottom intake, colder inflowing waters would remain in the hypolimnion and not mix with warmer surface waters because of the greater depth.

Water quality monitoring in Oneida reservoir indicates the reservoir begins to stratify in early-May and is strongly stratified by mid-June, with temperature and DO decreasing rapidly through the metalimnion[26]; the reservoir normally turns over and is well-mixed by early-November. When strongly stratified, Oneida reservoir temperature and DO concentrations are lowest in the hypolimnion, approximately 56 feet below the water surface, and are frequently less than 7°C and near 0 mg/L, respectively (see figures 3-5 and 3-6). The deepest station sampled in Oneida reservoir is at 72 feet. Assuming the temperature and DO concentrations in the proposed reservoir would be similar during a period of stratification, cool hypolimnetic water depleted of DO would be discharged through the proposed powerhouse. Discharges of water with DO concentrations near 0 mg/L would result in project discharges not meeting Idaho surface water quality standards (see table 3-8).

Twin Lakes assessed the potential effects of the proposed reservoir on Bear River water quality using a water quality model that simulated 20 years (1990 to 2009) of flow and water quality conditions under two scenarios (Stevens and Milleson, 2014). Although Idaho Fish and Game does not believe the model was accurate in predicting water temperature and DO in releases from the proposed reservoir, our review of the model indicates that it is reasonable in its prediction of water temperature effects, which was based on nearly 2 years of consultation with the agencies and Commission staff, to

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[26] The metalimnion, also called the thermocline, is a transitional layer of a stratified waterbody where temperature decreases rapidly with increasing depth.

establish reasonable re-calibration procedures. Therefore, we are using the modeling results in our assessment of project effects. The first or base scenario for the model simulated water quality downstream of Oneida dam without the proposed project, and the second scenario included the proposed project downstream of Oneida dam. The second scenario includes years when the reservoir would be drawn down and not drawn down.[27] The modeling was performed to predict and simulate water quality at 10 nodes in the Bear River from immediately downstream of the proposed dam (node 17) to the Idaho/Utah border (node 8).

Modeled daily mean temperatures immediately downstream of the proposed dam are similar between the two scenarios during most of the year, except in the summer and early fall when temperatures under the base scenario (existing conditions) are higher (figure 3-15). Modeled water temperatures at the Idaho/Utah border show similar trends but less difference between scenarios (figure 3-16). Table 3-15 shows modeled monthly average daily water temperatures below the proposed dam and at the Idaho/Utah border. Below the proposed dam, monthly average daily water temperatures are predicted to be identical from January through March, higher in April (+0.3°C), and lower by -0.1 to -2.1°C from May through December for both project operational scenarios as compared to the base scenario. At the Idaho/Utah border, monthly average daily water temperatures are predicted to be warmer than the base scenario by +0.1 to +0.5°C from January through May, and cooler by -0.1 to -0.7°C from June through November.

Table 3-16 presents the predicted frequency of proposed project discharges exceeding the surface water quality temperature standard for salmonids (≤19°C) for the simulated 20-year period. For all scenarios, the model predicts the daily average salmonid temperature standard would be exceeded beginning in May and becoming more frequent in June, July, August, and September from the proposed dam to the Idaho/Utah border. However, compared to the base case, the frequency of exceeding the temperature standard during the summer is reduced under both proposed project scenarios, reflecting the cooler outflow from the proposed reservoir. The modeling also predicts when the water quality standard for salmonid spawning (≤9°C) would be exceeded. Those instances would begin in March, become increasingly more frequent in April, and always be exceeded in May through September (table 3-17). Modeling predicted that the proposed project would have no effect on the current frequency of instances when the salmonid spawning standard in the Bear River are exceeded, although salmonid spawning would not occur in all months when violations occur. For example, BCT are springtime spawners, and suitable spawning temperatures would still occur during part of April under all modeled scenarios.

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[27] During normal operations, Twin Lakes would maintain the reservoir at near full reservoir (elevation 4,734 feet); in drought years, it would withdraw up to 5,000 acre-feet, drawing down the reservoir to elevation 4,718 feet, a maximum of about 16 feet.

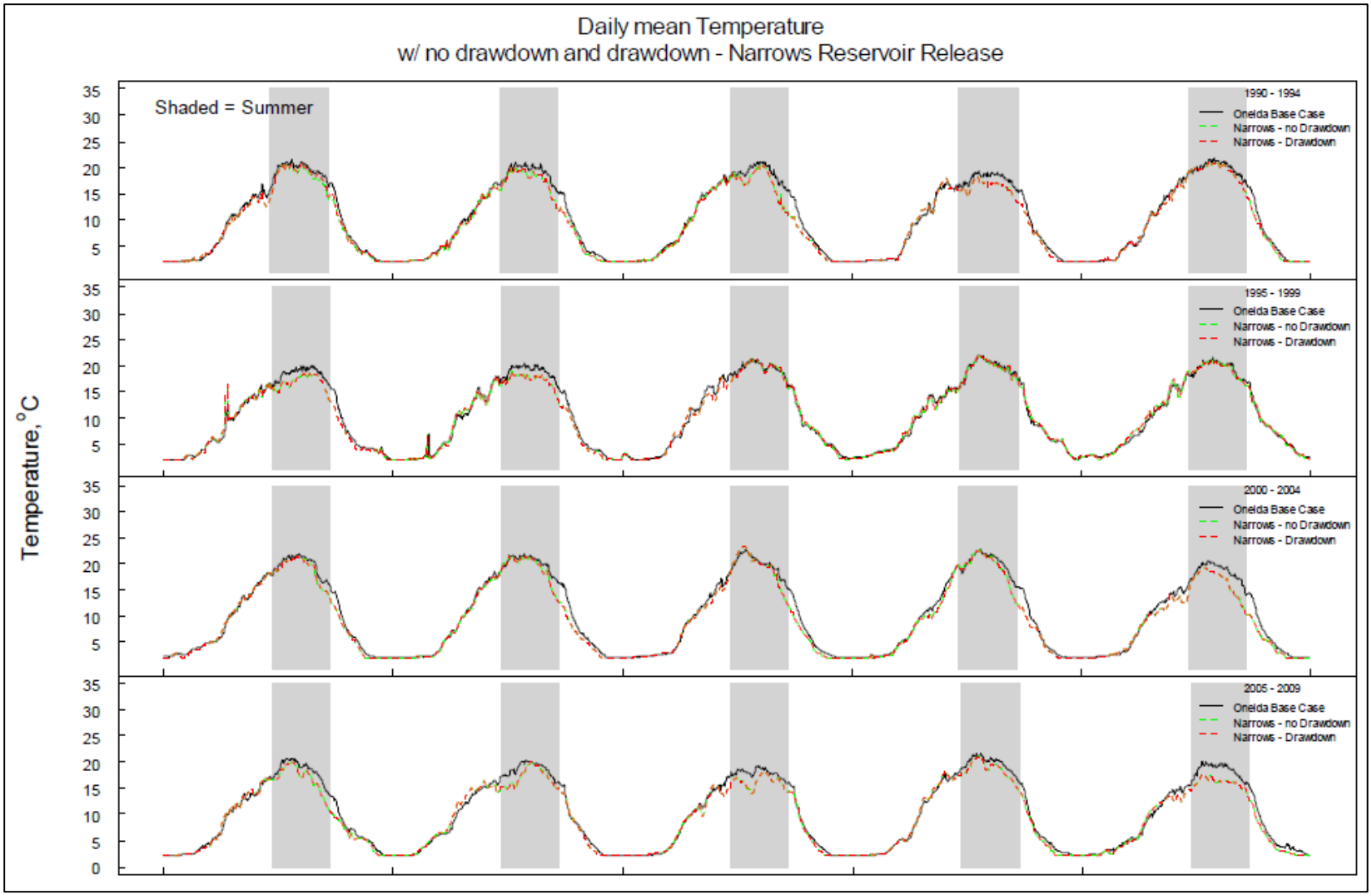

Figure 3-15. Water quality modeling results for Bear River water temperature immediately downstream of the proposed Bear River Narrows Project, under base-case and proposed project scenarios, 1990 to 2009, shown in 5-year increments (Source: Stevens and Milleson, 2014, as modified by staff).

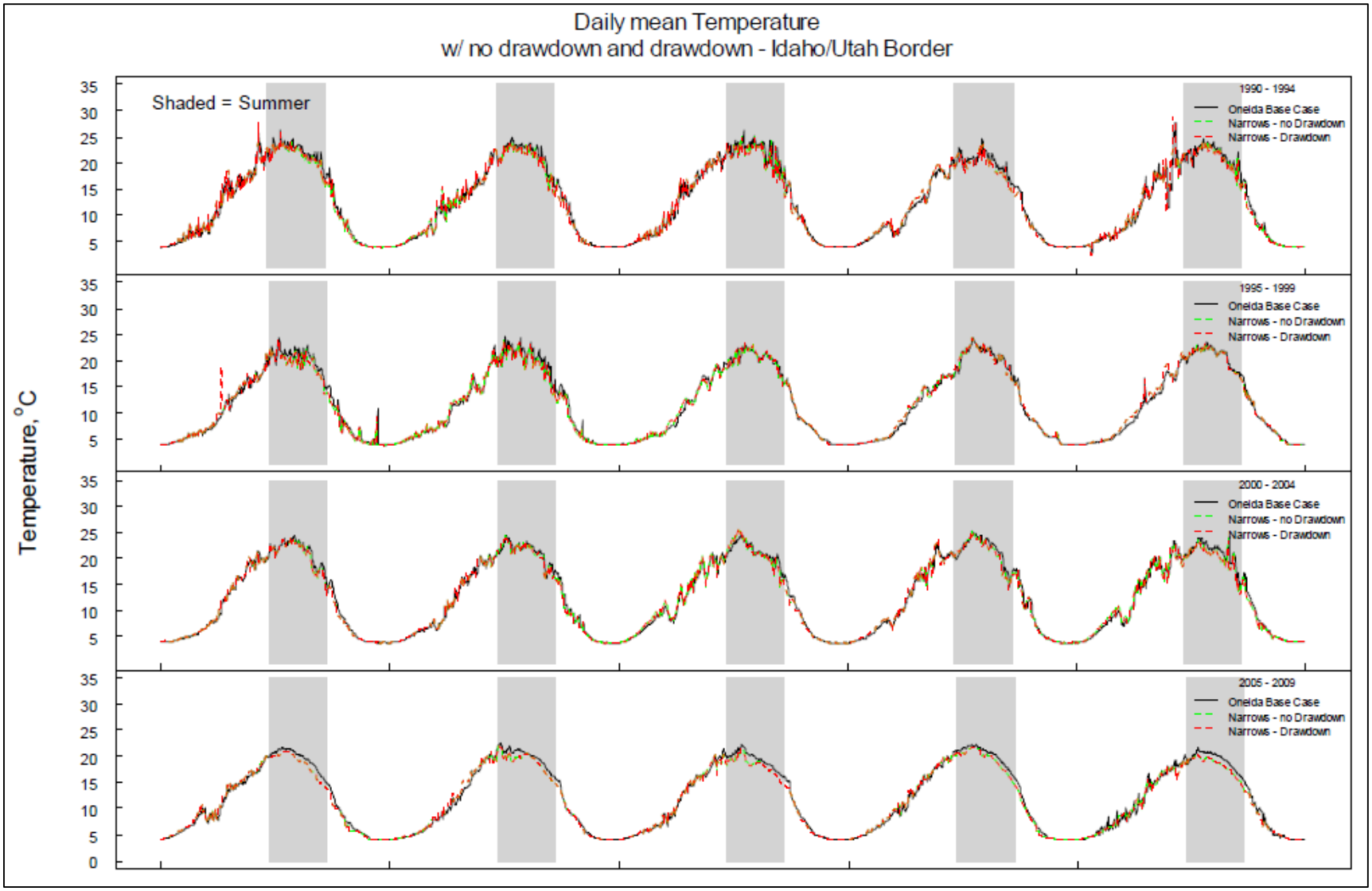

Figure 3-16. Water quality modeling results for Bear River water temperature at the Idaho/Utah border, under base-case and proposed project scenarios, 1990 to 2009, shown in 5-year increments (Source: Stevens and Milleson, 2014, as modified by staff).

Table 3-15. Modeled monthly average water temperature from 1990 to 2009 below the proposed dam and at the Idaho/Utah border (Source: GeoSense, 2014a, as modified by staff).

Month	Base (no project)	Project Drawdown[a]	No Project Drawdown[b]	Project Drawdown v. Base	No Project Drawdown v. Base
Downstream of Proposed Dam					
Jan	2.2	2.2	2.2	0.0	0.0
Feb	2.6	2.6	2.6	0.0	0.0
Mar	4.6	4.6	4.6	0.0	0.0
Apr	9.3	9.6	9.6	0.3	0.3
May	13.8	13.5	13.5	-0.3	-0.3
Jun	17.0	16.4	16.4	-0.6	-0.6
Jul	20.0	19.0	19.0	-1.0	-1.0
Aug	19.8	18.8	18.8	-1.0	-1.0
Sep	16.8	14.7	14.7	-2.1	-2.1
Oct	9.1	8.1	8.1	-1.0	-1.0
Nov	4.2	3.7	3.7	-0.5	-0.5
Dec	2.4	2.3	2.3	-0.1	-0.1
Idaho/Utah Border					
Jan	4.3	4.4	4.4	0.1	0.1
Feb	5.8	6.1	6.1	0.3	0.3
Mar	7.8	8.2	8.2	0.4	0.4
Apr	12.3	12.8	12.8	0.5	0.5
May	16.5	16.7	16.7	0.2	0.2
Jun	19.8	19.7	19.7	-0.1	-0.1
Jul	22.2	21.7	21.7	-0.5	-0.5
Aug	21.3	20.6	20.6	-0.7	-0.7
Sep	17.5	16.4	16.4	-1.1	-1.1
Oct	10.0	9.4	9.4	-0.6	-0.6
Nov	5.1	5.0	5.0	-0.1	-0.1
Dec	4.0	4.0	4.0	0.0	0.0

[a] Drawdown scenario predicts water quality when the proposed project is operating with a full reservoir drawdown.

[b] No drawdown scenario predicts water quality when the proposed project is operating with the reservoir at or near full pond.

Table 3-16. Percent frequency of days, based on modeling from 1990 to 2009, that Bear River mean daily water temperature would exceed the Idaho surface water quality standard for cold water aquatic life (≤19°C) by river mile downstream of the proposed dam (Source: GeoSense, 2014a, as modified by staff).

	Base (no project)			**Project Drawdown[a]**			**No Project Drawdown[b]**		
Month	**RM[c] 0.0**	**RM 15.8**	**RM 34.2**	**RM 0.0**	**RM 15.8**	**RM 34.2**	**RM 0.0**	**RM 15.8**	**RM 34.2**
Jan	0%	0%	0%	0%	0%	0%	0%	0%	0%
Feb	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mar	0%	0%	0%	0%	0%	0%	0%	0%	0%
Apr	0%	0%	0%	0%	0%	0%	0%	0%	0%
May	0%	0%	10%	0%	0%	13%	0%	0%	13%
Jun	7%	29%	72%	7%	21%	68%	7%	21%	68%
Jul	78%	95%	100%	56%	75%	97%	57%	75%	97%
Aug	81%	92%	96%	49%	66%	81%	48%	66%	82%
Sep	6%	15%	22%	3%	6%	12%	3%	6%	13%
Oct	0%	0%	0%	0%	0%	0%	0%	0%	0%
Nov	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dec	0%	0%	0%	0%	0%	0%	0%	0%	0%

[a] Drawdown scenario predicts water quality when the proposed project is operating with a full reservoir drawdown.

[b] No drawdown scenario predicts water quality when the proposed project is operating with the reservoir at or near full pool.

[c] RM 0.0 would be immediately downstream of the proposed dam, RM 15.8 would be mid-way between the proposed dam and Idaho/Utah border, and RM 34.2 would be at the Idaho/Utah border.

Table 3-17. Percent frequency of days, based on modeling from 1990 to 2009, that Bear River mean daily water temperature would exceed the Idaho surface water quality standard for salmonid spawning (≤9°C) by river mile downstream of the proposed dam (Source: GeoSense, 2014a, as modified by staff).

	Base (no project)			**Project Drawdown[a]**			**No Project Drawdown[b]**		
Month	**RM 0.0**	**RM 15.8**	**RM 34.2**	**RM 0.0**	**RM 15.8**	**RM 34.2**	**RM 0.0**	**RM 15.8**	**RM 34.2**
Jan	0%	0%	0%	0%	0%	0%	0%	0%	0%
Feb	0%	0%	0%	0%	0%	1%	0%	0%	1%
Mar	0%	1%	20%	0%	2%	26%	0%	1%	25%
Apr	63%	79%	92%	65%	86%	98%	65%	86%	98%
May	100%	100%	100%	100%	100%	100%	100%	100%	100%
Jun	100%	100%	100%	100%	100%	100%	100%	100%	100%
Jul	100%	100%	100%	100%	100%	100%	100%	100%	100%
Aug	100%	100%	100%	100%	100%	100%	100%	100%	100%
Sep	100%	100%	100%	100%	100%	100%	100%	100%	100%
Oct	44%	50%	58%	31%	44%	55%	31%	44%	55%
Nov	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dec	0%	0%	0%	0%	0%	0%	0%	0%	0%

[a] Drawdown scenario predicts water quality when the proposed project is operating with a full reservoir drawdown.

[b] No drawdown scenario predicts water quality when the proposed project is operating with the reservoir at or near full pool.

The water quality model also simulates mean daily DO concentrations based on the releases from Oneida reservoir, proposed Bear River Narrows reservoir characteristics, and influences from primary production (e.g., algae) and diurnal DO fluctuations. Model results show daily mean DO concentrations for proposed project scenario with and without reservoir drawdown would be higher during the late-spring/early-summer, compared to the base scenario (without the proposed project), but would be lower during late-summer, fall, and winter periods (see figure 3-17).[28] Although lower in magnitude, this effect would also occur at the Idaho/Utah border (see figure 3-18). DO modeling also predicts that applicable DO standards would continue not to be met immediately downstream of the proposed dam, although project releases would reduce the percent of time that standards are not met, as follows: (1) the 7-day mean (4.7 mg/L) standard would not be met 35 percent of the time compared to currently, when it's not met about 48 percent of the time; (2) the 30-day mean (6.0 mg/L) standard would not be met about 50 percent of the time compared to currently, when it's not met about 60 percent of the time; and (3) the instantaneous minimum (3.5 mg/L) standard would not be met about 25 percent of the time compared to currently, when it's not met about 35 percent of the time. The continued non-attainment of the DO standard would be a result of the release of hypolimnetic water with low DO levels, especially during the summer months (Stevens and Milleson, 2014). At the Idaho/Utah border, the frequency of not meeting the instantaneous standard (3.5 mg/L) would be less than 5 percent for daily means, but would increase to greater than 50 percent if the minimum diurnal DO concentration is considered (Stevens and Milleson, 2014).

Temperature and DO modeling of the Bear River downstream of the proposed project indicates that water quality would be affected. We expect water temperatures in the Bear River to become cooler, especially during the summer and early fall because of the deep, bottom intake structure, compared to the Oneida dam mid-level intake. As a result, we expect the frequency and magnitude of non-compliance with surface water temperature standards to be less than under existing conditions, but would still occur under certain flow and weather conditions. The modeling suggests that, without corrective actions, DO standards would continue not to be met, especially during the summer/fall when low-DO, hypolimnetic waters would be discharged from the proposed project. Temperature and DO effects related to proposed project reservoir operation (both with and without drawdowns) would be expected all the way to the Idaho/Utah border.

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[28] Modeling results shown in figure 3-17 may appear to show lower DO levels than empirical baseline DO data shown in table 3-9 and figure 3-7. Modeling included an adjustment (subtraction) of 3.25 mg/L to reflect diurnal DO fluctuations. Many empirical samples are collected during daylight hours when photosynthesis is occurring, resulting in higher DO levels.

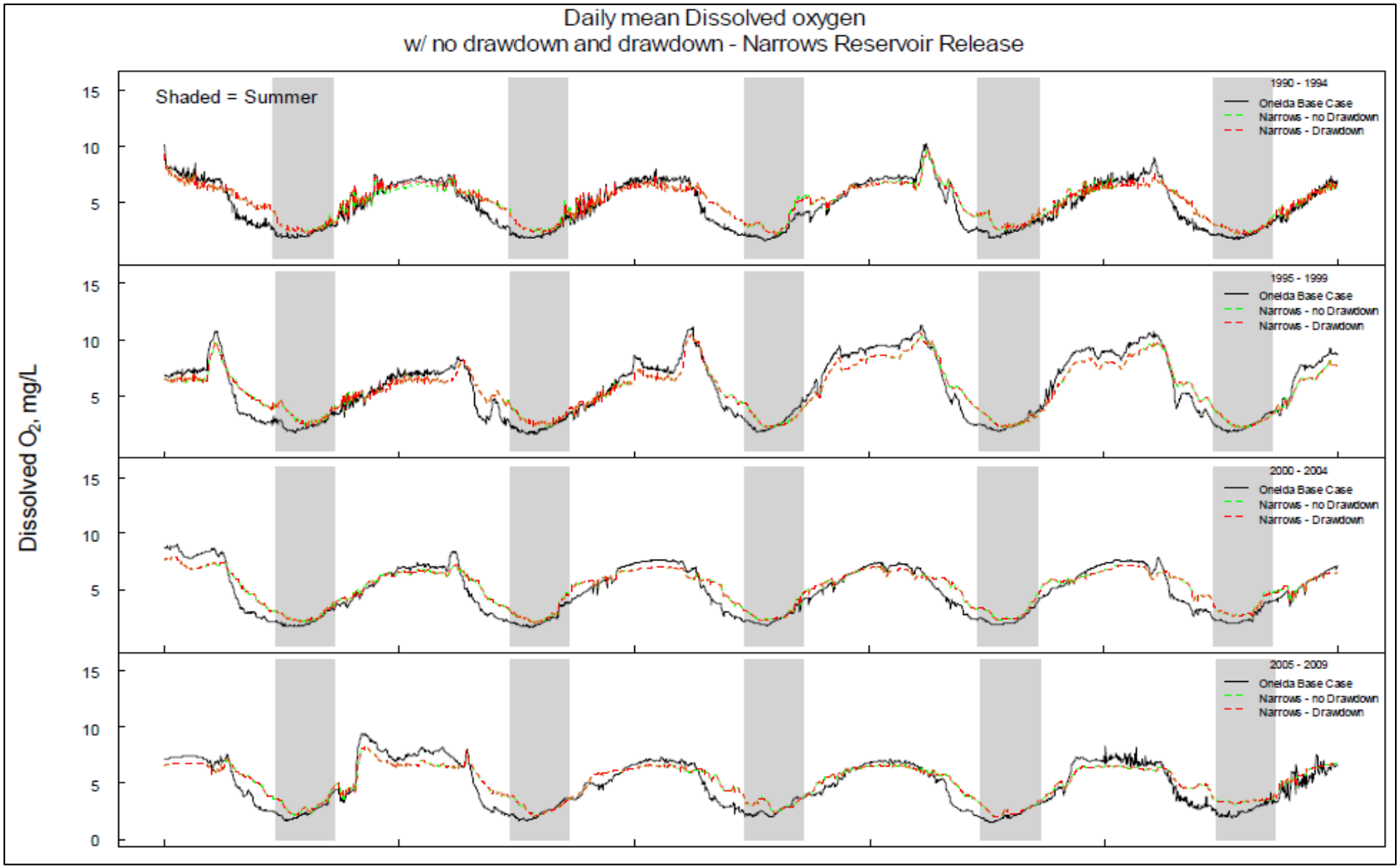

Figure 3-17. Water quality modeling results for Bear River DO immediately downstream of the proposed Oneida Narrows Project, under base-case and proposed project scenarios, 1990 to 2009, shown in 5-year increments (Source: Stevens and Milleson, 2014, as modified by staff).

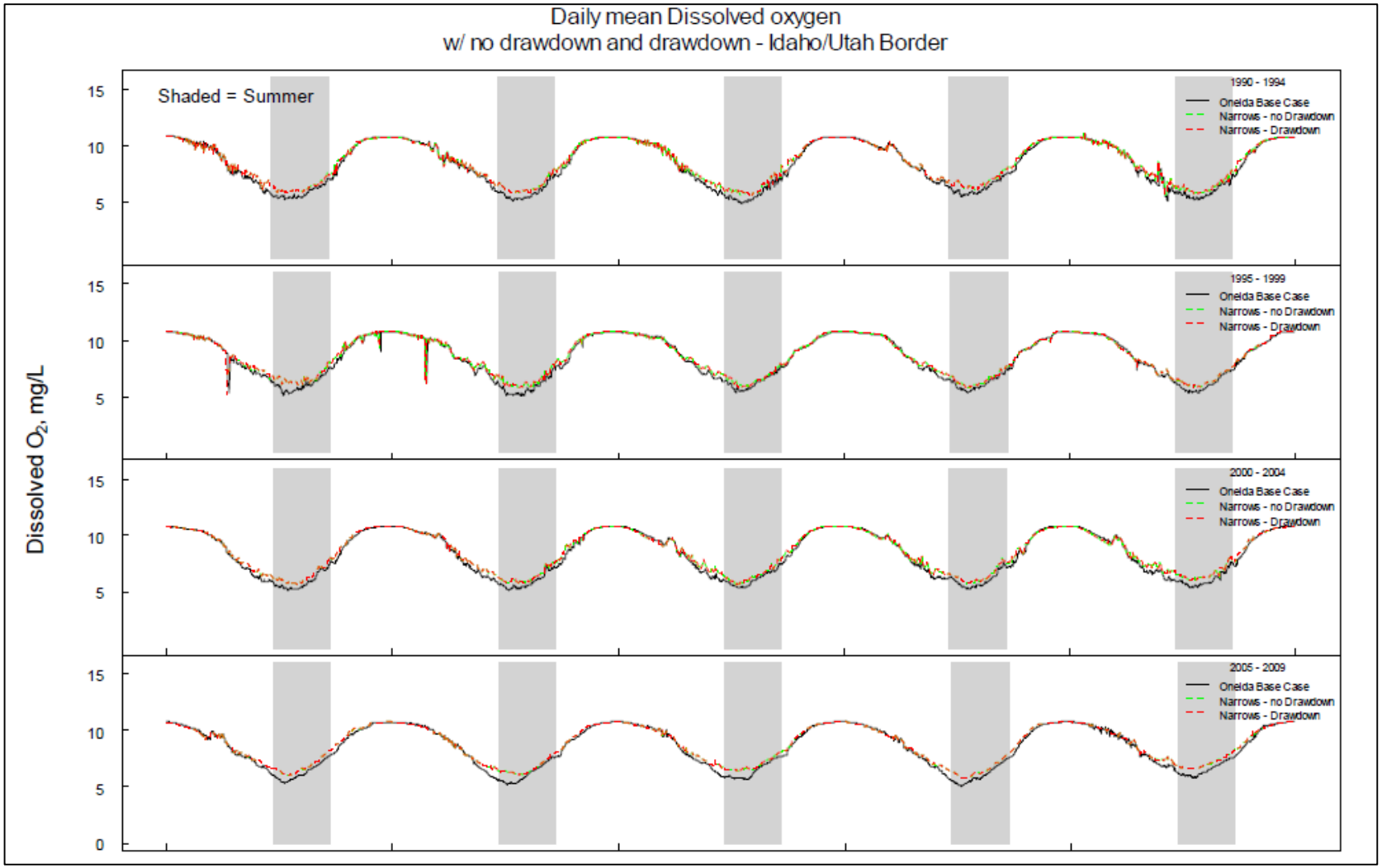

Figure 3-18. Water quality modeling results for Bear River DO at the Idaho/Utah border, under base-case and proposed project scenarios, 1990 to 2009, shown in 5-year increments (Source: Stevens and Milleson, 2014, as modified by staff).

Twin Lakes' proposed DO Management Plan calls for a two-stage process to increase DO concentrations downstream of the proposed dam, consisting of air injection into the draft tubes, and bypass of jetted water at 100-percent DO saturation from the penstock, if air injection does not return DO levels to state standards. However, the proposed plan does not indicate how long air injection would occur before jetted water at 100 percent saturation is implemented, how 100 percent DO saturation would be guaranteed in water jetted from the penstock, and what additional options would be assessed if these two actions still do not result in downstream water meeting water quality standards. Because of these deficiencies in the proposed DO Management Plan, it would be appropriate for Twin Lakes to revise the plan in consultation with state and federal resource agencies, to provide the above additional details, to ensure that DO levels in the Bear River are maintained, if the proposed project were to be licensed.

Other aeration options that could be assessed as part of a revised plan could include, but not be limited to: (1) redesigning the intake structure to allow for selective withdrawal of water from different depths in the reservoir (such as from the metalimnion or epilimnion); and (2) installing an air or oxygen injection system in the reservoir immediately upstream of the intake to oxygenate waters before passage through the project.

Effects of Project Operation on Nutrient Loading

The Bear River from Alexander reservoir to the Idaho/Utah border was placed on EPA's 303(b) list of impaired waters in 2006 for elevated levels of TP, and a Total Maximum Daily Load (TMDL) was established.[29] The TMDL calls for a reduction in loading from current levels; Idaho numerical water quality criteria for TP for the mainstem Bear River and its tributaries are shown in table 3-8. Potential sources of elevated TP levels include: agriculture, livestock grazing, changes in the natural hydrograph (e.g., water diversion), degraded stream channels and banks, roads, mining, recreation, mass wasting (e.g., landslides), and wastewater treatment plants (Ecosystems Research Institute, 2006). Excess nutrients and organic matter from these point and non-point sources enhance eutrophication and may result in anoxic conditions and elevated levels of turbidity, blocking sunlight and affecting primary production. Under existing conditions, there appears to be no clear temporal trend of TP downstream of Oneida dam. TP levels are frequently lower than Idaho surface water quality criteria (see table 3-8), except near the Idaho/Utah border where they frequently exceed the standard (Stevens and Milleson, 2014).

Neither Twin Lakes nor any entity proposes any measure to address possible effects associated with altered nutrient loading in reaches downstream of the proposed

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[29] TMDL is the maximum amount of a pollutant a waterbody can receive and still safely meet water quality criteria and standards.

project. However, EPA and Idaho DEQ comment that the presence of the proposed reservoir may exacerbate existing phosphorus levels that already exceed TMDL targets. In addition, Idaho DEQ expresses concern that nutrient modeling conducted by the applicant does not accurately predict future trends in TP levels.

Our Analysis

Twin Lakes assessed the potential effects of the proposed project on Bear River nutrient loading using a water quality model that simulated 20 years (1990 to 2009) of flow and water quality conditions, as we discuss in *Effects of Project Operation on Dissolved Oxygen and Temperature*. Table 3-18 presents the results of the water quality modeling in comparison to historical TP and the TMDL allocation.

Results from the TP modeling indicate that the proposed project would likely result in decreased TP loading in the Bear River in the upper basin runoff and summer baseflow periods, compared to modeled base (no project) conditions below Oneida dam. At the Idaho/Utah border, modeled daily TP loadings would also decrease in the upper basin runoff and summer baseflow periods, compared to modeled base conditions. However, the modeled base condition did not always agree with (was higher or lower than) historical data, and most of the modeled predicted TP loadings would be above the TMDL allocation both below Oneida dam and at the Idaho/Utah border.

The TP modeling results, although inconsistent in showing either an increase or decrease in TP loading, indicated that predicted TP loading would generally remain higher than the TMDL allocation, and thus would be inconsistent with the TMDL plan for the Bear River that has the primary goal of reducing nutrient loadings in the basin. TP loadings in the Bear River Basin, however, have been shown to be a long-term overall watershed problem resulting primarily from agricultural runoff. Baseline data from downstream of the proposed project at the Idaho/Utah border show higher TP concentrations (see table 3-18), indicating that agricultural operations and other watershed factors already adversely affect TP loadings in the lower Bear River, and any effect of the proposed project would likely be less than other ongoing watershed issues.

Idaho DEQ expressed concern with the results of the nutrient modeling, which, according to Idaho DEQ, may under-predict TP in the Bear River because phosphorus released from sediment in the reservoir was set to zero in the model. Idaho DEQ states that this is unrealistic based on other observations from Alexander reservoir upstream of the project and local geology. If higher TP loadings from the proposed project were to occur, however, technically feasible mitigative options would not be available to correct this basin-wide issue.

Table 3-18. Historical and modeled (1990 to 2009) total phosphorus (kilograms per day [kg/d])in comparison to TMDL allocations immediately below Oneida dam and at the Idaho/Utah border (Source: Stevens and Milleson, 2014, as modified by staff).

Hydrologic Period[a]	Historical[b]	Base (no project)	Project (with drawdown)	Project (no drawdown)	TMDL Allocation
Below Oneida Reservoir					
Winter Base Flow	42	42.0	49.9	49.8	42
Lower Basin Runoff	109	111.5	112.2	112.2	91
Upper Basin Runoff	107	185.8	159.7	160.2	93
Summer Base Flow	81	90.4	88.0	88.0	77
Idaho/Utah Border					
Winter Base Flow	188	53.0	61.2	61.1	107
Lower Basin Runoff	467	164.0	164.4	164.4	117
Upper Basin Runoff	337	226.6	192.6	192.8	138
Summer Base Flow	200	95.0	90.4	90.4	112

[a] Winter base flow (November to February) is when most of the watershed is locked in ice; lower basin runoff (March and April) is when melting of the snowpack occurs below 6,500 feet elevation; upper basin runoff (May to July) is when melting of the snowpack occurs above 6,500 feet elevation; and summer base flow (August to October) is with no dominate runoff conditions but irrigation withdrawals occur in the tributaries and Bear River mainstem.

[b] Period of record 1974–1998.

Effects of Proposed Project Operation on Instream Flows

In this section, we discuss how the proposed project would affect instream flows in project-affected reaches. We discuss alternative flow regimes and the habitat ramifications of proposed and recommended flow regimes, beginning with project effects during the construction period, followed by effects during project operation.

Instream Flows during Project Construction

Construction of the proposed dam would require diverting Bear River flows around the construction site, and once the proposed dam is completed, storing a portion of Bear River flows for reservoir filling. During the construction period, inflows to the construction site would be passed as received. The initial filling of the reservoir would use unallocated water in excess of downstream senior water rights. In case of low inflow conditions, Twin Lakes has committed to provide at least a continuous minimum flow downstream of the proposed project site equal to the minimum flow release from the Oneida development of 251 cfs, or inflow, whichever is less, during reservoir fill and operation of the proposed project. During the reservoir fill period, maintenance of the minimum flow would have priority, and the fill rate would be reduced to ensure passage of the minimum flow, if required.

Twin Lakes would fill the proposed reservoir using unallocated water to initially fill the reservoir (12,647 acre-feet) to elevation 4,734 feet from October 1 through April 15, which would reduce flows compared to existing conditions, potentially affecting the amount of available downstream aquatic habitat during that period. Twin Lakes proposes to continuously store water for initial reservoir filling outside the irrigation season when water is available after all senior water rights are met, varying from 10 cfs in October through February, 20 cfs in March, and 25 cfs from April 1 through 15. If the fill rate of 1 foot per day in reservoir elevation is not met, then additional water would be held at the dam to meet the prescribed fill rate and water would be diverted from Mink Creek to compensate for additional holding of water.[30] Twin Lakes estimates that it would require about 94 days to fill the proposed reservoir at its proposed storage rates. Any releases of flows from the Mink Creek diversion dam to compensate for Bear River water held to fill the new reservoir would also affect aquatic habitat in lower Mink Creek during filling. Twin Lakes does not propose a minimum flow in Mink Creek during the reservoir filling period.

None of the agencies recommended specific minimum flows during the project construction and reservoir filling period, although Idaho Fish and Game agrees with the proposal to release a minimum flow equal to the minimum flow at PacifiCorp's upstream

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[30] Water normally diverted from Mink Creek and conveyed to storage in reservoirs owned by Twin Lakes would instead be allowed to flow past the diversion and enter the Bear River.

Oneida dam during all phases of the project, including construction, initial reservoir filling, and long-term reservoir operation.

Our Analysis

According to Twin Lakes, construction would be initiated with installation of a bypass and intake structure, and reservoir filling and initial project startup would occur about 2 years later. Thus, aquatic resources in the immediate project vicinity would be exposed to construction-related flow effects over this 2-year period, which would include two spawning/early-rearing periods for fishes residing in this reach of the Bear River. Twin Lakes proposes to provide essentially the same flow regime during the project construction, reservoir filling, and operational periods (we discuss operational flows below) as now occurs in the reach as a result of the operation of the upstream Oneida development. Oneida development operational flows range from its licensed minimum flow of 251 cfs, or inflow, whichever is less, up to a maximum hydraulic capacity of its powerhouse of about 3,300 cfs, although maximum flows during the summer months are typically about 2,500 cfs (FERC, 2003b).

PacifiCorp conducted an instream flow study during the relicensing of the Oneida development (see FERC, 2003b). PacifiCorp's instream flow study concluded that a minimum flow of 250 cfs[31] would adequately protect habitat for multiple lifestages of rainbow, cutthroat, and brown trout downstream of the Oneida development (FERC, 2003b). The proposed project would be constructed within the reach investigated during PacifiCorp's study,[32] so it is reasonable to assume that the study results would still apply to the Bear River downstream of the proposed dam.

Twin Lakes conducted a study of the fisheries habitat in the reach of the Bear River from Oneida dam downstream to the confluence with the Cub River (about 50 river miles)(Hardy et al., 2012c). That study mapped existing habitat types, estimated suitable habitat for target species using PHABSIM modeling, compared modeling results to fish community sampling results, and compared available habitat under current and proposed flow regimes. Results indicated that the study reach, under current flow conditions, provides suitable habitat for target species including salmonids (rainbow trout, BCT, brown trout, mountain whitefish), smallmouth bass, and walleye, although the best salmonid habitat was in the upstream portion of the reach, including the reach that would be inundated by the proposed project. Hardy et al. (2012c) also concluded that similar

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[31] The study included a study flow of 250 cfs. The minimum flow requirement for the Oneida development includes leakage, which was measured at 1 cfs.

[32] FERC (2003b) states that the study covered the "Oneida riverine reach," which was defined as the "44 miles between the Oneida powerhouse and the upstream end of the Cutler reservoir."

amounts of target species habitat would be provided under the post-project flow regime (in the reach not directly affected by construction), indicating that Twin Lakes' proposal to pass the same flow regime as the upstream Oneida development would adequately protect aquatic habitat during the construction period. The Oneida development has been operating with a continuous minimum flow of 251 cfs, or inflow, whichever is less, for more than 10 years (since relicensing), and appears to be providing suitable habitat for target species. As noted above, Idaho Fish and Game agrees with Twin Lakes' proposal to maintain the same flow regime as now occurs from the Oneida development.

However, because proposed project construction would occur within Oneida Narrows Canyon, a deep, narrow canyon with limited area for construction activities, unanticipated construction events (such as rock slides or temporary blockages in flow) may interrupt river flows through the site. Although some of these events would be beyond Twin Lakes' control, it would be appropriate to require measures to ensure that normal Oneida development flow releases are maintained through the construction site, including during the reservoir filling period. This could be accomplished by implementing a construction flow monitoring plan, developed in consultation with state and federal agencies. An effective plan could include establishing a location for monitoring downstream flows, protocols for reporting any flow interruptions to the agencies and the Commission, description of measures taken to restore flows, and procedures that would be implemented to prevent future flow interruptions during the construction and reservoir filling period. Such a plan would need to be filed with the Commission for approval prior to the beginning of construction.

Instream Flows during Project Operation

Flow elements associated with hydroelectric project facilities and operations affect the aquatic and riparian environment as well as hydraulic and habitat connectivity. Flow regulation associated with operation of the proposed project reservoir and evaporative losses would affect the amount of water available downstream, in turn affecting aquatic biota, aquatic habitat, and riparian habitat in the Bear River. Twin Lakes proposes to operate the reservoir at or near elevation 4,734 feet during normal project operations (i.e., when the reservoir is not refilling). In dry years, Twin Lakes proposes to release from storage up to 5,000 acre-feet of water, reflecting a maximum drawdown to elevation 4,718 feet, over the course of the irrigation season, if needed to supplement irrigation water during years of system-wide irrigation water shortages. These releases from the proposed dam would be withdrawn from the Bear River and transferred to the Twin Lakes canal system at the pumping station 0.8 mile downstream of the proposed dam. Therefore, there would be a temporary increase in flows in this reach compared to the existing flow regime (releases from Oneida dam). Based on data from 1990 through 2010 included in table 3-7, full or partial drawdowns of the proposed reservoir could occur in about two thirds of years (i.e., there were water shortages to the system in 13 of 21 years). However, Twin Lakes also states that it may only make such releases if the value of lost crops exceeds the value of the water for power generation. During years

when supplemental releases are made, some amount of reservoir refill would be required depending on the amount of water released. Reservoir refill each year that supplemental releases are made would reduce downstream flows in the same manner as the initial filling of the reservoir, but would be limited to 5,000 acre-feet or less.

Twin Lakes states that the normal mode of project operation, when not filling the reservoir or passing additional flows to supplement irrigation shortages, would be run-of-reservoir, with manual start-up, automatic operation, and automatic shutdown. It indicates that head level control would be used to automatically adjust the flow through the turbines to match inflow to the reservoir, thus maintaining a relatively constant reservoir water surface elevation. Twin Lakes states that this method would ensure that water released from the project into the Bear River downstream of the proposed dam would match the outflow from the upstream Oneida development, including the Oneida development required minimum flow (251 cfs, or inflow, whichever is less, at all times). The minimum turbine discharge flow would be 175 cfs.

If inflow exceeds turbine capacity or the powerhouse units go off-line, automatic bypass gates would open to release additional water, ensuring that downstream water delivery would not be interrupted. If reservoir inflow exceeds the hydraulic capacity of the powerhouse units and bypass gates, excess water would be spilled.

Sections of Bear River and Mink Creek that would be affected by project operation include: (a) the 0.8-mile-long reach of the Bear River between the proposed dam and pumping station; (b) the 0.4-mile-long reach of the Bear River between the pumping station and the confluence of Mink Creek; (c) the 4.2-mile-long reach of Mink Creek from the Twin Lakes diversion dam to the Bear River; and (d) Bear River downstream of the mouth of Mink Creek. Aquatic resources would be affected, but recreational uses would also be affected (see section 3.3.5.2, *Recreation Resources, Environmental Effects*).

Twin Lakes proposes to maintain a continuous minimum flow release into the Bear River from the project equal to the required minimum flow at Oneida dam (251 cfs, or inflow, whichever is less), and would also adhere to ramping rate restrictions imposed at Oneida dam. The ramping rate restrictions implemented since 2003 at the Oneida development include no restrictions on upramping rates and limit downramping rates to a 2-foot decrease in river stage per 15 minutes. Twin Lakes also proposes to institute a year-round minimum flow of 10 cfs from the Mink Creek diversion dam; establish a baseline flow for protection of fish, wildlife, and recreational resources in lower Mink Creek; and maintain quality BCT habitat in Mink Creek as mitigation for Bear River BCT habitat inundated by the proposed project. Mink Creek enters the Bear River 1.2 miles downstream of the proposed dam site. Twin Lakes' continuous minimum flow at the diversion dam would also include a flow equivalent to the evaporative losses at the proposed reservoir (table 3-19) and would be measured at a gage installed at a suitable location downstream of Twin Lakes' Mink Creek diversion dam. Twin Lakes would continue to use lows in excess of the minimum flow in Mink Creek for irrigation.

Table 3-19. Estimated evaporative loss for the proposed reservoir (Source: Schiess and Associates, 2009).

Month	Evaporative Loss (inches)	Precipitation (inches)	Net Loss (inches)	Net Loss (acre-feet)	Continuous Flow Equivalent (cfs)
April	3.3	1.5	1.8	55.2	0.9
May	5.2	2.1	3.1	93.8	1.5
June	6.0	1.5	4.5	134.2	2.3
July	6.1	0.8	5.3	161.1	2.6
August	5.2	1.0	4.2	127.6	2.1
September	3.9	1.4	2.5	74.2	1.2
October	3.2	1.6	1.6	46.8	0.8
April-Oct	32.9	9.9	23.0	692.9	1.6

Twin Lakes proposes a water exchange that would allow it to release up to 10 cfs at its diversion dam for the benefit of Mink Creek, yet not lose this water from its irrigation system. Twin Lakes proposes to withdraw from its pump station on the Bear River a volume of water equivalent to the Mink Creek release minus the volume of water equal to evaporative losses in the reservoir. The proposed exchange, essentially changing a diversion point, allows Twin Lakes to enhance Mink Creek flows, yet recapture the water, minus lake evaporation at the Bear River pump station. However, due to the location of the pumping station above the Bear River/Mink Creek confluence, the exchange results in a small reduction of flow in the reach between the pumping station and the confluence of Mink Creek.

Twin Lakes provided a series of tables showing the net effects of proposed project operation related to irrigation, and for mitigation of evaporative losses, on instream flows in three reaches of the Bear River: (a) the 0.8-mile-long reach between the proposed dam and pumping station; (b) the 0.4-mile-long reach from the pumping station to the confluence of Mink Creek; and (c) the Bear River downstream of the confluence of Mink Creek. We include Twin Lakes' tables (tables 3-20, 3-21, and 3-22) depicting a worst-case scenario of the entire 5,000 acre-feet of reservoir storage used to compensate for irrigation water shortages, with a supplemental flow of 10 cfs released into Mink Creek downstream of the diversion dam at all times, and the reservoir refilled slowly at a rate ranging from 10 cfs in October to 25 cfs in April. In reality, under Twin Lakes' proposed operation, there would be times when there would be some Mink Creek natural inflows passed downstream of the diversion dam and not diverted into the irrigation system, such as when the Twin Lakes siphon freezes during the winter or periods of higher inflow.

Table 3-20. Net effect on Bear River flows in the reach from the proposed dam downstream to the proposed pumping station, assuming: (1) 5,000 acre-feet of storage is used to supplement irrigation water shortages and is then replaced, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek[a] (Source: Twin Lakes, 2013).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Loss (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	-10.0	0.0	0.0	-10.0	-2.5
February	388	0.0	-10.0	0.0	0.0	-10.0	-2.6
March	582	0.0	-20.0	0.0	0.0	-20.0	-3.4
April	730	0.0	-25.0	0.0	-0.9	-25.9	-3.5
May	639	0.0	0.0	0.0	-1.5	-1.5	-0.2
June	795	0.0	0.0	0.0	-2.3	-2.3	-0.3
July	967	35.0	0.0	0.0	-2.6	32.4	3.4
August	894	35.0	0.0	0.0	-2.1	32.9	3.7
September	438	30.0	0.0	0.0	-1.2	28.8	6.6
October	336	0.0	-10.0	0.0	-0.8	-10.8	-3.2
November	345	0.0	-10.0	0.0	0.0	-10.0	-2.9
December	339	0.0	-10.0	0.0	0.0	-10.0	-2.9

[a] For example, in July through September, the reservoir would be drawn down through releases of 30 to 35 cfs from the proposed dam into this reach to offset Twin Lakes' irrigation water shortages; the releases would be captured at the downstream pumping station and transferred to the Twin Lakes irrigation canal. In October through April, a portion of inflow would be stored in the reservoir (equivalent to 10 to 25 cfs) to refill the reservoir after prior compensation releases from July through September, resulting in a reduction in flow in this reach. Water associated with the Mink Creek water exchange (releases at the dam to compensate for the 10-cfs minimum flow release into Mink Creek) would be part of normal flow releases downstream of the dam, so there would be no net effect on this reach. In April through October, evaporative losses would reduce flows by 0.9 to 2.6 cfs.

Table 3-21. Net effect on Bear River flows in the reach from the proposed pumping station to the confluence of Mink Creek, assuming: (1) 5,000 acre-feet of storage is used to supplement irrigation water shortages and is then replaced, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek (Source: Twin Lakes, 2013, as modified by staff).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	-10.0	-10.0	0.0	-20.0	-5.0
February	388	0.0	-10.0	-10.0	0.0	-20.0	-5.2
March	582	0.0	-20.0	-10.0	0.0	-30.0	-5.2
April	730	0.0	-25.0	-9.1	-0.9	-35.9	-4.9
May	639	0.0	0.0	-8.5	-1.5	-10.0	-1.6
June	795	0.0	0.0	-7.7	-2.3	-10.0	-1.3
July	967	0.0	0.0	-7.4	-2.6	-10.0	-1.0
August	894	0.0	0.0	-7.9	-2.1	-10.0	-1.1
September	438	0.0	0.0	-8.8	-1.2	-10.0	-2.3
October	336	0.0	-10.0	-9.2	-0.8	-20.0	-6.0
November	345	0.0	-10.0	-10.0	0.0	-20.0	-5.8
December	339	0.0	-10.0	-10.0	0.0	-20.0	-5.9

Table 3-22. Net effect on Bear River flows downstream of the confluence with Mink Creek, assuming: (1) 5,000 acre-feet of storage is used to supplement irrigation water shortages and is then replaced, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek (Source: Twin Lakes, 2013).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	-10.0	0.0	0.0	-10.0	-2.5
February	388	0.0	-10.0	0.0	0.0	-10.0	-2.6
March	582	0.0	-20.0	0.0	0.0	-20.0	-3.4
April	730	0.0	-25.0	0.0	0.0	-25.0	-3.4
May	639	0.0	0.0	0.0	0.0	0.0	0.0
June	795	0.0	0.0	0.0	0.0	0.0	0.0
July	967	0.0	0.0	0.0	0.0	0.0	0.0
August	894	0.0	0.0	0.0	0.0	0.0	0.0
September	438	0.0	0.0	0.0	0.0	0.0	0.0
October	336	0.0	-10.0	0.0	0.0	-10.0	-3.0
November	345	0.0	-10.0	0.0	0.0	-10.0	-2.9
December	339	0.0	-10.0	0.0	0.0	-10.0	-2.9

Twin Lakes proposes to limit the refill of the reservoir to a maximum rate of 1 foot per day, which is equivalent to a flow rate of approximately 140 cfs. This is much higher than the 10 to 25 cfs refill rates used in tables 3-20, 3-21, and 3-22 that illustrate the effects of the project when refilling is spread out over a 6-month period. All but 4.0 cfs of the downstream water rights listed in table 3-4 expire by November 1. Conceivably, the November average monthly flow of 345 cfs would be sufficient to refill the reservoir in a single month with a maximum reservoir refill rate of 1 foot per day, while still meeting proposed downstream flow releases. Such a rapid refill would reduce the flow of the Bear River by 24.4 percent in November, but not reduce streamflow in the rest of the refill months.

Tables 3-23, 3-24, and 3-25 depict a best-case scenario with no use of reservoir storage to alleviate irrigation water shortages with a minimum flow of 10 cfs released into Mink Creek at Twin Lakes' Mink Creek diversion at all times.

Table 3-23. Net effect on Bear River flows from the proposed dam to pumping station, assuming: (1) no reservoir withdrawals for water shortages, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek (Source: Twin Lakes, 2013).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	0.0	0.0	0.0	0.0	0.0
February	388	0.0	0.0	0.0	0.0	0.0	0.0
March	582	0.0	0.0	0.0	0.0	0.0	0.0
April	730	0.0	0.0	0.0	-0.9	-0.9	-0.1
May	639	0.0	0.0	0.0	-1.5	-1.5	-0.2
June	795	0.0	0.0	0.0	-2.3	-2.3	-0.3
July	967	0.0	0.0	0.0	-2.6	-2.6	-0.3
August	894	0.0	0.0	0.0	-2.1	-2.1	-0.2
September	438	0.0	0.0	0.0	-1.2	-1.2	-0.3
October	336	0.0	0.0	0.0	-0.8	-0.8	-0.2
November	345	0.0	0.0	0.0	0.0	0.0	0.0
December	339	0.0	0.0	0.0	0.0	0.0	0.0

Table 3-24. Net effect on Bear River flows from the proposed pumping station to the confluence of Mink Creek, assuming: (1) no reservoir withdrawals for water shortages, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek (Source: Twin Lakes, 2013).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	0.0	-10.0	0.0	-10.0	-2.5
February	388	0.0	0.0	-10.0	0.0	-10.0	-2.6
March	582	0.0	0.0	-10.0	0.0	-10.0	-1.7
April	730	0.0	0.0	-9.1	-0.9	-10.0	-1.4
May	639	0.0	0.0	-8.5	-1.5	-10.0	-1.6
June	795	0.0	0.0	-7.7	-2.3	-10.0	-1.3
July	967	0.0	0.0	-7.4	-2.6	-10.0	-1.0
August	894	0.0	0.0	-7.9	-2.1	-10.0	-1.1
September	438	0.0	0.0	-8.8	-1.2	-10.0	-2.3
October	336	0.0	0.0	-9.2	-0.8	-10.0	-3.0
November	345	0.0	0.0	-10.0	0.0	-10.0	-2.9
December	339	0.0	0.0	-10.0	0.0	-10.0	-2.9

Table 3-25. Net effect on Bear River flows downstream of the confluence with Mink Creek, assuming: (1) no reservoir withdrawals for water shortages, (2) a minimum flow of 10 cfs is provided in Mink Creek, and (3) reservoir evaporation is compensated from Mink Creek (Source: Twin Lakes, 2013).

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
January	404	0.0	0.0	0.0	0.0	0.0	0.0
February	388	0.0	0.0	0.0	0.0	0.0	0.0
March	582	0.0	0.0	0.0	0.0	0.0	0.0
April	730	0.0	0.0	0.0	0.0	0.0	0.0
May	639	0.0	0.0	0.0	0.0	0.0	0.0
June	795	0.0	0.0	0.0	0.0	0.0	0.0

Month	Bear River Average Flow 2000-2009 (cfs)	Reservoir Withdrawal (cfs)	Reservoir Filling (cfs)	Mink Creek Exchange (cfs)	Reservoir Evaporative Losses (cfs)	Net Change (cfs)	Percent of Average Flow
July	967	0.0	0.0	0.0	0.0	0.0	0.0
August	894	0.0	0.0	0.0	0.0	0.0	0.0
September	438	0.0	0.0	0.0	0.0	0.0	0.0
October	336	0.0	0.0	0.0	0.0	0.0	0.0
November	345	0.0	0.0	0.0	0.0	0.0	0.0
December	339	0.0	0.0	0.0	0.0	0.0	0.0

Idaho Fish and Game agrees with the proposal by Twin Lakes to maintain a continuous minimum flow release from the proposed project equal to the minimum flow released from PacifiCorp's Oneida dam. However, Idaho Fish and Game recommends that Twin Lakes provide flows equivalent to the predicted evaporative losses from the proposed reservoir downstream of the proposed dam (not at the Mink Creek diversion dam), in addition to the volume released from Oneida dam, to ensure that flow in the Bear River below the proposed project remains unchanged from current conditions. This would also ensure that there would be no reduction in flow in the 0.4-mile reach between the proposed new pumping station and the mouth of Mink Creek, if Twin Lakes withdraws flow at the new pumping station to compensate for providing flows to lower Mink Creek. Idaho Fish and Game, however, recommends establishing a higher minimum flow in Mink Creek to support "good" aquatic habitat, which would be a minimum flow release of 28 cfs at the diversion dam from April to September, and 14 cfs during October through March.

Interior expresses concern that channel bed losses in Mink Creek downstream of the diversion may reduce the 10-cfs minimum flow substantially, before any flow augmentation occurs from adjacent springs and seeps located about 0.5 mile downstream of the diversion dam. Idaho Fish and Game states that there is always flow in Mink Creek except for a very short reach just below the diversion, and that Mink Creek between the Twin Lakes' diversion and Bear River is a gaining reach, consistent with Interior's assessment. Irrigation returns, spring flows, and elevated groundwater levels provide a flow of 3 to 5 cfs through the reach downstream of the first 0.5 mile.

Both Bear Lake Watch and PacifiCorp state that the release of additional water from the proposed project to compensate for reservoir evaporative losses would result in additional drawdowns of Bear Lake to make up for those additional releases, which could affect fish in Bear Lake, including several fish that only occur in Bear Lake.

Twin Lakes has no response to Idaho Fish and Game recommendations, but in its letter to the Commission dated January 23, 2015, clarifies that it is proposing to release a

minimum flow of 10 cfs past the diversion dam on Mink Creek at all times, and that it would install a stream gage immediately downstream of the diversion dam to monitor this flow.

Our Analysis

Twin Lakes proposes to operate the project to match releases from Oneida dam and would adhere to all minimum flow and ramping rate restrictions required by the Commission's license at Oneida dam. According to Twin Lakes, this operational scenario would ensure that water released from the Bear River Narrows Project into the Bear River would duplicate the minimum flow requirement and flow releases at the upstream Oneida development. Twin Lakes proposes to set turbine discharge equal to inflow, in which case flows downstream of the powerhouse would equal inflow to the reservoir, except when Twin Lakes is using unallocated water in excess of downstream senior water rights to refill the reservoir; even then, turbine flows would at least equal the required minimum flow of 251 cfs exiting the Oneida development. Based on our review of tables 3-20 and 3-21, any storage releases from the proposed reservoir associated with supplemental irrigation withdrawals would not affect flows in the reach from the pumping station to the confluence of Mink Creek, but they would increase flows released from the powerhouse to greater than inflow to the reservoir.

If inflow exceeds turbine capacity or the proposed Bear River Narrows power plant goes offline, automatic bypass gates would open to release water from the penstock, ensuring that downstream water delivery would not be interrupted. If reservoir inflow exceeds the hydraulic capacity of the combined turbines and the two bypass conduits, excess water would be spilled. As discussed earlier in this section, current operational flows from the Oneida development have been adequately protecting aquatic habitat downstream of the development for the past 10+ years, based on Twin Lakes' habitat assessment study, and Idaho Fish and Game's acceptance of the flow regime downstream of the Oneida development. Pass-through of the Oneida development flow regime, including minimum flows and ramping rates, would continue to protect riverine habitat in the Bear River downstream of the proposed dam. Although riverine habitat located in the proposed inundation zone would be lost (see *Loss of Fluvial Riverine Habitat*), remaining riverine habitat downstream of the proposed project should continue to support existing fishery resources.

Given the complexity of proposed reservoir operations, including withdrawals and refill of the reservoir for irrigation supplementation, water exchange, evaporation loss, and maintenance of project outflows, Twin Lakes would, at times, need to find an alternative way to ensure that project outflows match inflows from the Oneida development, other than maintaining a constant headwater elevation. Water levels in the reservoir would necessarily vary over the course of any given year, even if a large-scale irrigation withdrawal is not necessary.

Proposed project operation includes a variety of reservoir operations to both store and release water, while providing minimum flows downstream. The intent of Twin Lakes' proposed operation is to pass flows received from the upstream Oneida development, such that flows measured downstream of the confluence of Mink Creek would equal inflow from Oneida dam, except when refill operations are occurring, which would slightly reduce flows in the river (from 10 to 25 cfs, depending on month). The required minimum flow through Oneida dam, 251 cfs, or inflow if less, would be passed downstream of the proposed project at all times. Twin Lakes did not specifically propose a streamflow gage on the Bear River downstream of the confluence with Mink Creek, to ensure compliance with the proposed outflow equals inflow operation. Flows on the Bear River downstream of the proposed project would have to be measured, however, to ensure that Twin Lakes is passing the appropriate flows downstream of the project at all times, including during reservoir refill periods. Minimum flow monitoring is already proposed by Twin Lakes immediately downstream of the Mink Creek diversion dam.

If Bear River flows are also gaged downstream of the pumping station but upstream of the confluence of Mink Creek, the sum of the flows measured at the gage on Bear River downstream of the pumping station and flows measured at the gage on Mink Creek would reflect the total Bear River flows downstream of the confluence of Mink Creek. While some accretion flows would occur downstream of the Mink Creek gage, those accretion flows (3-5 cfs) would not be substantial and should not be considered when measuring compliance with minimum instream flow requirements for the proposed project because the accretion flows would not represent flow over which Twin Lakes has control. A gage located downstream of the pumping station would provide a good compliance point because it would not reflect irrigation releases that may occur in some years, or flow releases for water exchange that would be withdrawn from the proposed reservoir and then immediately removed from the Bear River at the pumping station. This would simplify the compliance monitoring of flows in the Bear River downstream of the proposed project.

The proposed water exchange would mostly compensate Twin Lakes for its proposed supplemental flow releases into Mink Creek (it would not be compensated for the portion of the release associated with the evaporative loss compensation flows). As table 3-24 shows, the proposed water exchange would decrease flows from the pumping station to the confluence of Mink Creek by 10 cfs.

Twin Lakes proposes a year-round 10-cfs minimum flow in Mink Creek downstream of its diversion dam, to enhance aquatic habitat in the creek. This flow would enhance aquatic resources in the creek because current flow diversions result in periods with zero flow releases from the diversion dam, with instream flow gradually increasing downstream due to spring inflows and inflow from the drainage basin downstream of the dam. Twin Lakes conducted an instream flow study in Mink Creek (Ecosystem Sciences, 2013, appendix C), to assess the habitat benefits to BCT of the proposed Twin Lakes minimum flow, in the 4.2 miles of stream downstream of the diversion dam. Investigators established three study reaches and six transects in the

reach, and using PHABSIM, simulated the amount of weighted useable area (WUA–an index of habitat) for four BCT lifestages, as well as total wetted area. Figure 3-19 shows the WUA versus discharge curves for the all study reaches combined. These curves indicate that the peak WUA would occur at different flows for the different lifestages, with only the fry lifestage peaking at the proposed flow of 10 cfs.

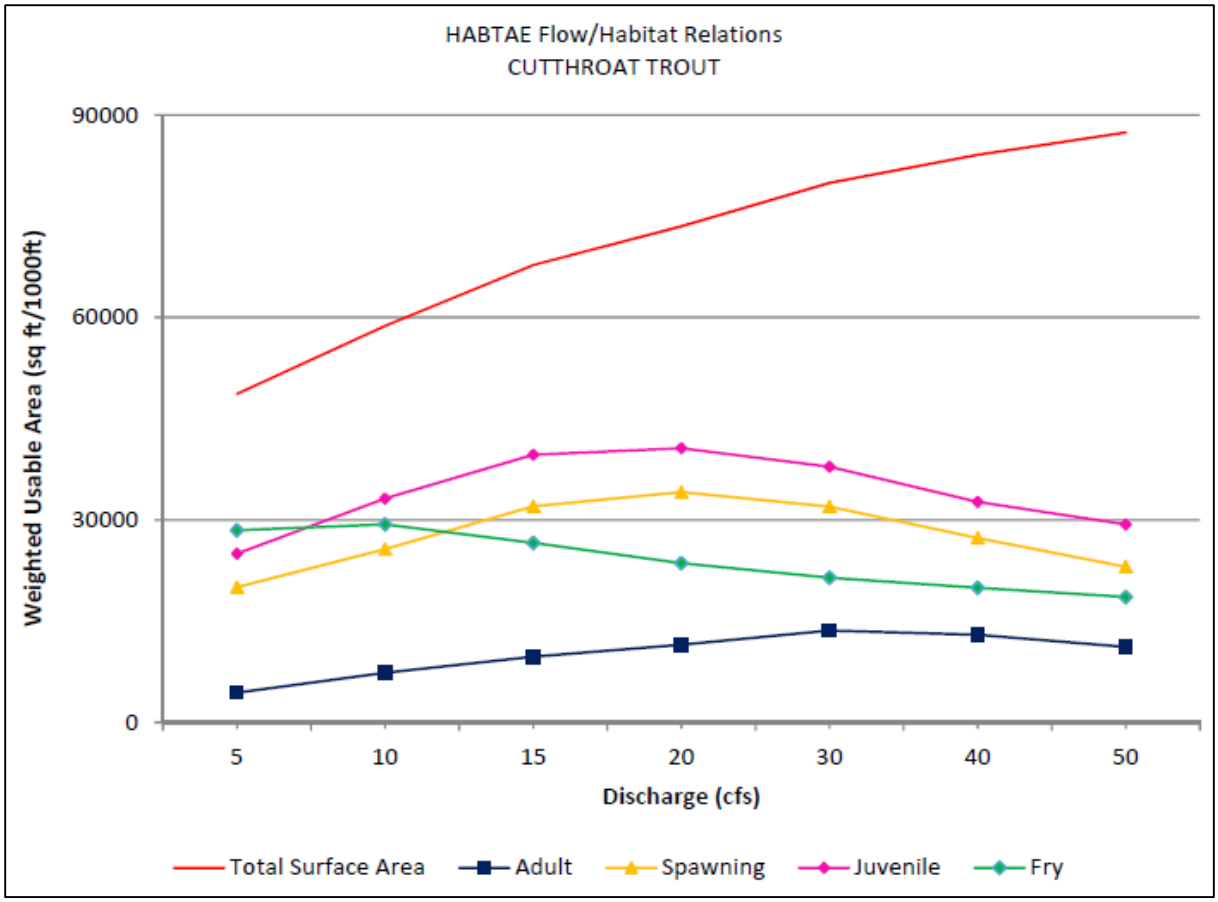

Figure 3-19. WUA versus discharge curves for BCT lifestages, all Mink Creek study reaches combined (Source: Ecosystem Sciences, 2013, appendix C).

Idaho Fish and Game recommends higher minimum flows of 14 to 28 cfs, but bases its flow recommendation on the Tennant Method (Tennant, 1976). The Tennant Method uses the hydrologic record to determine seasonally adjusted instream flow recommendations that have some hydrological relevance for maintaining natural habitat and the geomorphological and recreational attributes of rivers and streams. This record is used to calculate the average annual flow, and various percentages are applied to the

average annual flow to develop flow recommendations.[33] Idaho Fish and Game also reviewed Ecosystem Sciences (2013, appendix C) and concluded that the PHABSIM modeling showed that WUA for all lifestages except fry are maximized at flows between 20 and 30 cfs, similar to its flow recommendations using Tennant (1976).

We also reviewed the results of Ecosystem Sciences (2013, appendix C), but instead of only reviewing the "peak of the curve," we calculated the percent of maximum WUA provided at the flows modeled. Table 3-26 shows the results of our calculations, which indicate that peak WUA occurs at 20 to 30 cfs for adult, spawning, and juvenile lifestages (as Idaho Fish and Game noted), and at 10 cfs for fry. However, a relatively high percentage of maximum WUA also occurs at a flow of 10 cfs for spawning (75 percent) and juvenile (82 percent) lifestages, and a relatively high percentage (71 percent) occurs at 15 cfs for the adult lifestage. Ecosystem Sciences (2013, appendix C) states that Mink Creek actually gains flow downstream of the diversion dam as a result of springs and other local inflow, as did Interior and Idaho Fish and Game, and that even during the summer months when no flow is released at the diversion dam, lower Mink Creek typically has a flow of 3 to 5 cfs. Thus, if Twin Lakes releases a minimum flow of 10 cfs at the diversion dam, typical flows in the lower creek would be more in the range of 13 to 15 cfs, resulting in greater habitat value than indicated by a minimum flow of 10 cfs.

Table 3-26. Summary of WUA (square feet per 1,000 feet of stream) and percent of maximum WUA (in parentheses) for total area and four BCT lifestages in Mink Creek at simulated flows of 5 to 50 cfs (Source: Ecosystem Sciences, 2013, appendix C, as modified by staff).

Flow (cfs)	Total wetted area	Adult	Spawning	Juvenile	Fry
5	48,685 (56)	4,424 (32)	20,033 (59)	25,003 (62)	28,474 (97)
10	58,743 (67)	7,371 (54)	25,669 (75)	33,166 (82)	29,348 (100)
15	67,768 (78)	9,741 (71)	32,025 (94)	39,667 (98)	26,600 (91)

[33]According to Tennant (1976), 10 percent of average annual flow is considered the minimum instantaneous flow that would sustain "short-term" survival for most aquatic life; 30 percent of average annual flow would sustain "good" survival habitat for most aquatic life; and 60 percent of average annual flow would provide "excellent to outstanding" habitat for most aquatic life.

Flow (cfs)	Total wetted area	Adult	Spawning	Juvenile	Fry
20	73,513 (84)	11,516 (84)	34,119 (100)	40,630 (100)	23,598 (80)
30	79,941 (91)	13,632 (100)	31,978 (94)	37,893 (93)	21,453 (73)
40	84,085 (96)	12,992 (95)	27,338 (80)	32,680 (80)	19,953 (68)
50	87,404 (100)	11,192 (82)	23,058 (68)	29,335 (72)	18,591 (63)

Note: Shaded cells show the highest (100% of maximum) WUA for each lifestage.

Based on our analysis, a minimum flow release of 10 cfs at the Mink Creek diversion dam would provide enhancement of BCT habitat compared to existing conditions in the creek. However, a flow of 10 cfs would only provide 54 percent of the maximum WUA for adult BCT, which even with some additional inflow and habitat enhancement in the lower creek, may not provide sufficient habitat for adult BCT displaced from the inundated reach of the Bear River. If Mink Creek habitat is to serve as mitigation for the habitat lost in the Bear River, it would be appropriate to try to maximize the amount of BCT habitat in Mink Creek, particularly for adult and juvenile rearing because both of these lifestages use the mainstem Bear River for rearing. A minimum flow of 20 cfs would provide 84 percent of the maximum WUA for adult BCT, and 100 percent of the maximum WUA for spawning and juvenile lifestages, while still providing 80 percent of maximum WUA for the fry lifestage. This would be a substantial habitat enhancement over existing conditions in the creek and would offset some of the lost Bear River BCT habitat.[34] Idaho Fish and Game also recommends a seasonal minimum flow, with a lower flow (14 cfs) in the over-winter period of October to March. An over-winter minimum flow of 15 cfs would provide good habitat for over-wintering juveniles (98 percent of maximum WUA) and any fry (91 percent of maximum WUA). Over-winter adult BCT habitat would be reduced at a flow of 15 cfs (to 71 percent of maximum WUA), but fewer adult BCT were found to over-winter in Mink Creek (see figure 3-14). Whether this enhancement of Mink Creek habitat provides sufficient mitigation for the loss of Bear River BCT habitat is discussed below in *Loss of Fluvial*

[34] Because Mink Creek is a much smaller stream than the Bear River, maximizing BCT habitat in Mink Creek would still not mitigate on a one-to-one basis the area of habitat lost in the Bear River (see *Loss of Fluvial Riverine Habitat* discussion that follows).

Riverine Habitat. Any minimum flow to be passed at the diversion dam would be monitored at a stream gage immediately downstream.

Twin Lakes proposes to compensate for evaporative losses from the proposed reservoir by providing flow releases of a monthly equivalent of 0.8 to 2.6 cfs into Mink Creek as part of its proposed minimum flow release into Mink Creek, from the months of April through October, with the peak evaporation in July (see table 3-19). Thus, the compensation for the evaporative losses in the reservoir would be returned to the Bear River 1.2 miles downstream of the proposed dam, via increased Mink Creek flows. The water exchange that Twin Lakes proposes would provide compensation for a portion of the water release to meet the Mink Creek minimum flow requirement, but Twin Lakes did not propose to recoup the water associated with the evaporative loss compensation, and in fact would release less flow from the proposed reservoir if evaporation is occurring.[35] Idaho Fish and Game recommends making the evaporative loss compensatory releases at the proposed dam instead of within Mink Creek, so that flows downstream of the proposed dam would not be reduced from current conditions.

Twin Lakes and the agencies agree that compensatory flows for evaporation should be provided, and the only remaining issue is whether those compensatory flows should be released from the proposed dam, to maintain habitat in the 1.2-mile reach between the proposed dam and mouth of Mink Creek at current levels. Tables 3-20 through 3-25 show that the reach downstream of the proposed dam, particularly from the proposed pumping station to the confluence with Mink Creek, would be most affected by Twin Lakes' proposal, under some operational scenarios (more than just evaporative loss compensation flows), experiencing reduced average monthly flows of up to 6 percent (see table 3-21). Twin Lakes' proposal includes compensation for the evaporative losses by releases into Mink Creek, but that compensation would not occur in the Bear River until downstream of the confluence with Mink Creek (see table 3-25). Idaho Fish and Game's recommendation would provide up to 2.6 cfs more flow to the downstream reach from the proposed dam to the mouth of Mink Creek. We agree with Idaho Fish and Game that the evaporative loss compensatory flows would have to be released at the proposed dam, if outflow from the project is to equal inflow. If the outflow compliance point is located downstream of the pumping station and upstream of the Mink Creek mouth, as we discuss previously, any evaporative loss compensation flows from the dam would be reflected at that compliance point. While this would require Twin Lakes to use some reservoir storage to release an outflow equal to inflow, it would not require additional flow releases to compensate for evaporative losses as implied by Idaho Fish and Game's recommendation.

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[35] For example, if evaporation equal to 2 cfs is occurring from the reservoir, and the Mink Creek minimum flow is 10 cfs, Twin Lakes would pump 8 cfs from the Bear River for water exchange into Mink Creek via the proposed Bear River pumping station.

Bear Lake Watch and PacifiCorp express concerns that releasing additional water from the proposed project to compensate for evaporative losses at the proposed project would result in additional drawdowns of Bear Lake. Additional reservoir withdrawals for evaporative loss compensation (0.8 to 2.6 cfs) would not occur under Twin Lakes' proposal or under Idaho Fish and Game's recommendation. Under the scenario discussed above (outflow equals inflow), some reservoir storage would be used because of evaporation. However, if the proposed reservoir were to be drawn down because of evaporative losses, it would be refilled as with other drawdowns between October and April using unallocated flows.[36] Therefore, it would not be necessary to increase releases from Bear Lake to meet existing senior water rights allocations.

Reservoir Management

The normal maximum reservoir water surface elevation would be 4,734 feet. During severe dry weather conditions, Twin Lakes would set a reservoir drawdown limit of 5,000 acre-feet, which corresponds to a water surface elevation of 4,718 feet. Twin Lakes estimates the 5,000-acre-foot drawdown would occur in 11 out of 20 years, and a partial drawdown (from 3,200 to 4,000 acre-feet) would occur in 2 out of 20 years. Partial drawdown elevations of 3,200 to 4,000 acre-feet would correspond to elevations of about 4,722 to 4,725 feet. The reservoir would be refilled during the winter months only after all downstream water rights are met.

Drawdowns and water level fluctuations associated with operating the proposed project would dewater the littoral zone of the proposed reservoir, limiting the establishment of aquatic vegetation and the value of this habitat for reservoir fish populations, because of periodic dewatering. Effects of daily water level fluctuations and seasonal drawdowns would be most severe during spawning and rearing lifestages for any fish that may populate the reservoir and use nearshore littoral zone habitat for nest-building and rearing. Twin Lakes proposes no measures to mitigate effects of reservoir fluctuations for the reservoir drawdowns that would occur during dry years on reservoir aquatic habitat. Furthermore, no specific recommendations pertaining to reservoir fluctuations and drawdowns have been made by any resource agency or other stakeholder. However, the Idaho Fish and Game agrees with Twin Lakes that setting a maximum drawdown limit for reservoirs provides some benefits to fishery, wildlife, and recreation uses compared to complete drawdown.

Our Analysis

Although Twin Lakes states that it would maintain a constant headwater elevation to set the turbine discharge equal to inflows to the reservoir, except in years when it is making supplemental irrigation supply withdrawals, we find that this would not be

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[36] We anticipate evaporative losses within the reservoir to be about 2 feet per year on average.

possible at all times. Reservoir elevations would vary over the course of many years because of periodic irrigation withdrawals and winter and spring reservoir refill. In addition, reservoir evaporation that is expected to occur from April to October would result in slowly dropping reservoir water levels during the summer by nearly 2 feet or, alternatively, turbine discharge would need to be reduced if reservoir surface water levels were to be maintained at elevation 4,734 feet. Maintaining a constant water surface elevation of 4,734 feet and turbine discharge flows that equal inflow to the reservoir would rarely be possible, and only in years where precipitation is greater than evaporative losses. The rate and magnitude of reservoir fluctuations would be dependent on both Bear River Narrows Project and Oneida development operations, although typical proposed reservoir drawdowns for irrigation (30 to 35 cfs) would result in a drawdown rate of about 2 inches per day. Drawdowns of 5,000 acre-feet during dry years to provide irrigation water would lower the reservoir by 16 feet from its maximum proposed elevation of 4,734 feet. Drawdowns of this magnitude would dewater an estimated 100 acres of littoral zone aquatic habitat and decrease the volume of water stored in the proposed reservoir by 40 percent. This could affect establishment of shoreline fishery habitat in the proposed reservoir. Fish species that typically reside in littoral areas (e.g., sunfishes, smallmouth bass, and yellow perch) may experience high rates of mortality due to stranding and dewatering of nests if drawdowns occur during the spawning seasons and water levels decrease rapidly. Daily water level fluctuation and deeper reservoir drawdowns that would expose dewatered shoreline habitat to weather (rain storms) would also result in increased shoreline erosion, which would increase siltation of littoral spawning habitat (see section 3.3.1.2, *Geology and Soil Resources, Environmental Effects*, for a detailed discussion of potential shoreline erosion under worst-case drawdown conditions).

Setting a drawdown limit would provide some protection to fish and wildlife resources that would develop within the reservoir and maintain a certain level of boating and other recreational uses. Monitoring reservoir water surface elevations would maintain a record of reservoir levels and fluctuations, which would be useful to Twin Lakes in managing reservoir storage and hydropower and irrigation operations. Such monitoring also would allow Idaho Fish and Game and other stakeholders to monitor reservoir levels in relation to environmental resources in the reservoir, including fishery and recreational resources, and whether variations in reservoir water levels may be affecting such resources. For example, fishing and boating may be feasible or desirable only within a specific range of elevations, and knowing when those elevations would occur would be beneficial to those recreating at the reservoir. Reservoir monitoring could be included as part of an operation compliance plan discussed below.

Operation Compliance Monitoring Plan

Outflow from the upstream Oneida development currently includes minimum flow and ramping rate requirements for protection of aquatic habitat in the Bear River, releases to meet downstream water rights, and recreational flow releases. Under Twin Lakes' proposal, these flows would continue to be passed downstream, with the project operating

such that project outflow would match reservoir inflow under normal operation (when the reservoir is not being refilled). During reservoir refill periods, which could occur from October through April 15, Twin Lakes would maintain a minimum flow of 251 cfs, or inflow, which would be protective of aquatic habitat. Recreational flow releases from Oneida dam typically occur between Memorial Day weekend and Labor Day weekend and would not be affected during the reservoir refill period. Downstream water rights would not be affected because Twin Lakes would only use unallocated flows to refill the reservoir.

Our Analysis

Although Twin Lakes does not propose installation of a downstream flow measurement gage on the Bear River, its proposal suggests that measurement of flows downstream of the confluence of the Bear River and Mink Creek would demonstrate that outflow from the project is equal to inflow to the project as currently measured at the gage downstream of Oneida dam. Twin Lakes proposes minimum flow monitoring immediately downstream of its Mink Creek diversion dam. If Bear River flow is gaged downstream of the pumping station but upstream of the confluence with Mink Creek, the sum of flows measured at that gage and the gage on Mink Creek would reflect outflow from the project relative to inflow to the project reservoir as measured at the existing gage immediately downstream of Oneida dam. Because Mink Creek has accretion flows downstream of the diversion dam (and the proposed gage site), direct measurement of Bear River flows downstream of Mink Creek would reflect those accretion flows and not provide accurate gaging of outflow from the project over which Twin Lakes has control. A gage located downstream of the pumping station but upstream of the Mink Creek confluence would also provide a valid compliance point for documenting that the minimum flow in the Bear River is always at least 251 cfs, or inflow to the project, whichever is less, which would ensure that aquatic habitat downstream of the project is protected during reservoir filling periods. Measurement at a downstream location such as this would not reflect irrigation releases that may occur in some years (withdrawn from the proposed reservoir and then immediately removed from the Bear River at the pumping station). This overall monitoring approach would simplify the compliance monitoring of flows in the Bear River downstream of the proposed project and ensure that (1) outflow from the project downstream of the confluence of Mink Creek is equal to inflow during normal operation and (2) minimum flows in Bear River are at least 251 cfs, or inflow, whichever is less.

Because proposed project operation would be complex, it would be appropriate to develop a project operation compliance monitoring plan, in consultation with the Forest Service, BLM, FWS, Idaho Fish and Game, Idaho DEQ, and Idaho DWR. Such a plan, with details on streamflow monitoring on the Bear River and on Mink Creek; reservoir level monitoring; timing, magnitude, and rates of reservoir drawdown and refill; protocols for modifying drawdown or refill schedules; and provisions for reporting streamflows and reservoir levels, would ensure that project operation would be protective of environmental aquatic resources affected by the project. Provisions for publishing

real-time flow and reservoir water level elevations would pertain to recreational resources and are therefore discussed in section 3.3.5.2, *Recreation Resources, Environmental Effects*.

Loss of Fluvial Riverine Habitat

Construction of the proposed project would inundate 4.5 miles of riverine aquatic habitat in the Bear River and adversely affect existing aquatic biota and flora in the inundated reach. Currently, the proposed area to be inundated, Oneida Narrows, is characterized by high-gradient run, riffle, and pool habitat with the highest density of physical salmonid spawning habitat (appropriate depth, velocity, and substrate) in the Bear River (Hardy et al., 2012c), although this spawning habitat is currently limited by high water temperatures during the spawning season discussed above. The primary importance of the reach for BCT is for rearing habitat for both juvenile and adult BCT. Twin Lakes radiotelemetry study (Hardy et al., 2012c) showed that this reach consistently held tagged adult BCT through all seasons, although particularly during the winter months (when few tagged fish were found in Mink Creek), and indicated that BCT use this reach as a migratory corridor to access tributary streams such as Mink Creek and the Cub River, where most spawning now occurs. Inundation would transform this reach from a riverine to a lake-like ecosystem, would eliminate existing BCT rearing habitat, while the proposed dam would block movement of BCT within the reach from downstream of Oneida dam to downstream of the proposed dam. Effects associated with this transformation of habitat would include a change in species composition and diversity, flow regime, water quality, sediment transport, and nutrient cycling. With the proposed inundation of Oneida Narrows, the fish community of the resulting reservoir probably would eventually be similar to the fish community of the upstream Oneida reservoir, as fish from Oneida reservoir pass through PacifiCorp's Oneida development into the proposed reservoir and establish populations.

Twin Lakes proposes to establish a permanent 10-cfs minimum flow in Mink Creek to mitigate for habitat lost as a result of the proposed reservoir inundation, and also to enhance BCT habitat in Mink Creek. No agency or other stakeholder recommends any mitigation for the loss of the 4.5 miles of Bear River fluvial habitat. However, the Forest Service, FWS, FCFGA, GYC, Shoshone-Bannock Tribe, TU, and EPA comment that the proposed project would eliminate nearly half of BCT available and suitable riverine habitat downstream of Oneida dam through inundation. Furthermore, Idaho Fish and Game comments that it is not possible to protect, mitigate, or enhance fisheries resources, specifically BCT that are dependent upon riverine habitat for their survival, with the loss of habitat associated with inundation of the Oneida Narrows reach.

Our Analysis

Twin Lakes characterized the spatial and temporal patterns of physical habitat availability for target aquatic resources within the proposed inundation area by conducting habitat surveys and habitat modeling using PHABSIM. Twin Lakes formed a

technical working group composed of BLM, the Forest Service, FCFGA, GYC, Idaho Fish and Game, TU, and FWS to select sites and cross-sections for physical habitat modeling. The physical habitat modeling evaluated flow versus habitat relationships for six fish species and several lifestages at a range of flows (50 to 2,000 cfs) for all seasons (autumn, winter, spring, summer) (Hardy et al., 2012c). Table 3-27 presents the physical habitat modeling results for BCT under existing conditions.

Table 3-27. Acreage of habitat for BCT lifestages at the Bear River median flow (850 cfs) within survey reaches 4 and 5, the proposed inundation area (Source: Hardy et al., 2012c, as modified by staff).

Lifestage	Winter	Spring	Summer	Fall
Adult	47.3	113.6	111.7	60.0
Spawning	NA	23.3	15.2	NA
Juvenile	120.4	151.6	152.9	132.6
Fry	NA	81.6	80.8	70.4

Throughout the year at median flows, modeling indicates a strong seasonal change in physical habitat availability for adult BCT, with reduced habitat availability in the winter, and highest habitat availability during the spring and summer. In contrast, habitat available to juvenile BCT and BCT fry remain fairly constant at median flows, although juvenile habitat is somewhat reduced in the winter. Table 3-27 quantifies the amount of Bear River fluvial BCT habitat that would be lost with the inundation of reaches 4 and 5. Other fluvial species habitat would also be lost, but that was not quantified. Although the proposed reservoir could provide habitat for adult BCT,[37] the reservoir would not provide any suitable habitat for spawning, fry, and juvenile lifestages, and the paucity of adult BCT in Oneida reservoir (see table 3-11) strongly suggests that the proposed reservoir would have minimal if any value as BCT habitat.

Twin Lakes proposes a minimum flow of 10 cfs in Mink Creek as mitigation for the loss of BCT fluvial habitat in the 4.5 miles of inundated Bear River habitat. As discussed previously, the habitat benefits for BCT from the proposed permanent, year-round minimum flow of 10 cfs in Mink Creek were evaluated using a PHABSIM model. The amount of BCT habitat was simulated for flows ranging from 5 to 50 cfs, and table 3-26 shows the results for the full range of flows simulated for adult, spawning, juvenile, and fry lifestages.

[37] Habitat suitable curves used by Hardy et al. (2012a) show that adult BCT are tolerant of a wide range of depths and velocities, and greater depths have higher suitability than shallow depths.

The results of the Mink Creek PHABSIM modeling indicate that all lifestages of BCT habitat would be enhanced by Twin Lakes' proposed minimum flow of 10 cfs (and higher minimum flows). The benefit would be greatest in the summer period when water temperatures are high and flows in Mink Creek are reduced as a result of Twin Lakes' irrigation withdrawals at the Mink Creek diversion. Despite the gain in available habitat for BCT, PHABSIM modeling indicates the amount of BCT habitat that would be lost as a consequence of inundation of the Oneida Narrows reach would be orders of magnitude greater than the habitat gained by the 10-cfs minimum flow, the staff study flow, and the Idaho Fish and Game recommended flow in Mink Creek (table 3-28). The amount of habitat gained in Mink Creek, based on estimated acreage, would range from 3 to 6 percent of the adult habitat, 56 to 75 percent of the spawning habitat, 11 to 14 percent of the juvenile habitat, and 13 to 18 percent of the fry habitat that would be lost in the Bear River.

Table 3-28. Comparison of BCT habitat that would be inundated in the Bear River versus habitat to be gained in Mink Creek by various instream flow alternatives, in acres (Source: Hardy et al., 2012c; Ecosystem Sciences, 2013; as modified by staff).

BCT Lifestage	Bear River Habitat Lost[a]	Mink Creek Habitat Gained (10 cfs flow)	Mink Creek Habitat Gained Staff Flow (15/20 cfs)	Mink Creek Habitat Gained Idaho Fish and Game Flow (14/28 cfs)
Adult	113.6	3.8	5.9	6.9
Spawning	23.3	13.1	17.4	16.3
Juvenile	152.9	16.9	20.7	20.2
Fry	81.6	14.9	12.0	10.9

[a] For habitat lost or gained, we used the maximum WUA determined by the model for the season or for each flow analyzed and converted to acres.

BCT would not be the only species affected by the loss of fluvial habitat in the proposed project area. Twin Lakes collected 13 fish species in 2008 and 2009 within the proposed inundation reach, seven of which were also collected in Oneida reservoir. Rainbow trout (which is stocked) was common in the inundation reach, and only sporadically taken in Oneida reservoir; only small numbers of BCT were collected in both locations (see tables 3-12 and 3-13). Species that were collected in the proposed inundation reach but not in Oneida reservoir include: speckled dace, brown trout, mountain whitefish, and mottled sculpin. Habitat in the inundation reach was also mapped and modeled for brown trout and mountain whitefish. Results of the physical habitat modeling indicates that under current conditions the Bear River from Oneida dam

to the Cub River provides suitable habitat for brown trout and mountain whitefish, and that the physical habitat transitions from a series of runs, riffles, and pools in the proposed inundation reach to long deep runs and glides downstream (Hardy et al., 2012c). Speckled dace prefer riffle, runs and pools of headwater creeks and small to medium rivers, and were only found within the proposed inundation reach and Mink Creek (Page and Burr, 1991; Hardy et al., 2012c). Mottled sculpin exhibit similar habitat preferences as the speckled dace, but also can be found along rocky shorelines of lakes (Page and Burr, 1991). Nonetheless, the absence of mountain whitefish, brown trout, speckled dace, and mottled sculpin in Oneida reservoir suggests that these species would be affected by inundation of the Bear River fluvial reach and would not establish populations in the proposed reservoir, and would either be displaced downstream or occur only in tributaries such as Mink Creek. While this fishery community (mountain whitefish, brown trout, speckled dace, and mottled sculpin) may not be unique or of great regional significance, the inundation of this fluvial reach would likely result in reduced populations of these species in this reach of the Bear River.

Fish Entrainment

Entrainment through irrigation, industrial, and hydroelectric facility intakes frequently causes injury or mortality to a portion of those fish that become entrained. The proposed project would entrain fish at the proposed powerhouse during generation, and survivors would be discharged back to the Bear River. The proposed Bear River pumping station would also entrain Bear River fish; however, survivors would ultimately be transported to Twin Lakes' existing storage reservoirs in the same manner that Mink Creek fish that become entrained at Twin Lakes' Mink Creek diversion are transported.

Twin Lakes' studies indicate that entrainment at the proposed powerhouse would primarily be non-native species (e.g., common carp and rainbow trout), while entrainment at the proposed pumping station and existing Mink Creek diversion structure would likely be a mixture of native and non-native game and non-game species such as common carp, mottled sculpin, brook trout, and BCT (GeoSense, 2010; State of Idaho Agencies letter filed on December 16, 2014).

Twin Lakes conducted a desktop entrainment and turbine-induced mortality study for the proposed project to estimate fish entrainment and turbine morality that would occur through the proposed project. The study showed that between 72,000 and 74,000 fish would be entrained through the proposed powerhouse on an annual basis, and the resulting fish community downstream of the proposed dam would generally reflect the fish assemblage below Oneida dam, which consists of a mixture of native and non-native coldwater species and non-native warmwater species (see table 3-12).

Fisheries surveys and radiotelemetry studies conducted by Twin Lakes in the Bear River and Mink Creek found that the current fish community in the Bear River in the reach downstream of the proposed project consists of native and non-native cold- and warm water species. Telemetry studies also documented that small numbers of BCT may

be entrained at Twin Lakes' Mink Creek diversion structure and are then transported to Twin Lakes' irrigation reservoirs.[38] Because the fish community in the vicinity of the proposed pumping station on the Bear River includes non-native, nongame species (e.g., common carp), those species would likely be introduced to Twin Lakes' irrigation reservoirs that currently have fish communities exclusively comprising game species.

Twin Lakes' design for the proposed powerhouse intake structure would be at the reservoir bottom near the upstream toe of the dam, and would include a trashrack with clear-space openings between bars of 1.5 inches. This trashrack would prevent natural and artificial debris from entering the penstock and passing through the turbines, and would also prevent some fish entrainment. Twin Lakes proposes to install 1.75-millimeter wedge wire screening on the proposed Bear River pumping station and to cooperate with the agencies in the planning and eventual installation of a fish screen to prevent entrainment of fish at the Twin Lakes diversion structure on Mink Creek.

No agency or other stakeholder recommends protective measures to prevent fish entrainment at the powerhouse intake. Idaho Fish and Game recommends that Twin Lakes be required to fund, design, construct, and install fish screens at Twin Lakes' canal intake of its Mink Creek diversion (within a specified period of time) and proposed Bear River pumping station in consultation with Idaho Fish and Game, to prevent the entrainment of BCT and nuisance species into Twin Lakes' canal system.

Our Analysis

The proposed powerhouse intake design, with 1.5-inch clear-spaced trashracks, would offer some protection for fish populations within the proposed reservoir. The trashracks would prevent the entrainment of some larger-bodied fishes, but would allow entrainment of smaller bodied fish. The proposed location of the intake at the reservoir bottom would also act to reduce fish entrainment, as most species that we expect would occur in the new reservoir would spend much if not all of their time in near shore habitat and would tend to avoid the deep hypolimnion where DO concentrations may be low during summer stratification. Because the fish assemblage in the proposed reservoir would likely be similar to that of Oneida reservoir, the species most likely to be entrained would be non-native common carp, channel catfish, smallmouth bass, yellow perch, walleye, and rainbow trout. Those fish that survive entrainment would become resident in the Bear River downstream of the proposed project and may compete with native species for habitat and resources. However, those non-native species already are common in the Bear River from Oneida dam downstream to the Idaho/Utah border (see tables 3-12 and 3-13), and any fish surviving passage through the proposed project would unlikely substantially enhance the non-native populations already occurring in the lower

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[38] One of 16 adult BCT (6.3 percent) tagged in 2009 and 2010 was documented in Twin Lakes' reservoir, and was later confirmed as a mortality.

Bear River. Fish entrainment would be an unavoidable adverse effect of the proposed project because it would be technically challenging to design a 100-foot-deep intake structure that efficiently reduces fish entrainment more than what would occur with the proposed intake structure, and at the same time not increase the potential for higher debris loading and fish impingement on the structure.

Twin Lakes proposes to include narrow-spaced wedge wire screens on the proposed Bear River pumping station intake, and to cooperate with resource agencies on the eventual installation of a fish screen at Twin Lakes' Mink Creek diversion intake structure.[39] Installing fish screens at these facilities would reduce fish entrainment under existing operations in Mink Creek and under the proposed operation of the Bear River pumping station. Reducing entrainment at these facilities would prevent fish from entering the Twin Lakes' irrigation system and the distribution of these fishes to other water bodies in their system. Fish screens at the proposed Bear River pumping station would be particularly important in preventing the entrainment of non-native species (carp, suckers) from the Bear River and their entry into the Twin Lakes canal system, where they could gain access to Twin Lakes' reservoirs and potentially adversely affect the sport fisheries in those reservoirs. The proposed wedge-wire screening at the pumping station should be effective in preventing entrainment of most fish. A fish screen at the Mink Creek diversion could also act to prevent the further distribution of BCT and the non-native brook trout to the lower suitability habitat of the Twin Lakes' reservoirs, prevent downstream-migrating BCT from entering the Twin Lakes' canal system, and increase the likelihood of their return to the higher-quality rearing habitat in the Bear River. The radiotelemetry studies documented that at least some BCT are entrained at the Twin Lakes' diversion and enter its canal system. Upstream habitat improvement structures installed downstream of the Mink Creek Hydroelectric Project (FERC No. 8636) have been successful in increasing the production of BCT in upper Mink Creek.[40] Improvements in upstream fish passage and non-native species control should also improve the BCT production in Mink Creek, which is already considered one of the primary BCT spawning tributaries of the Bear River. If downstream-migrating BCT move during lower flow periods of the year when Twin Lakes would be withdrawing most of the Mink Creek flow for irrigation, this would substantially increase the potential

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[39] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to install a fish screen on its Mink Creek diversion structure, but recognizes that if a license is issued, it would bear considerable responsibility for implementing such a measure.

[40] According to 72 FERC 62,107, issued August 10, 1995, the licensee for the Mink Creek Project installed 34 rock and log weirs, creating a 1-meter-deep pool below each weir. Monitoring indicated a substantial increase in the BCT population after installation of the weirs.

for fish entrainment and the loss of these fish from the Bear River population. The proposed fish screen at the Mink Creek diversion would mitigate this potential effect.

Designing the Mink Creek fish screen and finalizing the design of the pumping station fish screen in consultation with the resource agencies would allow Twin Lakes to draw upon the expertise of these agencies in the design and installation of fish screens at other locations.

Upstream Fish Passage

Barriers to upstream fish passage can be natural or human-caused and often delay migrations and movements, fragment populations, or prevent access to critical habitat necessary to sustain populations. Natural barriers can include waterfalls and debris obstructions (e.g., beaver dams) and artificial barriers to fish passage mainly include dams and road-stream crossings. Twin Lakes conducted surveys of the existing Mink Creek physical habitat and identified artificial structures and natural features that may hinder or prevent upstream fish passage, such as natural water falls, improperly designed culverts, and the Twin Lakes diversion structure (Hardy et al., 2012a).[41] On the main stem of the Bear River, the proposed construction of the approximately 115-foot-high project dam does not include plans for the installation of upstream or downstream fish passage facilities or other plans to facilitate fish movement around the dam.

Twin Lakes proposes to cooperate with agencies in the planning and eventual removal of fish passage barriers in Mink Creek.[42] In addition, Twin Lakes proposes to agree to provide fish passage at the proposed dam if FWS requires such passage, and if fish passage is also required at PacifiCorp's upstream Oneida dam.

In response to Twin Lakes' proposal to cooperate in the planning and eventual removal of upstream passage barriers in Mink Creek, Idaho Fish and Game comments that Twin Lakes does not provide a specific plan for the time period, funding responsibility, or water user agreements needed for any removal of fish passage barriers in Mink Creek. Regarding Twin Lakes' statement that it would potentially install fish passage at its proposed dam if PacifiCorp is required to install fish passage at the Oneida dam, Idaho Fish and Game comments that discussion of fish passage at the dam is premature; however, if passage is contemplated, Twin Lakes should be required to consult with Idaho Fish and Game and FWS. FCFGA recommends that the Commission

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[41] Survey reaches were the 4.2 miles from the mouth of Mink Creek upstream to the Twin Lakes diversion structure, and the 6.8 miles from the diversion structure upstream to Penstock Bridge.

[42] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to implement fish barrier removal in Mink Creek.

require year round upstream and downstream fish passage at the proposed project dam, and those facilities should also take into account reservoir drawdowns.

PacifiCorp comments that the proposed project would preclude the ability of PacifiCorp and Idaho Fish and Game to successfully implement its BCT Conservation Hatchery Program below Oneida dam.[43] PacifiCorp states that the program, combined with other PacifiCorp measures, has been so successful in the Thatcher reach between the Oneida and Grace dams (upstream of Oneida reservoir) that Idaho Fish and Game was able to stop stocking non-native hatchery fish in that reach. PacifiCorp says it expects similar recovery results downstream of Oneida dam, but states that the removal of 4.5 miles of critical mainstem habitat within PacifiCorp's project boundary would likely reduce the conservation value of habitat investments already made downstream of Oneida dam. Those investments include conservation easements, fish screens, and passage structures completed with PacifiCorp's Habitat Enhancement Fund and Land and Water Conservation fund below Oneida Narrows Canyon, in anticipation of stocking from the Conservation Hatchery Program.

Our Analysis

Removal of fish passage barriers would help facilitate migrations and dispersal of fish and would rejoin previously fragmented habitats. If Twin Lakes were to plan and eventually remove fish passage barriers in Mink Creek, that would provide improved passage for all fish species, but it could also result in the introduction and establishment of non-native species in areas upstream of any current barriers to non-native species. If greater numbers of non-native species (e.g., brook trout and smallmouth bass) were to gain access to a greater length of Mink Creek, they may compete with and prey upon BCT.

Under current conditions, not all fish passage barriers in Mink Creek are year-round barriers. For example, Twin Lakes' habitat surveys in Mink Creek identified one barrier, a natural waterfall, 1.33 miles upstream of the confluence with the Bear River. Radiotelemetry data of tagged BCT indicate that this barrier was successfully passed during the spring spawning season, which suggests upstream passage for BCT at this barrier is flow dependent and likely limited primarily during the summer, low-flow season because of insufficient water depth (Hardy et al., 2012a; 2012b). Furthermore, upstream passage through fish passage barriers also depends on the species and size of individuals, not just the physical structure itself. Thus, although improvement of fish

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[43] In the Bear River Project settlement agreement, PacifiCorp commits to funding an Idaho Fish and Game BCT stocking program in the Bear River for the life of its license. The stocking program would use local BCT broodstock also developed under the settlement agreement, and the action area for stocking is the Bear River from Bear Lake downstream to the Idaho/Utah border, including the proposed project area.

passage within Mink Creek would likely have some benefits, we do not have enough information on how or if barrier removal would actually be implemented, or how improved passage may affect the existing fishery, to be able to analyze the benefits of this proposed measure.

Development of a fish barrier removal plan in consultation with the resource agencies that surveys, identifies barriers for target species, prioritizes removal, and outlines removal timing and design, and addresses water user agreements would be needed prior to actual removal efforts. Development of such a plan should also consider the potential benefits of maintaining some fish passage barriers. A common management view for streams with non-native salmonids and interior cutthroat trout is that isolation of cutthroat trout above impassable barriers would protect cutthroat trout from competition and predation by non-native salmonids, such as barriers that are purposely maintained in other watersheds to prevent smallmouth bass passage, but at the expense of population isolation (Hilderbrand and Kershner, 2000). Thus, we conclude that agency management goals for Mink Creek must be considered during the development of any such plan. If a recommendation to remove or modify existing upstream fish passage barriers were included in such a plan, Twin Lakes would be responsible for implementing any such measure if approved by the Commission. By providing BCT better access to Mink Creek habitat, barrier removal could serve to mitigate the loss of mainstem BCT habitat from reservoir inundation.

Twin Lakes' proposal to install fish passage at the proposed dam if required by FWS, and only if fish passage is also required at PacifiCorp's Oneida dam, would help facilitate fish passage above the proposed dam and Oneida dam. However, fish passage is not now provided at Oneida dam, because there would be little benefit for BCT and other native species in connecting riverine habitat upstream and downstream of Oneida dam. BCT and other fluvial species are able to complete their life cycles in their current habitat upstream and downstream of the Oneida development, and Oneida reservoir offers little suitable habitat for these species. Reservoir habitat primarily favors non-native species, and providing upstream and downstream passage at Oneida dam would allow these species to further expand their range in the Bear River. These same issues would apply to the proposed project dam, which would also further degrade Bear River fluvial habitat by inundating 4.5 miles of river. Transformation of fluvial habitat to reservoir would further reduce any benefit of providing fish passage at the proposed dam. If the proposed project is constructed, there would be two large reservoirs back-to-back in the Bear River, and there would be little benefit in providing passage for native fluvial species into either the proposed reservoir or Oneida reservoir.

Non-native Fish Species Management in Mink Creek

Non-native fish species can adversely affect native fish populations through competition, predation, and hybridization. Through competition, non-natives compete for similar food and habitat resources, such as spawning and rearing habitats. Non-native fish prey directly on native fishes causing direct mortality. Hybridization effectively

dilutes the genetic makeup and structure of the population. Together, competition, predation, and hybridization may lead to population declines or even extirpation of native species.

Twin Lakes' fish surveys of Mink Creek conducted in 2008 and 2009 show the fish community includes native and non-native species (see table 3-14). Most of the non-native species are brook trout (25 percent of the total catch), brown trout (16 percent of the total catch), and rainbow trout (1 percent of the total catch). The only native salmonid in Mink Creek is BCT (9 percent of the total catch), which along with brook trout was collected at all surveyed sites.

Twin Lakes proposes to cooperate with the agencies in eventually developing and implementing measures designed to control non-native fish species in Mink Creek.[44]

No agencies make recommendations regarding non-native fish species management in Mink Creek, but Idaho Fish and Game affirms that non-native species control could benefit BCT in Mink Creek. However, there is little certainty that this measure would result in benefits because Twin Lakes is not actually proposing this measure at this time, nor is responsibility for implementing any actions specified.

Our Analysis

If Twin Lakes cooperates with the agencies and implements measures designed to control non-native fish species in Mink Creek, there would be a benefit to BCT and other native species within Mink Creek. Non-native fish may hybridize, compete for habitat and food resources, or prey directly upon BCT. BCT do hybridize with rainbow trout; however, no hybridization has been documented in Mink Creek or its tributaries, as all rainbow trout stocked in the Bear River by Idaho Fish and Game are sterile (Idaho Fish and Game and Forest Service, 2007). Threats to BCT within Mink Creek are more likely from competition with and predation by brook trout and brown trout, and to a lesser extent smallmouth bass and walleye. Non-native species control would be consistent with Idaho's Fish and Game's management plan for BCT (Idaho Fish and Game and Forest Service, 2007), but Twin Lakes is not proposing this measure at this time and provides few details of what any measures would entail, what entity would implement any actions pertaining to non-native species control, or the implementation schedule. Developing a non-native species control plan with the above-noted details, in consultation with the resources agencies, would enable the benefits of implementing specific actions to be assessed and, as appropriate, approved by the Commission.

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[44] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is does not currently propose to implement non-native species control in Mink Creek.

Consistency with Bonneville Cutthroat Trout Management Plans

BCT are known to occur downstream of, within, or migrate through the Oneida Narrows reach, and based on Twin Lakes' fisheries surveys, are in low abundance, probably due to marginal water quality, and the past impacts of hydropower development and irrigation operations in the Bear River Basin, which have acted to fragment and degrade BCT habitat. Collective effects of construction and operation of the proposed project would have long-term implications for BCT habitat connectivity and population sustainability.

Several management, conservation, and restoration plans that aim to conserve and ensure long-term viability and existence of BCT have been developed for BCT relevant to the proposed project. These plans include the *Management Plan for Conservation of Bonneville Cutthroat Trout in Idaho* (Idaho Fish and Game and Forest Service, 2007),[45] *Range-Wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout* (*Oncorhynchus clarki Utah*) (Lentsch et al., 2000), and *Comprehensive Bonneville Cutthroat Trout Restoration Plan for the Bear River Hydroelectric Project* (Shrier, 2008). These three plans share some similar goals and objectives that would be directly affected by the proposed project, such as:

- preserve and conserve genetic integrity and diversity of existing populations and provide for genetic exchange;
- eliminate or significantly reduce threats that cause any present or potential destruction, modification, or curtailment of habitat or range;
- improve degraded habitats;
- restore and maintain habitat for all life history stages and strategies;
- reduce impacts of non-native fish species such as predation, competition, and hybridization;
- develop recreational fishing opportunities management actions and requirements to meet specific recreation objectives and angling opportunities for BCT; and
- maintain current distribution and restore distribution in previously occupied areas.

Twin Lakes proposes multiple measures to mitigate the effects of the proposed project on fisheries and water resources that may affect or are related to BCT, including: (1) implement an Erosion Control Plan to protect water quality during construction; (2) establish a minimum flow downstream of the proposed dam equal to the minimum

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[45] This plan is on the Commission's list of approved comprehensive plans for the state of Idaho (see section 5.5, *Consistency with Comprehensive Plans*).

flow released at PacifiCorp's Oneida dam; (3) implement a DO Monitoring Plan to ensure powerhouse discharges meet state water quality standards; (4) provide a permanent, year-round minimum flow of 10 cfs in Mink Creek below Twin Lakes' diversion dam; (5) control non-native fish species in Mink Creek (potential future measure); (6) remove fish passage barriers in Mink Creek (potential future measure); (7) install a fish screen on the proposed Bear River pumping station; and (8) plan and eventually install a fish screen to prevent entrainment of BCT into the Mink Creek diversion structure (potential future measure).

Comments and recommendations on Twin Lakes' proposed mitigation measures as they pertain to BCT were filed by resource agencies and other stakeholders, and are discussed in detail previously. However, several commenters state that the proposed project would be inconsistent with the plans for conservation and restoration of the BCT. Interior states that the proposed project would cause the irreplaceable loss of 4.5 miles of the mainstem Bear River below the existing Oneida dam and would severely impact the remaining suitable habitat for BCT in the river between Oneida dam and the river's confluence with the Great Salt Lake, a distance of 140 miles. Further, Idaho Fish and Game concludes that it is not possible to adequately mitigate for the proposed inundation of Oneida Narrows Canyon, because of the unique habitat characteristics of the Canyon, which is critical for fluvial BCT survival and the significant existing recreation opportunities. Similar comments were filed by TU, GYC, and PacifiCorp.

Our Analysis

All of the above measures proposed by Twin Lakes, if implemented, would have some beneficial effects on BCT, in that water quality and instream habitat would be protected or enhanced, BCT may be protected from entrainment at Twin Lakes' irrigation intakes, and a program may be established to control non-native fish species that compete or prey on BCT.

Idaho Fish and Game and Forest Service (2007) state that the viability of the overall Bear River BCT population depends upon the number of local populations, adult abundance (number of spawning fish), the reproductive rate of the population (measured by population trend and variability), and habitat connectivity (presence of migratory life history form and functional habitat). The presence of the proposed project would significantly affect BCT population persistence in the proposed project area. This BCT population would be most affected by the elimination of 4.5 miles of fluvial habitat, and this habitat contains a high density of suitable salmonid habitat. Operational effects on remaining BCT populations downstream of the proposed dam would include changes in water quality, temperature, and flow regime as a consequence of water releases from the proposed project. The radiotelemetry study found that BCT maintain a substantial presence in the Bear River even during the summer months (see figure 3-14). The radiotelemetry study also showed that Mink Creek is an important tributary for BCT spawning and rearing, with a large percentage of fish tagged in the Bear River entering Mink Creek during multiple seasons. Thus, connectivity between the Bear River and

Mink Creek is likely important in maintaining this population. If Twin Lakes was to improve fish passage within Mink Creek in the future, that should improve this connectivity, although screening of the Twin Lakes' diversion within Mink Creek would also be required to prevent the entrainment of BCT into its irrigation system and the loss of BCT from the Bear River.

Water temperature modeling indicates that water temperatures may be slightly lower downstream of the dam, which would benefit BCT, but lower DO levels may also occur because of hypolimnetic releases. Twin Lakes proposes to mitigate for lower DO levels, but the success of its proposed measures cannot be quantified now and could not be tested until after the project is constructed.

Despite some potential benefits to BCT from the proposed mitigation measures, the major loss of BCT fluvial habitat in the proposed project area would be largely inconsistent with the goals and objectives of the relevant management, conservation, and restoration plans, including the goal of decreasing predation and competitive interactions with non-native species. The proposed project would also be inconsistent with the goals of improving degraded habitats and restoring and maintaining habitat for all life history stages and strategies. Mainstem Bear River habitat remaining after the inundation of Oneida Narrows would be of poorer quality for BCT than habitat that currently exists within the Narrows, and the additional habitat to be made available in Mink Creek for mitigation of this lost Bear River habitat is only a small fraction of what would be lost (see table 3-28). Table 3-29 describes the habitat characteristics of the five study reaches used in Twin Lakes' studies, in the 50-mile reach of the Bear River from Oneida dam downstream to the confluence with the Cub River. This shows that reaches 4 and 5, the location of the proposed reservoir, have higher gradient, greater habitat diversity, and larger substrate size (gravel/cobble) than the downstream study reaches, particularly reaches 1 and 2. This indicates that suitable BCT habitat cannot be simply shifted downstream after the construction of the proposed reservoir.

Table 3-29. Habitat characteristics of the five study reaches of the Bear River (Source: Hardy et al., 2012c).

	Reach 5	**Reach 4**	**Reach 3**	**Reach 2**	**Reach 1**
Length (mi.)	1.8	1.8	2.0	24.9	19.6
Gradient (ft/mile - %)	27.8 (0.5 %)	27.8 (0.5 %)	24.0 (0.5%)	6.2 (0.1%)	1.3 (0.02%)
Run (%)	56	53	34	69	7
Riffle (%)	34	33	66	9	<1
Pool (%)	3	0	0	1	<1
Cascade (%)	0	0	0	0	<1
Deep glide (%)	0	14	0	15	58

	Reach 5	Reach 4	Reach 3	Reach 2	Reach 1
Shallow glide (%)	0	0	0	5	34
Backwater (%)	7	0	0	2	<1
Mean substrate particle diameter (inches)	2.2	1.4	1.2	0.7	<0.1

In addition, the fishery protection and enhancement measures included in PacifiCorp's settlement agreement for its Bear River hydroelectric developments would not be fully realized with the construction of the proposed project. PacifiCorp and Idaho Fish and Game have successfully implemented a BCT Conservation Hatchery Program between Oneida dam and the upstream Grace dam, and the success of that program has allowed Idaho Fish and Game to stop stocking non-native hatchery fish in that reach. PacifiCorp is proposing to expand the BCT Conservation Hatchery Program to downstream of Oneida dam and expects similar recovery results below the dam. However, the removal/inundation of 4.5 miles of critical mainstem habitat within PacifiCorp's project boundary would likely reduce the conservation value of habitat investments already made below Oneida dam by PacifiCorp, including conservation easements, fish screens, and passage structures completed with PacifiCorp's Habitat Enhancement Fund and Land and Water Conservation fund below Oneida Narrows Canyon, in anticipation of stocking from the Conservation Hatchery Program. Ultimately, inundation of the Oneida Narrows reach would permanently degrade or eliminate BCT habitat, and make it impossible to restore and maintain current BCT distribution. Without fish passage at the proposed dam and Oneida dam, which is not proposed or currently in place at Oneida dam, connectivity between upstream and downstream BCT habitat and populations would continue to be interrupted.

Southern Middle Bear Watershed Commission

Twin Lakes proposes to form a commission composed of personnel from Twin Lakes, resource agencies, non-governmental organizations, and other stakeholders. The main purpose of the SMBWC would be to implement, monitor, and make management decisions to achieve mitigation plan goals, such as those associated with wetland restoration and aquatic habitat enhancement. All aspects of mitigation implementation, monitoring, and adaptive management would be overseen by a scientific advisory board formed by the SMBWC. In addition, Twin Lakes proposes to commit $25,000 in annual funding for the conservation projects overseen by the SMBWC, and establish a website to inform the public about mitigation goals, progress, new projects, recreation access, and monitoring results. The website would also provide access to a database that provides all

project-related data. In determining what projects to fund and prioritize, the SMBWC would apply a watershed-based approach.

No agency or other stakeholder made recommendations regarding the formation of the SMBWC; however, Idaho Fish and Game and FWS comment that an annual contribution of $25,000 to the SMBWC would be insufficient to fund anticipated mitigation efforts.

Our Analysis

Projects implemented and funded by the proposed SMBWC could benefit aquatic and other resources in the project vicinity and in the watershed; however, the proposed measure does not identify specific mitigation projects that would be funded by the $25,000 contribution. Although the SMBWC appears to be a reasonable approach to manage mitigative measures, we cannot determine whether any funded measure would have a direct nexus to the project.

3.3.2.3 Cumulative Effects

Water Quality

Water quality is a resource that could be cumulatively affected by operation of the proposed project, other hydroelectric projects on the Bear River, and water withdrawals at irrigation diversions. The results of Twin Lakes' water temperature modeling indicate that releases from the proposed project during normal operation or for irrigation purposes would generally result in a cooling effect during the spring and summer months. This cooling effect would diminish with distance downstream from the proposed project, primarily because of ambient atmospheric conditions, and may also be affected by irrigation withdrawals downstream of the proposed project by reducing flows in the river. At the Idaho/Utah border, however, the model predicts spring temperatures would be slightly higher and winter temperatures would be slightly lower. Despite the overall cooling effect, water temperatures during the spring and summer were predicted by the model to still exceed state water quality standards for temperature (coldwater aquatic life, and for salmonid spawning) from the proposed dam to the Idaho/Utah border, although at a slightly lower frequency than under current conditions.

Twin Lakes monitored DO in the Bear River in 2009, and modeled DO to predict DO levels in the river during proposed project operation. Empirical observations show that DO follows a typical annual pattern with higher concentrations in the winter, spring, and fall and the lowest concentrations occurring during the summer. Modeled DO concentrations showed a similar pattern from the proposed project site to the Idaho/Utah border. Modeling also indicated that DO concentrations would be lowest immediately downstream of the dam and lower than the state standard of ≥6 mg/L for coldwater aquatic life in late-spring through the summer and into the fall. This would be the result of release of cool, hypolimnetic waters depleted of DO during periods of thermal stratification in the proposed reservoir. Modeling also showed that while DO levels

would generally remain lower than the state standard for coldwater aquatic life from late-spring through early-fall, proposed project releases would result in small increases in DO levels during the late-spring and early-summer. Downstream of the proposed dam, modeled DO gradually increased with distance downstream of the proposed dam, but also remained lower than the state standard during summer months. Nutrients may also affect DO concentrations through algal growth or decreased water clarity. Modeling indicates that total phosphorus would decrease and total nitrogen would increase slightly compared to existing conditions. Total phosphorus concentrations are predicted to decrease 0.04 mg/L, acting to limit the potential for additional algal growth, while the predicted increase in total nitrogen would increase algal growth, which would cause a decrease in the daily average DO concentration in the river.

Baseline data from downstream of the proposed project at the Idaho/Utah border show higher TP concentrations (see table 3-18), indicating that agricultural operations and other watershed factors already adversely affect TP loadings in the lower Bear River. Baseline data also show that DO is depressed in the Bear River during the summer months, while water temperatures generally exceed the coldwater aquatic life and salmonid spawning standard in the spring and summer. The Bear River has been affected by past construction of hydroelectric projects, construction and operation of a large irrigation system, extensive agricultural operations, and mining, and any effect of the proposed project would likely be less than other ongoing watershed issues. Although the presence of the proposed project would likely affect DO concentration downstream, implementation of the proposed DO Management Plan would mitigate some of the cumulative effects associated with DO.

In summary, the effects of the proposed project on water quality, in concert with other ongoing effects on the Bear River noted previously, would result in a cumulative adverse effect on water quality. In portions of the year when project releases would result in cooler water temperatures or higher DO levels, however, that effect would be beneficial.

Bonneville Cutthroat Trout

The Bear River is a highly regulated river fragmented by several dams. Upstream of the proposed project is PacifiCorp's Bear River Project, which consists of the Oneida, Grace, Cove (decommissioned), and Soda developments. Bear Lake, located about 44 miles upstream of the Soda development, controls flow releases into the Bear River. Forty-four miles downstream of the proposed project is the Cutler Project (FERC Project No. 2420). Construction of the proposed project would further reduce or BCT habitat through the construction of the approximately 115-foot-high dam and inundation of the Oneida Narrows reach. In addition, neither the Cutler Project nor Bear River Project have upstream or downstream fish passage facilities. As proposed, Twin Lakes would not install fish passage facilities at the project, unless FWS requires facilities at Oneida dam. Without fish passage at the proposed dam and Oneida dam, connectivity between upstream and downstream BCT habitat and populations would continue to be interrupted.

According to Idaho Fish and Game and Forest Service (2007), about 14 percent (899 miles) of the BCT historical river and stream habitat occurs in Idaho, and BCT currently occupy an estimated 63 percent (565 miles) of the historically available habitat. In the Idaho portion of the Bear River Basin, Idaho Fish and Game and Forest Service (2007) report that 516 miles of available habitat currently have BCT present, BCT has been extirpated from about 60 miles of habitat, and the BCT population status is unknown in about 136 miles of its historical habitat. Thus, if the project is constructed and inundates 4.5 miles of BCT habitat, this would represent about 1 percent of the known occupied BCT habitat in the Idaho portion of the Bear River Basin.

Direct mortality of BCT would also likely increase as a result of operation of the proposed project through entrainment and impingement at the powerhouse intake, at the proposed pumping station downstream of the proposed dam, and at the Mink Creek diversion structure. Installation of the proposed trashracks and fish screens would reduce the entrainment of larger individuals, and screening the existing Mink Creek diversion structure, if implemented, would reduce an existing source of mortality for BCT and other species and would prevent the exportation of BCT out of the Bear River Basin. However, trashracks and screens would unlikely be 100 percent effective in preventing entrainment of smaller individuals (i.e., fry and juveniles), and the proposed project would withdraw a greater volume of flow from the proposed reservoir (and potentially entrain more fish of several species) than the existing irrigation withdrawals on Mink Creek. Combined with other irrigation diversions in the Bear River watershed and hydroelectric projects on the main stem, direct mortality from entrainment would likely be greater than under existing conditions.

Operation of the project in a similar fashion as PacifiCorp's Oneida development would result in a flow regime downstream of the proposed project that should protect BCT habitat downstream of the proposed project. However, the intake of the proposed project would be deeper than that at the Oneida development and would draw water from the bottom of the proposed reservoir (the hypolimnion). During periods of stratification, hypolimnetic waters would be cool and likely depleted of DO. Although releases of cooler bottom water would benefit BCT, the potential lower DO releases would be detrimental to fish immediately downstream of the project, until DO levels recover in the riverine reach downstream of the project. In addition, if the proposed DO Management Plan is effective, DO concentrations would be maintained to state standards from the proposed dam to the Idaho/Utah border. The beneficial effect on water quality of cooler water temperatures and enhanced DO levels would decrease thermal and respiratory stress on BCT. Improved water quality, however, would not result in an increase in BCT habitat in the Bear River downstream of the proposed project area because the substrate and overall aquatic habitat would remain more suited for invasive warmwater species than for salmonids like BCT (see table 3-29).

The proposed project would be in the Idaho Fish and Game BCT Riverdale Management Unit. As part of its settlement agreement, PacifiCorp formed an Environmental Coordination Committee to develop and implement a Comprehensive

Bonneville Cutthroat Trout Restoration Plan. The restoration plan involves the removal of non-native salmonids in the Riverdale Management Unit, which includes Mink Creek, Mink Creek tributaries, the Cub River, and tributaries to the Cub River (Shier, 2008). Twin Lakes proposes to form a similar commission called the SMBWC, as discussed above. Collectively, these two conservation actions could benefit BCT in the Riverdale Management Unit, especially those focused on the removal of non-native salmonid species from Mink Creek, reducing competition, predation, and hybridization. However, if the formation of the SMBWC is tied to the licensing and construction of the proposed project, which we have concluded would adversely affect BCT, then there would be little conservation benefit directly related to the SMBWC. Because the proposed funding is also not specified for measures to benefit BCT, and could be used for unspecified purposes at unspecified places within the Bear River watershed, there could be little cumulative benefit to BCT.

Although some measures currently being implemented by PacifiCorp and proposed by Twin Lakes would result in some enhancements to BCT, the overall effects of the proposed project, particularly habitat loss, in concert with other ongoing effects in the Bear River Basin, would result in an adverse cumulative effect on BCT populations in the Bear River Basin downstream of Oneida dam. [46]

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

Twin Lakes surveyed and mapped 19,174 acres in the vicinity of the proposed project to evaluate botanical resources and wildlife habitat (table 3-30 and figure 3-20). We refer to the 19,174 acres surveyed by Twin Lakes (which extends about a mile from the proposed high water line and project facilities) as the cover type study area in the vegetation subsection. The cover type study area is dominated by shrub/scrub grassland, maple forest, and agricultural land, which together account for roughly 92 percent of the area. Wetland and riparian areas account for 1.8 percent.

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[46] These other ongoing effects are related to operation of existing hydroelectric projects, irrigation system operations including water withdrawals, extensive agricultural operations, and mining. These other projects and operations affect river flows, water quality (increased sedimentation and water temperatures), and result in aquatic habitat losses and fragmentation.

Table 3-30. Land cover categories and composition within the cover type study area (Source: Twin Lakes, 2013, as modified by staff).

Name	**Acres**	**% of Cover Type Study Area**
Road	194	1.0
Low intensity urban	141	0.7
Disturbed low	31	0.2
Agricultural land	4,602	24.0
Foothills grassland	5,716	29.8
Maple	5,148	26.8
Douglas fir/limber pine	112	0.6
Utah juniper	2,220	11.6
Water	589	3.1
Broadleaf-dominated riparian	302	1.6
Graminoid/forb-dominated riparian	40	0.2
Deep marsh	3	<0.1
Exposed rock	76	0.4
Total	19,174	100

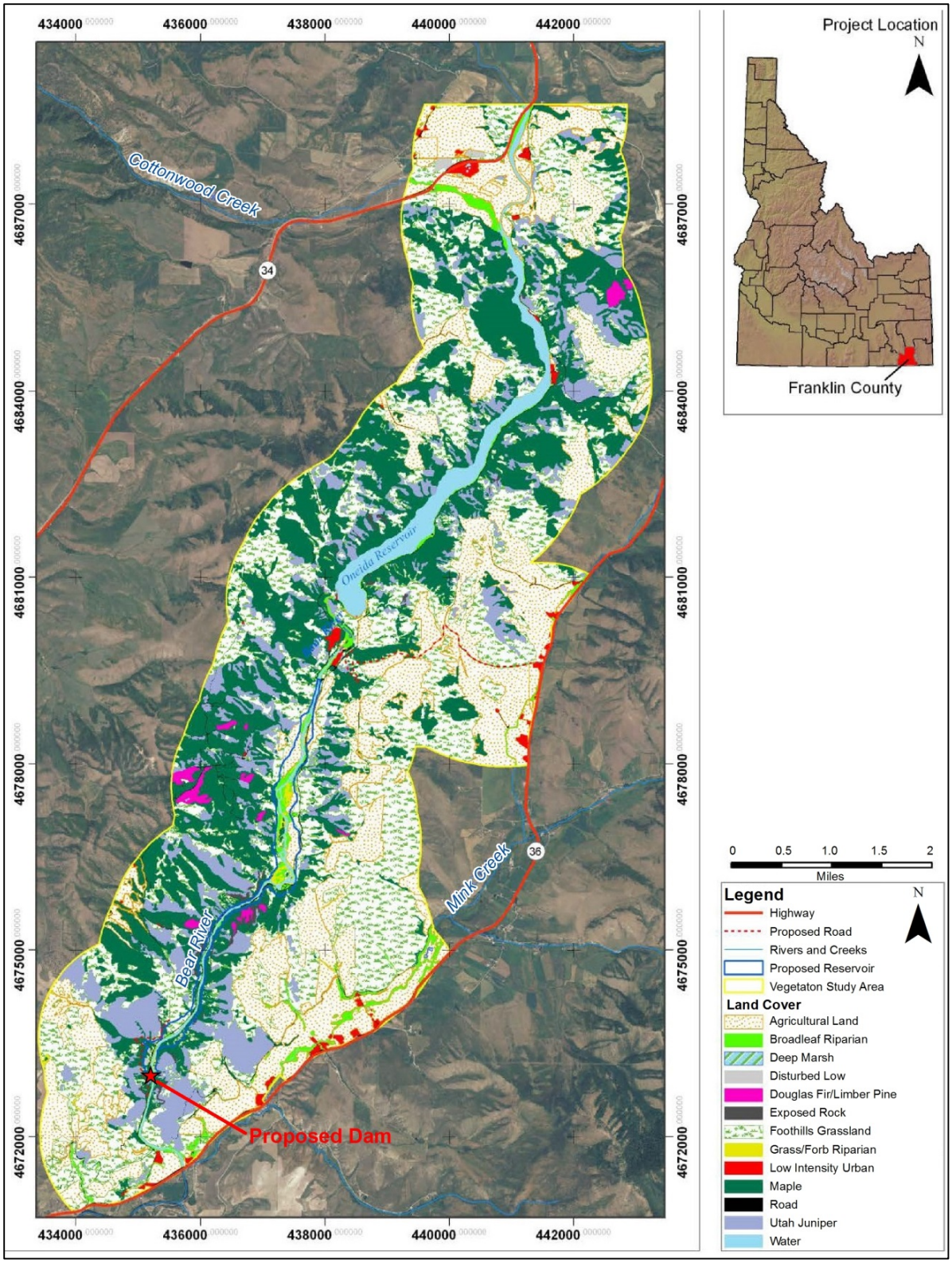

Figure 3-20. Land cover types (Source: Twin Lakes, 2013, as modified by staff).

Roads

The road cover type includes highways, secondary roads, county roads, and all dirt roads wider than 10 meters within the project area. Roads are vectors for invasive weed species; common species found along roadsides include field bindweed, cheatgrass, and spotted knapweed.

Low Intensity Urban

This cover type primarily delineates homesteads along Highway 36, PacifiCorp infrastructure near Oneida reservoir, and other features of the built environment.

Disturbed Low

The disturbed low cover type includes borrow pits and other non-vegetated areas.

Agricultural Land

Agricultural land, the third-most abundant cover type in the study, area is dominated by alfalfa fields and dry pasture. Some irrigated pasture occurs along Highway 36 and Mink Creek. Along the Bear River, agricultural land consists primarily of alfalfa and dry pasture.

Foothills Grassland

This land cover type occupies the most acreage within the cover type study area. It is primarily a grassland cover type with a variety of shrubs. Dominant grass species include smooth brome, cheatgrass, Great Basin wildrye, bluebunch wheatgrass, and Idaho fescue. Sagebrush is the dominant shrub species within this land cover type, but others such as bitterbrush and snowberry are co-dominant where they occur. Utah juniper and Rocky Mountain juniper occur sparingly within the foothills grassland land cover type.

Maple

The second-most abundant cover type, maple, is dominated by big-tooth maple in pure stands or more commonly mixed with juniper. This cover type occurs throughout the study area. Common shrub species include golden currant, snowberry, and bitterbrush.

Douglas Fir/Limber Pine

The Douglas-fir/limber pine cover type occupies less than 1 percent of the entire cover type study area. This cover type occurs primarily at higher elevations within the study area but is found on steep slopes adjacent to cliffs at some lower elevations. Douglas fir and limber pine form a sparse canopy above a mix of tree and shrub species including big tooth maple, juniper, curl-leaf mountain mahogany, sagebrush, and snowberry.

Utah Juniper

Utah juniper occurs throughout the cover type study area primarily on dry slopes often with a south or southwest aspect. It is the fourth-most abundant cover type encompassing approximately 12 percent of the study area. This community is dominated by Utah juniper and Rocky Mountain juniper, often forming sparse stands interspersed with grasses and some shrubs. Common shrubs found within this cover type include sagebrush and bitterbrush.

Water

Water occurs throughout the project area in the form of lakes, rivers, creeks, canals, and stock ponds. The dominant water features within the cover type study area are Oneida reservoir, the Bear River, and Mink Creek.

Broadleaf-dominated Riparian

The broadleaf-dominated riparian cover type occurs primarily adjacent to the Bear River and Mink Creek. These floodplain forests cover less than 2 percent of the entire study area. Dominant canopy tree species found within this cover type include narrowleaf cottonwood, box elder, and big-tooth maple. Understory tree and shrub species include alder, birch, coyote willow, and chokecherry. Some portions of this habitat type are classified as forested wetlands, following U.S. Army Corps of Engineers (Corps') wetland delineation guidelines, while other portions are in upland riparian zones.

Grass/Forb-dominated Riparian

The grass/forb-dominated riparian cover type occurs within the floodplains of the Bear River and Mink Creek in the study area. This cover type forms narrow herbaceous strips directly adjacent to the wetted edge of water bodies. Common species associated with this cover type are beaked sedge, reed canary grass, smooth horsetail, baltic rush, and orchard grass. Similar to broadleaf-dominated riparian areas, portions of grass/forb-dominated riparian cover are delineated as emergent wetland, while remaining portions are in upland riparian zones.

Deep Marsh

The deep marsh cover type occupies a very small percentage of the entire project area. This cover type occurs within the Bear River downstream of Oneida dam. The dominant species of this cover type is cattail, which often forms dense, homogenous stands within the river channel.

Exposed Rock

Exposed rock occurs primarily within Oneida Narrows. Although cliffs and talus slopes are prominent features of the Narrows, the exposed rock cover type encompasses less than 0.5 percent of the study area.

Wetlands

To specifically identify the portion of the riparian land cover type that meets the criteria for designation as wetland, Twin Lakes completed a wetland delineation study in 2012. The wetland delineation was carried out in accordance with technical methods outlined in the Corps' wetland manual and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. The functional assessment followed the methods of 2008 Montana Wetland Assessment Method. The final study report, which was submitted to the Corps for review on December 4, 2012, is included in the license application as appendix G. Appendix G also contains Corps' correspondence consisting of a wetland boundary approval letter and a Jurisdictional Determination. The Jurisdictional Determination represents the Corps' finding that the wetlands Twin Lakes identified in its delineation are indeed wetlands associated with waters of the United States. Therefore, any project-related effects on these areas are subject to the Corps' section 404 regulations.

A total of 121 acres of wetlands occur within the proposed project boundary and would be inundated by the proposed reservoir (table3-31). The dominant wetland type designated was open water riverine wetland, and the second most common wetland type was forested palustrine wetland.

Table 3-31. Results of wetland delineation within the proposed project boundary (Source: Twin Lakes, 2013).

Wetland Type	Acres	Percent of Total Wetland Area
Palustrine emergent	16	13%
Palustrine Forested	19	16%
Palustrine scrub/shrub	12	10%
Palustrine Total	47	39%
Riverine	74	61%
Total	121	100%

Riverine wetlands correspond with the main Bear River channel, and the entire Bear River has been designated as riverine wetland. Seasonal runoff and artificial flow fluctuation patterns associated with PacifiCorp's operation of Oneida dam strongly influence the limits of riverine wetland in the project area. When inundated, riverine wetlands provide habitat for water-tolerant plants and aquatic animals.

The freshwater emergent (grass and forb dominated) and forested/shrub (deciduous shrubs and tree dominated) wetlands occur mainly in the upper portion of the proposed reservoir inundation area where the Bear River valley broadens. These wetland areas occur along the banks of the river, high water channels and on small islands subject to inundation during high water. These wetlands provide forage and cover for a variety of wildlife and, when inundated, temporary habitat for aquatic species.

Noxious Weeds

Twin Lakes documented 12 different noxious weed species in the cover type study area during 2008 field surveys (table 3-32). Surveyors recorded noxious weeds throughout the cover type study area and found populations of noxious weeds in eight different cover types. Most occurrences were adjacent to roads and disturbed areas, but noxious weeds were also documented in areas far from roads and disturbed areas. Interior portions of forested areas, including maple woodlands and broadleaf-dominated riparian woodlands, also contained noxious weeds, suggesting that weeds have been present in the area for some time and that disturbance has affected areas beyond roadways and urbanized zones. The most common noxious weed species encountered were: Japanese brome, cheatgrass, Canada thistle, field bindweed, hound's tongue, and bulbous bluegrass.

The land cover types harboring the most noxious weeds were roads (nine species), foothills grassland (seven species), and broadleaf-dominated riparian (seven species). Roadways and other disturbed areas are common vectors for noxious weed invasions. The foothills grassland cover type is often adjacent to roadways in the study area and shows evidence of heavy grazing and other land uses. Recent fire activity in the foothills grassland and other cover types in the study area may have promoted the establishment and spread of noxious weeds post-fire, especially in areas denuded of vegetation. The broadleaf-dominated riparian areas, which were also highly invaded, occur in proximity to the road and foothills grassland cover types, areas with many noxious weeds. Only three noxious weed species were documented in the agriculture land cover type, which could be due to recent mowing and tilling of fields prior to field surveys, the formation of near monocultures in these areas, or other factors.

Table 3-32. Noxious weed species within the study area, by land cover type (Source: Twin Lakes, 2013).

	Cover Types[a]										
Species Name	**AG**	**BLR**	**DL**	**ER**	**GFR**	**M**	**UJ**	**DM**	**DFLP**	**ROAD**	**FG**
Jointed goatgrass										X	X
Japanese brome		X				X	X			X	X
Cheatgrass	X	X	X		X		X			X	X
Whitetop (hoary cress)			X							X	X
Musk thistle		X	X								
Spotted knapweed			X				X			X	
Canada thistle			X			X				X	X
Poison hemlock		X				X					
Field bindweed	X	X								X	X
Hound's tongue			X		X	X	X			X	
Dame's rocket		X									
Bulbous bluegrass	X	X					X			X	X

[a] BLR- broadleaf riparian, DL- disturbed low, ER- exposed rock, GFR- graminoid forb-dominated riparian, M- maple, UJ- Utah juniper, DM- deep marsh, DFLP- Douglas-fir limber pine, AG- agriculture, ROAD- road, FG- foothills grassland.

Special Status Plants

Twin Lakes defines special status plants as BLM-listed rare species, Forest Service sensitive species, and species listed as Idaho Natural Heritage special status plants. Applicants for other Commission licenses conducted several surveys for special status plants in the vicinity of the proposed Bear River Narrows Project. These surveys occurred as part of a previous licensing proceeding for a different Bear River Narrows Project in 1989, and as part of PacifiCorp's relicensing process for the Oneida Project (FERC No. 472, now part of the Bear River Project, FERC No. 20) in 1997. No special status plants were identified during these surveys.

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Table 3-33. Special status plants with potential to occur in the project vicinity (Source: Twin Lakes, 2013).

Scientific Name	Common Name	Status	Cover Type
Allium anceps	Twinleaf onion; Kellogg's onion	BLM Rare Plant, SP2	Foothills grassland
Arabis lasiocarpa	Wasatch rockcress	G3	Foothills grassland/Douglas fir/limber pine
Asplenium septentrionale	Forked spleenwort, Northern spleenwort	G4/5, S1, Idaho Fish and Game special status plants in Franklin County	Exposed rock
Asplenium trichomanesramosum	Green spleenwort	USFS Region 4- Sensitive, G4, S1	Exposed rock
Astragalus adanus	Boise milkvetch	GP3	Foothills grassland
Astragalus amnis-amissi	Lost River milkvetch	BLM Rare Plant	Exposed rock
Astragalus anserinus	Goose Creek milkvetch	GP2	Foothills grassland/Utah juniper
Astragalus aquilonius	Lemhi milkvetch	BLM Rare Plant	Exposed rock
Astragalus bisulcatus var. bisulcatus	Two-grooved milkvetch	BLM Rare Plant	Foothills grassland/road/grass forb riparian
Astragalus drummondii	Drummond's milkvetch	BLM Rare Plant	Foothills grassland
Astragalus gilviflorus	Plains milkvetch, plains orophaca	BLM Rare Plant	Exposed rock
Astragalus jejunus var. jejunus[a]	Starveling milkvetch	G3/T3, S2, GP3, BLM Type 2	Exposed rock
Camissonia pterosperma	Wing-seeded evening primrose	BLM Rare Plant	Foothills grassland/Utah juniper
Carex idahoa	Idaho sedge	G2, S2, GP2, BLM Type 2	Grass forb riparian

Scientific Name	Common Name	Status	Cover Type
Carex occidentalis	Western sedge	BLM Rare Plant	Foothills grassland/Utah juniper/maple/Douglas fir/limber pine
Carex tumulicola	Foothill sedge	BLM Rare Plant	Foothills grassland/Utah juniper/maple
Cercocarpus montanus	Alderleaf mountain mahogany	Species of special concern, G5, S2, SP1, BLM Type 5	Foothills grassland/Utah juniper/maple/Douglas fir/limber pine
Coryphantha vivipara	Cushion cactus, spinystar	BLM Rare Plant	Douglas fir/limber pine
Cryptantha breviflora	Uinta Basin cryptantha	BLM Rare Plant	Foothills grassland/Utah juniper
Cryptantha caespitosa	Tufted cryptantha	BLM Sensitive, G3, S1, USFS Region 4- Sensitive	Foothills grassland
Cryptantha sericea	Silky cryptantha	G4, SNA, SP1, BLM Type 5	Grass forb riparian
Cuscuta denticulata	Desert dodder, sepaltoothed dodder	BLM Rare Plant	Foothills grassland
Cymopterus davisii	Davis' spring parsley, Davis' wavewing	GP3	Douglas fir/limber pine/exposed rock
Epipactis gigantea	Giant helleborine	BLM Rare Plant	Grass forb riparian/broadleaf riparian/exposed rock
Ericameria discoidea var. winwardii	Whitestem goldenbush	GP2	Douglas fir/limber pine
Eriogonum capistratum var. *welshii*	Welsh's buckwheat	BLM Rare Plant	Foothills grassland
Eupatorium maculatum	Joe-pye weed	SP 1	Grass forb riparian

Scientific Name	Common Name	Status	Cover Type
Hymenoxys cooperi var. canescens[a]	Cooper's hymenoxys	G4/G5, S2, S, BLM Type 4	Road/Utah juniper/ Douglas fir/limber pine
Ipomopsis polycladon	Spreading ipomopsis; Many branched ipomopsis	BLM Rare Plant	Utah juniper
Lesquerella multiceps	Manyhead bladderpod	G3/S2	Exposed rock/Utah juniper
Lesquerella paysonii	Payson's bladderpod	GP3	Foothills grassland/ exposed rock
Lomatogonium rotatum	Marsh felwort	BLM Rare Plant	Grass forb riparian/broadleaf riparian
Muhlenbergia racemosa	Green muhly	BLM Rare Plant	Grass forb riparian/foothills grassland
Musineon lineare	Rydberg's musineon	USFS Region 4- Sensitive, G2, GP2, S1	Foothills grassland/exposed rock
Nassella viridula	Green needlegrass	BLM Rare Plant	Foothills grassland/Utah juniper
Phacelia inconspicua	Obscure phacelia; obscure scorpion plant	BLM Rare Plant	Foothills grassland
Piptatherum micranthum	Small-flowered ricegrass	BLM Rare Plant	Utah juniper/maple/exposed rock
Salix candida	Hoary willow	BLM Rare Plant	Grass forb riparian
Sphaeromeria potentilloides	Cinquefoil tansy, fivefinger chickensage	SP2	Grass forb riparian
Spiranthes diluviali	Ute ladies' tresses	BLM Rare Plant, GP3	Grass forb riparian

Scientific Name	Common Name	Status	Cover Type
Sporobolus compositus var compositus	Composite dropseed	SP1	Utah juniper/agricultural land
Townsendia scapigera	Tufted townsend daisy	SP2	Foothills grassland
Trichophorum pumilum	Rolland's bulrush; dwarf bulrush; small clubrush	BLM Rare Plant	Grass forb riparian

Note: NatureServe (formerly the Association for Biodiversity Information) and its network of Heritage Programs and Conservation Data Centers assigns the global (G) and state (S) conservation ranks listed in the table. GP and SP ranks are assigned by the Idaho Native Plant Society. The global rank applies to the species' conservation status rangewide, while the state rank applies to its conservation status within Idaho. 1 = critically imperiled because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction; 2 = imperiled because of rarity or because of other factors demonstrably making it vulnerable to extinction; 3 = rare or uncommon, but not imperiled; 4 = not rare and apparently secure, but with cause for long-term concern; 5 = demonstrably widespread, abundant, and secure. BLM Type 2 = Rangewide/globally imperiled species – high endangerment; BLM Type 3 = Rangewide / globally imperiled species – moderate endangerment; BLM Type 4 = Species of concern; BLM Type 5 = Watch species.

[a] BLM plants known to occur in the Pocatello Field Office area.

In 2008, and in consultation with BLM, Twin Lakes compiled a list of 44 special status plants with potential to occur in the vicinity of the project based on habitat preferences and habitat presence in the cover-type study area (table 3-33). Twin Lakes then conducted surveys in June, July, and September 2008, coinciding with the flowering periods for the species with potential to occur in the cover type study area. Twin Lakes surveyed all land cover types represented in the study area. However, surveyors focused primarily on vegetation patches within and surrounding the proposed project's construction areas, reservoir inundation zone, and road construction routes. Twin Lakes surveyed all vegetation patches within the proposed inundation zone and road construction routes. Surveyors traversed habitat patches and established 61 study plots. For small habitat patches, study plots encompassed the entire patch. In larger habitat patches, 10-meter x 10-meter plots were used. In small, irregularly shaped patches (e.g., long, narrow riparian patches) surveyors modified study plot sizes as needed. Surveyors did not encounter any special status plant species in the study area.

Twin Lakes also consulted with the Shoshone-Bannock Tribes to identify plant species with traditional or cultural importance to the tribes. The tribes provided a list of 45 species that are of cultural significance to them. During the 2008 vegetation surveys, surveyors encountered 32 of the 45 species with cultural significance.

Wildlife

The project area could contain wildlife species typical of the southeastern Idaho habitat types identified during Twin Lakes' detailed land cover mapping. Twin Lakes presents a list of 276 wildlife species that could occur in the project vicinity. These species, when present, would be part of continuous populations extending into lands adjacent to the project and controlled by the distribution of habitat shown in figure 3-20.

The diverse upland and wetland habitats in the proposed project vicinity are known to support at least 64 species of mammals. The dominant cover types for most of the study area are foothills grassland and maple, which typically contain a high density of small mammals such as rabbit, squirrel, chipmunk, and other small rodents. Other wildlife potentially using or known to use the upland areas includes larger mammal species such as elk, mule deer, badger, coyote, red fox, skunk, raccoon, and porcupine. Wetland and riparian habitats support beaver, muskrat, mink, and moose. The project vicinity also contains predicted habitat for 12 bat species including California myotis (*Myotis californicus*) and Townsend's big-eared bat (*Corynorhinus townsendii*), which are considered Idaho Species of Greatest Conservation Need. Ecosystem Sciences conducted a bat survey on behalf of Twin Lakes from May 2008 to January 2009 and documented the occurrence of five bat species in the study area: little brown myotis, Yuma myotis, silver-haired bat, big brown bat, and hoary bat. During surveys (Ecosystem Sciences, 2009b), 38 bats were captured during 57 hours of mist netting and 4,723 echolocation sequences were collected during acoustic monitoring. The study also documented bat use of two major caves.

The project vicinity supports a robust and diverse population of resident, migratory, breeding, and wintering birds that have unique habitat preferences and nesting requirements. The wetland and upland habitats in the project vicinity support at least 197 bird species, including waterfowl, shorebirds, raptors, passerine[47] and non-passerine landbirds. The open water and associated shoreline habitat provide habitat for a variety of waterfowl and shorebirds such as American bittern, great blue heron, Canada goose, common merganser, trumpeter swan, eared and western grebes, snowy egret, gadwall, wood duck, common goldeneye, and mallard.

Raptors potentially or known to occur within the project vicinity include bald eagle, Cooper's hawk, red-tailed hawk, sharp-shinned hawk, Swainson's hawk, osprey, short-eared owl, and American kestrel. Scavengers such as turkey vultures are also present in the project vicinity. Birds of prey use a wide range of habitat types, including riparian and upland forests, cliff and rock ledges, and habitats close to lakes and open-water areas.

Passerine, or perching birds, represent the largest group of landbirds that may occur in the project vicinity, with nearly 100 species having the potential to occur. The most common passerine species detected in the landbird survey study area include black-capped chickadee, Brewer's blackbird, chipping sparrow, Lazuli bunting, spotted towhee, Townsend's solitaire, white-crowned sparrow, yellow-rumped warbler, and yellow warbler.

An estimated 12 species of non-passerine landbirds may occur in the project vicinity. Non-passerine species include northern flicker, downy woodpecker, blue grouse, ruffed grouse, mourning dove, rock pigeon, red-naped sapsucker, and Williamson's sapsucker. Woodpeckers forage in forested habitats, except for the ground-foraging northern flicker. Nesting typically occurs in open woodlands, forest edges, and scattered trees in open fields.

FWS has identified birds of conservation concern (BCC), species that represent FWS' highest conservation priorities (FWS, 2008). The project would be located within Bird Conservation Region 9-Great Basin Region. The following BCC that have the potential to occur in the project vicinity are discussed under *Special Status Wildlife Species*: greater sage-grouse (Columbia Basin distinct population segment), bald eagle, ferruginous hawk, peregrine falcon, flammulated owl, Lewis's woodpecker, Virginia's warbler, and Brewer's sparrow. Other BCC include those detected in the project vicinity (eared grebe, golden eagle, green-tailed towhee, calliope hummingbird, and willow

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[47]Passerine describes birds belonging to the large order of Passeriformes and includes mainly songbirds that have a special foot and leg adaptation for perching. Non-passerine are birds that do not perch (e.g., woodpeckers and gamebirds) or belong to the Passeriformes.

flycatcher) and those predicted to occur in the project area (long-billed curlew, Williamson's sapsucker, loggerhead shrike, pinyon jay, sage thrasher, black-chinned sparrow, and sage sparrow) (Ecosystem Sciences, 2009a, 2009d, 2009e).

Amphibian and reptile species that may occur in the project vicinity include the boreal chorus frog, Great Basin spadefoot, northern leopard frog, tiger salamander, western toad, common and terrestrial gartersnake, common sagebrush lizard, eastern racer, gophersnake, ring-necked snake, rubber boa, striped whipsnake, western rattlesnake, and western skink.

Special Status Wildlife Species

Special-status wildlife species include those protected by the state of Idaho as endangered or threatened, candidate for listing, Idaho species of special concern, and BLM sensitive species. The federally threatened Canada lynx, known to occur in Franklin County, is discussed in section 3.3.4, *Threatened and Endangered Species*.

Forty-eight animal species that could occur in the project vicinity were identified through literature review and consultation with BLM and Idaho Fish and Game as Idaho Species of Greatest Conservation Need. Table 3-34 lists these species along with their conservation status, habitat requirements, and occurrence within the project vicinity. Twin Lakes funded nine field investigations focused on these special status species. Although not listed as Idaho Species of Greatest Conservation Need, mule deer, elk, and wild turkey are included in the table because of their importance as game species.

Table 3-34. Special status terrestrial species with the potential to occur in the vicinity of the proposed Bear River Narrows Project (Source: Twin Lakes, 2013, as modified by staff).

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Mammals				
Mule deer *(Odocoileus hemionus)*	G5/S2		Game animal	Prefer forested broadleaf-dominated riparian areas, Douglas-fir/limber pine, maple, and Utah juniper cover types which provide good to excellent habitat in various seasons. The agricultural lands provide additional food resources, while the foothills grassland areas provide good winter habitat. They winter in lower elevations to escape deep snows, and in summer seek higher elevations where temperatures are cooler. A March 2007 aerial survey detected 132 deer within the big game survey study area (defined as all land and shoreline area within 1 mile of the Bear River upstream of Oneida dam downstream to the Highway 36 Bridge). Incidental observations between April 2008 and July 2009 recorded 116 deer. Mule deer Bear River crossing points were more common in the upper reach (above Redpoint Campground) than the lower reach of Bear River.
Elk *(Cervus elaphus)*	G5		Game animal	Prefer forested broadleaf-dominated riparian areas, Douglas-fir/limber pine, maple, and Utah juniper cover types which provide good to excellent habitat in various seasons. They winter in lower elevations to escape deep snows, and in summer seek higher elevations where temperatures are cooler. Although suitable habitat for elk was indicated by habitat analysis, elk were not detected during the March 2007, April 2008, or July 2009 aerial

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				surveys within the big game study area.
Merriam's Shrew *(Sorex merriami)*	G5/S2	Type 4	Protected non-game species	Found at elevations from about 650 to 9,500 feet, primarily in grasses in shrub steppe or pinyon/juniper woodlands. Seems to prefer drier habitat than other shrews. In Idaho, this species has only been collected in sagebrush habitats, but it is also known to occur in mountain mahogany. Not observed within the project study area during 2008/2009 landbird survey, but is predicted to occur based on the presence of its known habitat preferences and 2002 habitat analysis results.
Rock Squirrel *(Spermophilus variegates)*	G5/S1	Type 5	Protected non-game species	Found in Utah juniper, maple, and foothills grassland habitat types. Prefer rocky habitats such as cliffs, canyons, hillsides, talus slopes, old buildings, terraced roads and stone walls. Observed within rock squirrel survey study area (all land area within 1 mile upstream of Oneida dam downstream to Highway 36 Bridge) during 1997 and 2008 surveys. Primarily found in southerly facing hillsides, steep slopes, and rocky/sandy and well-drained soils. Surveys also show rock squirrel use of extensive areas upstream and downstream of proposed reservoir including along existing Oneida reservoir.
Idaho Pocket Gopher *(Thomomys idahoensis)*	G4/S3		Unprotected wildlife	Found in shrub steppe, grasslands, and subalpine mountain meadows, but favor shallow, rocky soils. Not observed within project area in 2008/2009 rock squirrel or wild turkey surveys, but predicted to occur based on presence of its known habitat preferences and 2002 habitat analysis results.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	G4/S3	Type 3	Protected non-game species	Habitat ranges from desert shrub to deciduous and coniferous forests at a wide range of elevations. In Idaho, some individuals likely migrate to hibernal sites to overwinter and disperse to forested areas during summer. Not observed within 2008/2009 bat survey study area (defined as all land area within 1 mile upstream of Oneida dam downstream to the Highway 36 Bridge), but is predicted to occur due to potential available habitat.
California Myotis *(Myotis californicus)*	G5/S2	Type 4	Protected non-game species	Habitat ranges from forest to desert at elevations up to about 1,800 meters, in oak/juniper woodlands, canyons, riparian woodlands, desert scrub, and grasslands. More common in open areas of slack water. Summer roosts include crevices in rocky hillsides, rocky outcrops, buildings, trees with exfoliating bark, and cavities in snags. Not observed within 2008/2009 bat survey study area, but is predicted due to potential available habitat.
Birds				
Bald eagle *(Haliaeetus leucocephalus)*	G4/S3B, S4N	Type 1	Protected non-game species	Prefers Douglas-fir/limber pine, Utah juniper, maple, broadleaf-dominated riparian, exposed rock, deep marsh, graminoid/forb-dominated riparian, and open water habitats. About 750 acres of suitable nesting, roosting, and foraging habitat within the bald eagle/peregrine falcon survey study area (defined as all land area within 1 mile of the Bear River from the Highway 34 Bridge above Oneida reservoir to the Highway 36 Bridge). The 2008/2009 raptor survey recorded 187 sightings of bald eagles in the study area during winter months. Eagles

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				were concentrated in broadleaf riparian zones; one located about 1 mile upstream of Redpoint Campground, and the other on lower Cottonwood Creek for about 1 mile above its confluence with the Bear River. Although no roosting or nesting sites were identified during the survey, one nest approximately 0.4 mile outside the study area was identified and monitored in 2008 by Idaho Fish and Game; one chick fledged in late July 2008. BLM further indicates that an active nest was also located north of Redpoint Campground in 2011 and 2012.
Burrowing Owl *(Athene cunicularia)*	G4/S2B	Type 5	Protected non-game species	Found in open grasslands (especially prairies, plains and savannas), and sometimes in open areas such as airports or vacant lots near human habitation. In southern Idaho, nests in sagebrush steppe and agricultural lands. Not observed within project vicinity during 2008/2009 landbird survey, but is predicted to occur based on 2002 habitat analysis results.
Ferruginous Hawk *(Buteo regalis)*	G4/S3B	Type 3	Protected non-game species	Found in shrub steppe at periphery of pinyon/juniper or other woodlands. Builds nest in tree or on cliff. Not observed within project vicinity during 2008/2009 bald eagle/peregrine and landbird surveys, but is predicted to occur based on 2002 habitat analysis results.
Flammulated Owl *(Otus flammeolus)*	G4/S3B	Type 3	Protected non-game species	Found in montane forests; associated mainly with ponderosa or Jeffrey pine. Prefers old growth. During migration, found in wooded areas in lowlands and mountains. In Idaho, occupies older ponderosa pine, Douglas-fir, and mixed coniferous forests. Not observed

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				within project vicinity during 2008/2009 bald eagle/peregrine and landbird surveys, but is predicted to occur based on 2002 habitat analysis results.
Boreal Owl *(Aegolius funereus)*	G5/S2	Type 5	Protected non-game species	Found in coniferous forests, mixed forests, thickets of alder, aspen, or stunted spruce, and muskeg bogs. Generally found in spruce/fir in Rockies. In Idaho, nests in mixed conifer, spruce/fir, Douglas-fir, and aspen stands. Not observed within project vicinity during 2008/2009 bald eagle/peregrine and landbird surveys, but is predicted to occur based on 2002 habitat analysis results.
Merlin *(Falco columbarius)*	G5/S2B, S2N		Protected non-game species	Found in both deciduous and coniferous forests, frequently near water, where they rely on old corvid nests. In Idaho they are very rare, but are thought to use riparian habitat along streams or lakes. Not observed within project vicinity during 2008/2009 bald eagle/peregrine and landbird surveys, but is predicted to occur based on 2002 habitat analysis results.
Short-eared Owl *(Asio flammeus)*	G5/S4	Type 5	Protected non-game species	Found in open country in prairies, meadows, tundra, moorlands, marshes, savannas, dunes, fields, and open woodlands. Typically associated with open habitats that support small mammals. Observed during 2008/2009 bald eagle/peregrine and landbird surveys.
Swainson's Hawk *(Buteo swainsoni)*	G5/S3B	Type 5	Protected non-game species	Found in open pine/oak woodlands, and in cultivated land with scattered trees (e.g., alfalfa and other hay crops, and certain grain and row crops, but not vineyards, orchards, rice, or corn). During migration and in winter, also found

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				in grasslands and other open country. In Idaho, prefers to nest in trees or shrubs near riparian zones adjacent to agricultural lands. Observed during 2008/2009 bald eagle/peregrine and landbird surveys.
Peregrine falcon *(Falco peregrinus)*	G4/S3B	Type 3	Threatened species	Prefers Douglas-fir/limber pine, Utah juniper, maple, broadleaf-dominated riparian, exposed rock, deep marsh, graminoid/forb-dominated riparian, and open water habitats. Approximately 63 acres of suitable nesting habitat within 2008/2009 bald eagle/peregrine survey study area. Not observed in study area.
Greater Sage-grouse *(Centrocercus urophasianus)*	G4/S2	Type 2	Game bird and federal candidate species for listing as threatened or endangered	Found in foothills, plains and mountain slopes where sagebrush is present or in mixture of sagebrush, meadows, and aspen in close proximity. In some areas, suitable winter habitat is probably most limiting seasonal factor. Not observed within project vicinity during 2008/2009 landbird survey, but is predicted to occur based on 2002 habitat analysis results.
Sharp-tailed Grouse *(Tympanuchus phasianellus)*	G4T3/S1	Type 3	Game bird	Found in grasslands (especially with scattered woodlands), arid sagebrush, brushy hills, oak savannas, and edges of riparian woodlands. Also found in upland winter wheat fields. Not observed within project vicinity during 2008/2009 landbird survey, but is predicted to occur based on 2002 habitat analysis results.
Lewis's Woodpecker *(Melanerpes lewis)*	G4/S3B	Type 3	Protected non-game species	Found in northern and western Idaho in open forests and woodlands (often logged or burned) including ponderosa pine and riparian woodlands. Observed upstream of Redpoint Campground in 2008/2009 landbird survey.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Wild Turkey *(Meleagris gallopavo)*	G5		Game animal	Found in broadleaf-dominated riparian and maple land cover types for winter habitat. Spring and summer habitat includes agricultural land, Douglas-fir/limber pine, foothills grassland, and Utah juniper. Presence has been verified through hunter harvest reports and observational data from Idaho Fish and Game biologists. They use the wild turkey study area (defined as all lands within 0.5 mile of the Bear River from Oneida dam to the Highway 36 Bridge) year round, but are more common near the Bear River in spring and fall and less common in summer. They overwinter south of the study area downstream of the confluence of the Bear River and Mink Creek.
Juniper Titmouse *(Baeolophus rudgwayi)*	G5/S2		Protected non-game species	Common resident in the extreme southern edge of Idaho. Found in pinyon/juniper and juniper woodlands. Heard at Redpoint Campground during 2008/2009 landbird survey.
Blue Grosbeak *(Passerina caerulea)*	G5/S1B		Protected non-game species	Found in partly open situations with scattered trees, and in riparian woodlands, scrub, thickets, cultivated lands, woodland edges, overgrown fields, and hedgerows. In Idaho, nests in hayfields or chicory, Russian olive, willow, and wild rose thickets next to sagebrush foothills. Not observed within project study area during 2008/2009 landbird survey, but is predicted to occur based on the presence of its known habitat preferences and 2002 habitat analysis results.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Brewer's Sparrow *(Spizella breweri)*	G5/S3B	Type 3	Protected non-game species	Common summer resident in southern Idaho. Uncommon and very local in northern Idaho. Usually found in association with sagebrush. Observed during 2008/2009 landbird survey in a shrubby area close to the river downstream from the existing Oneida dam.
Grasshopper Sparrow *(Ammodramus savannarum)*	G5/S2B	Type 5	Protected non-game species	Found in prairies, old fields, open grasslands, cultivated fields, and savannas. Not observed within project study area during 2008/2009 landbird survey, but is predicted to occur based on 2002 habitat analysis results.
Lesser Goldfinch *(Carduelis psaltria)*	G5/S2B		Protected non-game species	Found in areas where water is available, in partly open cover types with scattered trees, and in woodland edges, second growth, open fields, pastures, and around human habitation. Not observed within project study area during 2008/2009 landbird survey, but is predicted to occur based on the presence of its known habitat preferences and 2002 habitat analysis results.
Pinyon Jay *(Gymnorhinus cyanocephalus)*	G5/S1	Type 5	Protected non-game species	Found in pinyon/juniper woodlands, less frequently in pine. When not breeding, also found in scrub oak and sagebrush. Not observed within project study area during 2008/2009 landbird survey, but is predicted to occur based on the presence of its known habitat preferences and 2002 habitat analysis results.
Virginia's Warbler *(Vermivora virginiae)*	G5/S1B	Type 5	Protected non-game species	Common breeder in Cassia County and elsewhere along the southern edge of Idaho in suitable habitat. Breeds in deciduous woodlands on steep mountain slopes. In Idaho, species is most closely associated with

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				pinyon/juniper or juniper woodlands and nearby riparian areas. Frequents dense underbrush and slopes of mountain mahogany. Observed close to the road and across from Oneida reservoir during 2008/2009 landbird survey.
Trumpeter Swan *(Cygnus buccinator)*	G4/S1B, S2N	Type 3	Game bird	Breeds in freshwater marshes and along ponds and lakes. Winters in lakes, streams, springs, rivers, and reservoirs. They use the river stretch between Redpoint Campground and the PacifiCorp boat launch site. However, the open water areas upstream of the study area on the Oneida reservoir were found to consistently contain a greater number of swans. Habitat on the river is likely of lower quality than north of the study area on the existing reservoir. Observed within project study area (defined as all open water and shoreline areas of the Bear River from Oneida dam downstream to the Highway 36 Bridge) during 2008/2009 winter swan survey.
Lesser Scaup *(Aythya affinis)*	G5/S3		Game bird	During migration and when not breeding, found along coast in sheltered bays, estuaries, and marshes, or inland on lakes, ponds, and rivers; found on saltwater especially if lakes and ponds are frozen. In southern winter range, prefers freshwater ponds, lakes, and sloughs with reasonably clear water 1 m or more deep. Not observed within project study area (defined as all open water and shoreline areas of the Bear River from the Highway 34 Bridge above Oneida reservoir to the Highway 36 Bridge) during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Northern Pintail *(Anas acuta)*	G5/S2B, S2N		Game bird	Nests in open country with shallow, seasonal wetlands and low vegetation. Winters in wide variety of shallow inland freshwater and intertidal habitats. Not observed within project study area during 2008/2009 waterfowl survey.
Sandhill Crane *(Grus canadensis)*	G5/S3B		Game bird	Isolated, open, marshes or bogs, surrounded by shrubs and forests. Most important characteristics: diverse wetland types, composition and structural diversity of aquatic vegetation, and seasonally static water levels. Nest on dry ground; in an Idaho study, nests were usually found in *Juncus* and *Carex* vegetation communities. Observed within project study area on an island upstream of Redpoint Campground during 2008/2009 waterfowl survey.
American White Pelican *(Pelecanus erythrorhynchos)*	G3/S1B	Type 2	Protected non-game species	Found on rivers, lakes, estuaries, and bays. In Idaho, found on large inland reservoirs and island nests. Observed within project study area upstream of Redpoint Campground during 2008/2009 waterfowl survey and is thought to use the area during migration season when moving through the area.
Black Tern *(Chlidonias niger)*	G4/S1B		Protected non-game species	Prefers sheltered, offshore waters and bays; comes to shore chiefly during migrations or when breeding, when it is found along seacoasts, bays, estuaries, lagoons, lakes, and rivers. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Franklin's Gull *(Larus pipixcan)*	G4/S2B		Protected non-game species	When breeding, found on sloughs, marshy lakes, and prairie freshwater marshes. When not breeding, found on seacoasts, bays, estuaries, lakes, rivers, marshes, ponds, irrigated fields, and mudflats. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
American Avocet *(Recurvirostra Americana)*	G5/S5B		Protected non-game species	Found in lowland marshes, mudflats, ponds, alkaline lakes, and estuaries. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Black-crowned Night-Heron *(Nycticorax nycticorax)*	G5/S2B		Protected non-game species	Found in brackish, saltwater, or freshwater systems in marshes, swamps, and wooded streams, and on shores of lakes, ponds, and lagoons. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Black-necked Stilt *(Himantopus mexicanus)*	G5/S3B		Protected non-game species	Found in shallow water (salt or fresh) with soft muddy bottom. In Idaho, found on marshes, on flooded meadows and margins of pond, and on lakes and reservoirs; also occupies islands in Snake River. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
California Gull *(Larus californicus)*	G5/S2B, S3N		Protected non-game species	Found on seacoasts, bays, estuaries, mudflats, marshes, irrigated fields, lakes, ponds, dumps, agricultural lands, and in cities. Not observed within project study area

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
				during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Caspian Tern *(Sterna caspia)*	G5/S2B		Protected non-game species	Found on seacoasts, bays, estuaries, lakes, marshes, and rivers. Observed within project study area during 2008/2009 waterfowl survey. They likely use the river and reservoir to forage for fish and may use the islands for roosting during their migration.
Cattle Egret *(Bubulcus ibis)*	G5/S2B		Protected non-game species	Found in wet pastures and freshwater and brackish areas, but may also be found in dry fields and garbage dumps. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Clark's Grebe *(Aechmophrus clarkia)*	G5/S2B		Protected non-game species	Found on marshes, lakes, and bays. During migration and in winter, also found along sheltered seacoasts, and, less frequently, along rivers. Usually forages in deeper water. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Common Loon *(Gavia immer)*	G5/S1B, S2N		Protected non-game species	Primarily marine when not breeding. During migration, found on inland lakes, rivers, and coastal waters. In Idaho, breeds occasionally on a few lakes and reservoirs in southeastern Idaho, mostly in Fremont County. Observed within project study area during 2008/2009 waterfowl survey. Likely using the area during migration as breeding in southeastern Idaho is rare.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Great Egret *(Ardea alba)*	G5/S1B		Protected non-game species	Found on marshes, swampy woods, tidal estuaries, lagoons, along streams, lakes, and ponds, and in fields and meadows. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Long-billed Curlew *(Numenius americanus)*	G5/S2B		Protected non-game species	Found in prairies and grassy meadows, generally near water. During migration and in winter, also found on beaches and mudflats. In Idaho, prefers open, recently grazed shrub steppe containing short vegetation for nesting; often feeds in agricultural areas. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Snowy Egret *(Egretta thula)*	G5/S2B		Protected non-game species	Found on marshes, lakes, ponds, reservoirs, lagoons, and shallow coastal habitats. Not observed within project study area during 2008/2009 waterfowl survey, but is predicted to occur based on 2002 habitat analysis results.
Western Grebe *(Aechmophrus occidentalis)*	G5/S2B		Protected non-game species	Found on marshes, lakes, and bays. During migration and in winter, also found on sheltered seacoasts, less frequently along rivers. In Idaho, prefers large rivers and reservoirs that include shallow water areas with emergent vegetation. Observed during breeding season within project study area during 2008/2009 waterfowl survey. However, there is no evidence that they were nesting within the study area.

Species	GRank/ SRank[a]	BLM[b]	Idaho[c]	Habitat requirements/Documented occurrence
Amphibians and Reptiles				
Northern Leopard Frog *(Rana pipiens)*	G5/S2	Type 2	Protected non-game species	Mixture of riparian, agricultural land, foothills grassland, and maple land cover types within proximity to open water along the Bear River below Oneida dam and on lower Mink Creek. Observed within the project study area (defined as all lands within 1 mile of the Bear River from Oneida dam to the Highway 36 Bridge) during 1999, 2004, and 2008/2009 amphibian and reptile survey. Three breeding sites documented within the area of proposed inundation.
Ring-necked Snake *(Diadophis punctatus)*	G5/S2	Type 5	Protected non-game species	Forested, brushy areas or open hillsides that have rocks and other debris for them to hide in and they may use microhabitats that are moist. Not observed within project study area 2008/2009 amphibian and reptile survey, but may be present in Oneida Narrows.

[a] **GRank/SRank** = The global rank (GRank) denotes the rank of the species throughout its range, whereas the state rank (SRank) refers to the species status within the borders of Idaho. Both the global and state ranks are subject to periodic revision as new information is obtained on a species either in Idaho or elsewhere in its range:
1 - Critically imperiled because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction (typically five or fewer occurrences).
2 - Imperiled because of rarity or because of other factors demonstrably making it vulnerable to extinction (typically 6 to 20 occurrences).
3 - Vulnerable (typically 21 to 100 occurrences).
4 - Not rare, and apparently secure, but with cause for long-term concern.
5 - Demonstrably widespread, abundant, and secure.
B – Breeding
N – Non-breeding

[b] **BLM** = BLM conservation status:

Type 1 – Federally Threatened, Endangered, Proposed, and Candidate Species
Type 2 – Rangewide / Globally Imperiled Species
Type 3 – Regional / State Imperiled Species
Type 4 – Peripheral Species
Type 5 – Watch Species

[c] **Idaho** = state conservation status assigned by Idaho Fish and Game

3.3.3.2 Environmental Effects

Vegetation

Project construction would directly affect vegetation resources through clearing associated with the dam and powerhouse, access roads, recreation areas, substation, and interconnection facilities. Construction activities could also affect microsite environmental conditions through soil compaction and alteration of water drainage patterns and sunlight levels, which could change species composition or survival of existing vegetation. Additionally, construction vehicles could transport invasive weed species to recently disturbed areas, potentially leading to increased competition with existing vegetation communities or modifying existing community composition.

Project operation would modify existing elevation, duration, and timing of inundation periods. These changes in water availability would reduce vegetation cover in permanently inundated areas and modify vegetation community structure in areas with fluctuating water levels.

Project construction and operation would affect just under 500 acres of vegetation. About 425 acres of vegetation would be subject to long-term loss or change, and 72 acres would be subject to temporary disturbance and restored following construction. The land cover types that would have the greatest permanent loss are agricultural land (82.0 acres), maple (75.4 acres), and foothills grassland (68.6 acres). Together these three vegetation types represent 65 percent of the overall vegetation loss (i.e., excluding the water land cover type). Most of the loss would be associated with the reservoir inundation area and the main access road. Table 3-35 provides a complete breakdown of vegetation disturbance by project feature and cover class.

Table 3-35. Land cover acreages potentially lost or changed due to project construction (Source: Twin Lakes, 2013, as modified by staff).

	Long-term loss/change[a]								Temporary loss/change[a]				
Land Cover Type	**Dam and Reservoir**	**Access Road**	**Summer Home Road**	**Recreation Areas**	**Powerhouse and Parking**	**Pumping Station/Interconnection**	**Substation**	**TOTAL PERMANENT**	**Borrow Areas**	**Staging Areas**	**Powerline**	**TOTAL TEMPORARY**	**OVERALL TOTAL**
Foothills grassland	52.7	11.0	2.1	2.8	--	0.0	--	68.6	30.2	2.6	0.3	34.1	102.7
Maple	59.2	13.2	3.0	0.0	--	--	--	75.4	20.6	0.6	0.0	21.2	96.6
Agriculture	62.0	20.0	--	0.0	--	--	--	82.0	--	4.4	0.0	4.4	86.5
Water	74.4	--	--	0.0	0.0	0.0	0.0	74.5	--	--	1.1	1.1	75.5
Broadleaf	58.4	--	--	0.8	0.1	0.1	0.1	59.3	--	--	2.4	2.4	61.8

	Long-term loss/change[a]								Temporary loss/change[a]				
Land Cover Type	**Dam and Reservoir**	**Access Road**	**Summer Home Road**	**Recreation Areas**	**Powerhouse and Parking**	**Pumping Station/Interconnection**	**Substation**	**TOTAL PERMANENT**	**Borrow Areas**	**Staging Areas**	**Powerline**	**TOTAL TEMPORARY**	**OVERALL TOTAL**
Riparian													
Grass/forb riparian	28.6	--	--	--	--	--	--	28.6	--	--	--	--	28.6
Road	17.6	4.2	0.9	0.7	0.0	0.0	0.0	23.5	0.9	0.6	0.7	2.3	25.8
Utah juniper	5.7	0.7	0.8	--	0.0	--	--	7.2	5.2	--	0.1	5.2	12.4
Disturbed low	4.2	--	0.4	--	--	--	--	4.6	1.1	--	--	1.1	5.7
Exposed rock	0.8	--	0.0	--	--	--	--	--	0.8	--	--	0.1	0.8
Low intensity urban	--	0.1	--	--	--	--	--	--	0.1	--	--	--	0.1
TOTALS	363.5	49.2	7.3	4.3	0.2	0.1	0.1	424.7	57.9	9.3	4.5	71.8	496.5

[a] Acreages shown as 0.0 represent round-off value for land areas less than 0.05 acre and -- = no effect.

Loss or Alteration of Upland Vegetation

In total, Twin Lakes' proposal would result in 237.8 acres of permanent and 64.9 acres of temporary loss/change to upland vegetation (foothill grassland, maple, agricultural, Utah juniper, and disturbed low cover classes). Twin Lakes notes that it has worked to minimize these effects by designing the project to limit disturbance areas as much as possible and by implementing its final Erosion Control Plan and Noxious Weed Prevention and Revegetation Plan.

In its draft Erosion Control Plan, filed on April 1, 2014, Twin Lakes proposes to use hydromulching and seeding to prevent erosion associated with borrow areas, access roads, the power line and connection, and recreation improvements. It also proposes seeding in the absence of hydromulching for laydown areas and the embankment. For these seeding activities, Twin Lakes proposes to use species native to Franklin County. Twin Lakes also proposes to complete the Erosion Control Plan in conjunction with the development of final project design and consult with a technical working group to determine specific areas for seeding. We discuss the proposed Erosion Control Plan in more detail in section 3.3.1.2, *Geology and Soil Resources, Environmental Effects*.

Twin Lakes' proposed draft Noxious Weed Prevention and Revegetation Plan provides a summary of mitigation measures it intends to include in a detailed revegetation plan, which Twin Lakes would develop through consultation with a

technical working group following development of final project design. These measures include:

- Form a technical working group consisting of BLM, Idaho Fish and Game, FWS, and private landowners to guide development and implementation of noxious weed control and revegetation efforts.
- Minimize ground disturbance by using existing roads for project access.
- Wash all construction equipment to remove weed seeds prior to entering the construction areas and not leave the corridor until construction is completed; if equipment leaves construction areas, Twin Lakes would re-wash vehicles prior to re-entry.
- Flag key native vegetation communities in the vicinity of construction areas prior to ground disturbance and avoid these areas as much as possible.
- Stockpile native topsoil for re-use.
- Recontour all disturbed areas to control run-off and erosion prior to replanting. Twin Lakes would specify any necessary pre-planting weed treatment in the detailed revegetation plan.
- Revegetate all areas with ground disturbances of existing vegetated areas due to project construction (excepting impoundment-related impacts) using plant mix and planting requirements developed in consultation with the technical working group. The technical working group would develop a detailed revegetation plan identifying plant species mixes, planting density, mulching agents, seasonal planting restrictions, and detailed contouring.
- Conduct surveys of revegetated areas for 3 years following completion of construction using photo point surveys.[48] The monitoring program would include provisions for annual reports to the technical working group and development of corrective measures and long-term monitoring as necessary.

Idaho Fish and Game recommends that Twin Lakes establish goals and criteria by which to judge the success of revegetation efforts. In addition to general species composition and abundance information collected during photo point surveys, Idaho Fish and Game recommends Twin Lakes document the success of the plantings relative to the goals and criteria established by the technical working group. Additionally, Idaho Fish and Game recommends the final revegetation plan include a discussion of any irrigation needed to expedite plant growth, including documentation of existing water rights and those necessary for ensuring survival of plantings. Idaho Fish and Game further

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[48] Photo point surveys document vegetation coverage at a specific location and are used to demonstrate changes at that specific location over time.

recommends the plan include a description of any provisions for a site steward to oversee management of the sites.

Bear Lake Watch comments that, due to evaporative losses associated with the proposed project, there would be additional drawdowns at Bear Lake to compensate for these losses. Bear Lake Watch expresses concern that additional drawdowns would result in exposed shorelines where noxious weed species could establish.

Our Analysis

Project construction and operation would have unavoidable effects on upland vegetation. Measures included in Twin Lakes' proposed Noxious Weed Prevention and Revegetation Plan would protect existing vegetation adjacent to areas of disturbance from accidental damage. Revegetation measures and details proposed for inclusion in the detailed revegetation plan, including site treatments to restore soil and drainage conditions, and consultation to determine appropriate plant species and planting densities, are appropriate and would increase potential for revegetation success. Proposed washing of vehicles and use of existing roads would reduce potential for transfer of invasive weed propagules to disturbed sites. Adding Idaho DEQ BMP-11, vehicle/equipment washing and maintenance, to the final Erosion Control Plan and applying it, as appropriate, to specific construction locations, as we discuss in detail in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, would ensure proper disposal of waste water and that debris, including invasive weed propagules, would be washed off vehicles. Timely revegetation and use of reclaimed topsoil would also reduce potential for introduction of noxious weeds.

Twin Lakes' proposed plan also includes measures for monitoring revegetated sites. The plan includes a minimum monitoring period of 3 years, followed by additional monitoring, if necessary. Monitoring revegetation success using photo points and collection of general plant species and abundance information would provide some information about revegetation success. However, the current plan does not provide any detail about number of photo points, what specific vegetation data would be collected, or what criteria would determine success or failure. The degree to which a photo provides valuable information depends on the cover type in question and the size of the restoration site. Small areas of disturbance in open cover types may only require one photo point, with 360 degree coverage. On the other hand, disturbance areas several acres in size within forested cover would require multiple photo points to provide adequate coverage. If Twin Lakes consults with the technical working group to identify photo point locations, and includes a map of the proposed locations in the final plan, potential for under-sampling could be avoided.

Idaho Fish and Game's recommendation that the final plan include specific goals and success criteria, developed in consultation with the technical working group, would better allow Twin Lakes to assess whether revegetation efforts are successful or whether further action is needed to reduce effects of project construction. Typically, revegetation success criteria include metrics such as percent survivorship for planted vegetation, cover

percentages by species in seeded areas, and/or vegetation cover in multiple vertical zones. Criteria developed based on existing vegetation community structure in areas of proposed disturbance, or based on reference sites with similar vegetation structure are preferred because they are more likely to reproduce existing stand structure. For example, success criteria may be establishing vegetation cover that is 70 percent of existing or reference site cover, by vegetation type. If vegetation at a reference includes 60 percent cover of grass/forbs, and 20 percent cover of Utah juniper, a revegetated site could be successful if efforts produce 42 percent grass cover and 14 percent cover of Utah juniper. One potential downside of percent cover driven success criteria is that, during abnormally wet years, cover may be abnormally high. Ensuring criteria are met for two successive growing seasons would help ensure revegetation efforts are successful.

Although upland vegetation in the project vicinity is generally tolerant of semi-arid conditions, newly transplanted plants or sewn seed do better when water is readily available during the weeks after planting. Twin Lakes' draft Erosion Control Plan proposes hydromulching in some locations, but does not address irrigation of plantings in its proposed Noxious Weed Prevention and Revegetation Plan. Although we expect irrigation would be an integral component of revegetation success, the availability of water for irrigation is unclear. Including a discussion of the need for water supplements and documentation of existing water rights for any proposed watering of plantings in the final plan, as recommended by Idaho Fish and Game, would ensure water is available and facilitate agency and Commission evaluation of the detailed revegetation plan.

Twin Lakes' proposed Noxious Weed Prevention and Revegetation Plan would rely on the formation of a technical working group consisting of representatives from BLM, Idaho Fish and Game, FWS, and private landowners. Twin Lakes would seek advice and comment from this group in preparing the detailed plan. This approach would provide the benefit of local knowledge in identifying plant species and planting requirements most likely to result in successful restoration. However, final responsibility for restoration success would lie solely with Twin Lakes. The proposed plan for revegetation activities includes varied time schedules for activities at different sites, plantings over a variety of cover types, and a significant monitoring effort. Designation of a site steward to oversee revegetation activities as Idaho Fish and Game recommends would help ensure successful development of replacement habitat. These elements of the final plan would ensure that revegetation efforts are successful and corrective actions (e.g., adjustment of irrigation amounts, modification of barriers or signage to ensure revegetation sites remain undisturbed), if needed, are implemented in a timely manner.

In regard to potential for the project to result in exposed shorelines at Bear Lake, as Bear Lake Watch suggests, Twin Lakes proposes to offset any evaporative losses associated with the project with additional flows from Mink Creek into the Bear River system. As such, evaporative loses would come from water that would otherwise be directed to Twin Lakes' irrigation canal. However, Twin Lakes proposes to make up for any releases into lower Mink Creek by pumping an equivalent amount of water from the Bear River into the irrigation canal system. This could result in a slight drawdown of the

proposed reservoir to make up for evaporative losses. Twin Lakes proposes to refill the reservoir following any drawdowns from October 1 through April 15 using unallocated water. Consequently, no additional releases from Bear Lake would be needed to meet allocated water rights and there would be no change in the water level of Bear Lake caused by the proposed project.

Loss or Conversion of Riparian and Wetland Vegetation

In total, Twin Lakes' proposed action would result in about 162 acres of permanent and about 2 acres of temporary loss/change to riparian vegetation and wetlands (riverine wetlands shown in table 3-31 plus broadleaf-dominated riparian and grass/forb-dominated riparian cover classes shown in table 3-35). Of the 88 acres of permanent riparian cover type loss, 47 acres are palustrine wetland, and 41 acres are upland riparian habitat. The proposed project would also convert about 74 acres of riverine wetlands to lacustrine wetlands.

Twin Lakes proposes to provide riparian vegetation enhancements along Mink Creek, Condie reservoir, and Winder reservoir. Twin Lakes also proposes a riparian restoration project on the Ben Johnson Family Farm site and at the confluence of Battle Creek and the Bear River. In addition, Twin Lakes expects new wetland/riparian vegetation to develop along the shore of the new reservoir. Due to geographical separation and differing existing conditions in areas of proposed riparian enhancements, we separate our analysis of these measures into five subsections.

<u>Mink Creek Enhancements</u>

At Mink Creek, Twin Lakes proposes to implement a year-round, 10-cfs minimum flow below the Twin Lakes diversion. Based on an average riparian zone of 80 feet over the course of the 4.2 miles of stream channel, Twin Lakes expects this measure to benefit about 42 acres of riparian habitat.

Our Analysis

Project construction and operation would inundate about 59 acres of broadleaf riparian forest and 29 acres of grass/forb riparian cover. Additional effects associated with the proposed recreation site, powerhouse, pumping station, and substation would occur in broadleaf riparian zones. Twin Lakes' proposed measure to implement a 10-cfs minimum flow in Mink Creek is likely to increase the vigor of riparian vegetation along the creek. However, the proposed increase in flow would only influence instream conditions during the summer irrigation period. Under existing conditions, Mink Creek typically receives a spring flood pulse (see section 3.3.2, *Aquatic Resources*, figure 3-3), which is more of a driver of riparian vegetation establishment than summer base flows because spring flows create potential establishment sites for seeds and other propagules (Mahoney and Rood, 1998; Friedman and Auble,1999). Existing vegetation along the creek is healthy and likely limited more by adjacent agricultural land use than low summer flows. Based on our October 13, 2011, environmental site review observations, the Mink Creek channel is also constrained by steep slopes in many areas, limiting

potential lateral expansion of the riparian community. Therefore, although the increase in summer flows to 10 cfs, from 0 to 5 cfs would have some benefit to riparian vegetation, we conclude this benefit would be minimal and provide little if any increase in functional value to offset effects on riparian areas along the Bear River. In section 3.3.2, *Aquatic Resources*, we identify potential for increased benefits to BCT if Twin Lakes provides flows of 20 cfs from April through September and 15 cfs from October through March. These flows would provide additional beneficial effects on existing riparian vegetation, as compared to Twin Lakes' proposed 10-cfs minimum flow. Yet, similar to Twin Lakes' proposed measure, the increased flows would not increase spring peak flows and would be unlikely to increase recruitment of native riparian species.

Condie Reservoir and Winder Reservoir Enhancements

Based on analysis of existing soils, topography, and vegetation at Condie and Winder reservoirs, Twin Lakes determined there is potential to enhance a total of 23 acres of emergent wetland and 26 acres of woody riparian habitats with plantings. As described in Twin Lakes' response to the Commission's request for additional information, filed April 1, 2014, Twin Lakes would provide short-term irrigation for new plantings with water pulled from the reservoirs. Although Twin Lakes also proposes to use these sites as restoration areas, it proposes to manage roughly 85 percent of the shoreline at Condie reservoir and 60 percent of the shoreline and Winder reservoir as riparian mitigation priority areas. Twin Lakes would use signs, fences, and natural barriers to discourage recreational use in the enhancement areas and design plantings to provide wildlife habitat.

Interior comments that the shoreline areas proposed as sites where Twin Lakes would establish new riparian habitat are not likely to provide in-kind replacement for the river flood plain riparian habitats that would be inundated by the new reservoir. Interior also notes that any planting of riparian forest vegetation would require at least 50 years to function in the same manner as the mature riparian forest that would be lost.

As discussed further in the *Bald Eagle* section below, Idaho Fish and Game recommends that Twin Lakes acquire a mitigation parcel with 70 acres of mature cottonwood forest.

The Corps comments that, to be accepted as valid compensatory mitigation, the hydrology supporting the system would need to be reliable. The Corps notes that both Condie and Winder reservoirs are drawn down substantially during the growing season each year. The Corps suggests these routine long-duration drawdowns could limit or hinder the functional value and success of the mitigation or cause the failure of riparian and wetland mitigation.

Our Analysis

Twin Lakes manages Condie and Winder reservoirs as storage reservoirs to supplement summer irrigation. These reservoirs are annually filled to capacity with water from irrigation canals and drawn down during the dry summer months. Land use

adjacent to the reservoirs consists of dry land agriculture and no grazing occurs under existing conditions. Based on materials presented in the license application and review of GoogleEarth imagery dated October 7, 2014, we determined that riparian vegetation is present along the high water lines at both reservoirs. Vegetation is denser, and apparent differences in tree ages suggest there is more riparian tree reproduction at Winder reservoir than at Condie reservoir. Although we agree with the Corps that existing hydrologic patterns at the reservoirs would hinder development of riparian areas, existing conditions indicate potential for planted vegetation to survive the seasonal draw downs. The resulting community, however, is likely to remain confined to a narrow band along the high water line, similar to existing conditions. Twin Lakes' proposed measure to enhance these areas with riparian plantings and irrigation could increase vegetation cover and diversity. As Interior comments, however, it would take substantial time, on the order of 30-50 years, before plantings mature and resemble existing conditions along the Bear River. Furthermore, instead of replacing the existing linear corridor of connected habitat along the river, it would enhance isolated habitat islands in a matrix of agricultural land. If enhancement efforts succeed, Condie and Winder reservoirs would provide some functional replacement for the project-related loss of riparian cover. However, these benefits would not be fully in effect until the later years of any license term, if the Commission were to issue a license for the project. In the meantime, these measures would provide little increase in functional value to offset effects on riparian areas along the Bear River. Acquisition of conservation rights to existing mature cottonwood forest, as Idaho Fish and Game recommends (discussed later in this section under *Bald Eagle*), could help offset project effects on riparian areas. No potential areas have been identified.

Ben Johnson Family Farm and Battle Creek Restoration

At the Ben Johnson Family Farm site, Twin Lakes conducted a feasibility study to determine potential for restoration of herbaceous and woody wetlands and upland riparian habitat. Currently the property is under private ownership, and Twin Lakes did not receive permission to access the site for detailed data collection. As such, the analysis relies on publicly available data including soils maps, historic and current aerial photography, regional topography, observations from outside the property boundary, and professional judgment. Twin Lakes mapped existing land cover on the mitigation site using aerial photography (figure 3-21). Following restoration, Twin Lakes proposes to create at least 16 acres of emergent wetland, 20 acres of forested wetland, 12 acres of scrub/shrub wetland, and 38 acres of upland riparian habitat (figure 3-22). Additionally, Twin Lakes expects to enhance existing marsh and riparian habitat currently existing on the property, including about 17 acres of grass-forb dominated riparian, 20 acres of shrub riparian, 25 acres of tree riparian, and 13 acres of marsh cover types. Restoration efforts would focus on changes in land management, hydrology, and active planting. Twin Lakes expects to acquire sufficient water rights with the property to provide 20 cfs of water to the project. Twin Lakes proposes to enhance existing riparian areas by under-planting existing Russian olive-dominated riparian forest with native species.

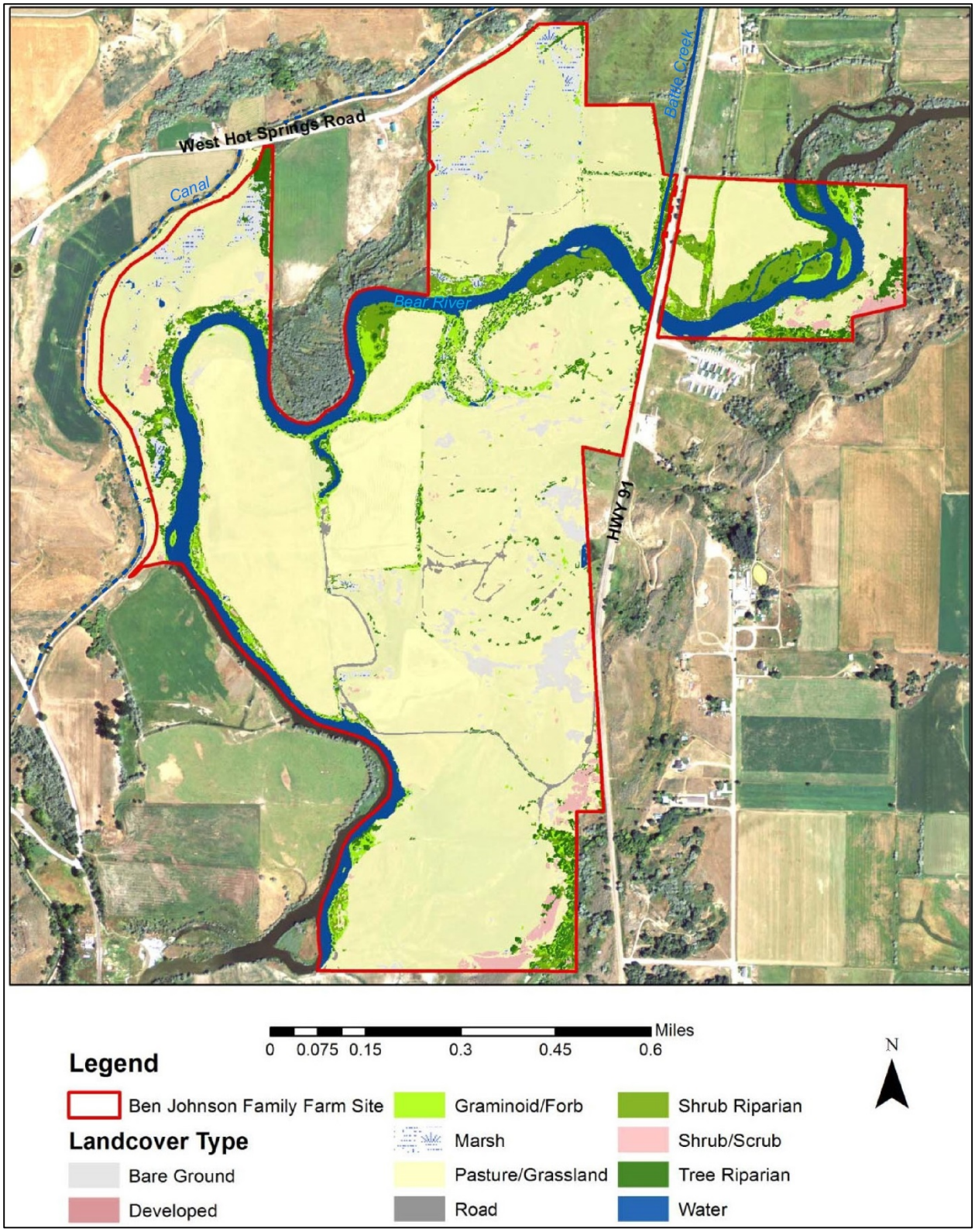

Figure 3-21. Existing land cover (2011) at the Ben Johnson Family Farm site (Source: Twin Lakes, 2013).

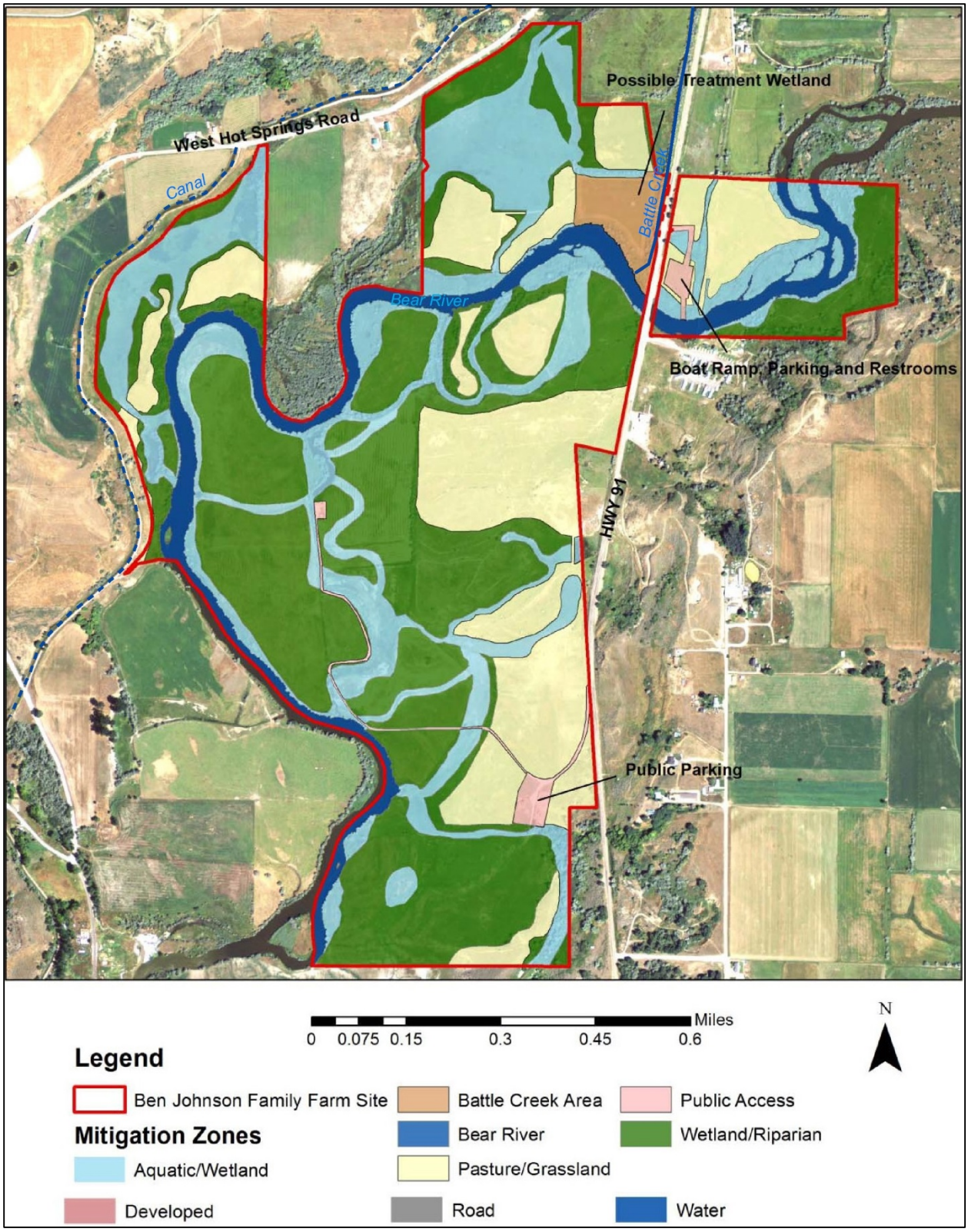

Figure 3-22. Proposed land cover at the Ben Johnson Family Farm site following wetland restoration (Source: Twin Lakes, 2013).

Twin Lakes also proposes a future study to investigate a 10-acre parcel of land at the mouth of Battle Creek. The study would determine whether it is feasible to construct a wetland to improve water quality by retaining sediments and nutrients before they enter the Bear River. Twin Lakes acknowledges, however, that there are numerous challenges to designing a functional wetland at that location.

Idaho Fish and Game asserts that Twin Lakes' assumption about the 20 cfs water right associated with the Ben Johnson Family Farm is incorrect, stating there is no single, 20 cfs water right appurtenant to the property. Instead, there are multiple sources of water used to irrigate the farm, and these water rights do not add up to 20 cfs. Additionally, under Idaho law, the water rights appurtenant to the Ben Johnson Family Farm property cannot be transferred to an instream flow water right, nor can they be used for any purpose other than irrigation. Given Twin Lakes' uncertainty about the feasibility of establishing a functional wetland at these locations and about obtaining the necessary water rights to create, restore, or enhance wetland and riparian habitats at the mitigation site or establish enhanced flows in Battle Creek, Idaho Fish and Game does not consider these measures adequate to mitigate for project effects. Given the speculative nature of this proposed measure, Idaho Fish and Game concludes that it does not represent mitigation for the adverse effects of the project on fish and wildlife resources.

The Corps comments that, although there is potential to restore and preserve important wetland and riparian communities along the Bear River, Twin Lakes' wetland creation plans are speculative at this time, and the benefits of restoration and preservation cannot be fully assessed without onsite inspections. Adjacent property land use practices could also greatly affect the functional values of the proposed mitigation.

FCFGA comments that the proposed project would disrupt the contiguous riparian areas in the Oneida Narrows reach of the Bear River, fragmenting the current riparian ecosystem. FCFGA also comments that the proposed enhancements of the Russian olive-dominated riparian area at the Ben Johnson Family Farm would not replace functions associated with riparian communities along the Bear River.

Yellowstone to Uintas Connection comments that the Ben Johnson Family Farm site would not replace the loss of riparian habitat in the Bear River Narrows because the restoration site is surrounded by active agriculture land use and does not resemble the canyon environment that would be lost.

The Ben Johnson Family Farm comments that areas on the property proposed for development as wetlands are several feet above the Bear River and require irrigation to grow crops. The landowner expects the mitigation plan to entail substantial excavation efforts.

Our Analysis

Twin Lakes' proposed measures at the Ben Johnson Family Farm site would face several significant hurdles prior to implementation, some of which are discussed elsewhere in this document, but referenced here to facilitate review of these measures.

For example, as discussed in section 3.3.2.2, *Aquatic Resources, Environmental Effects, Water Quantity*, it is not clear where the 20 cfs of water Twin Lakes proposes to use for restoration purposes would come from and whether existing rights could be legally transferred for such purposes. As discussed in section 3.3.7.2, *Cultural Resources, Environmental Effects*, the proposed mitigation site has high value for cultural resources, which could preclude excavation associated with mitigation efforts. For these reasons alone, the feasibility of the proposed restoration is questionable.

From a biological perspective, restoration of the site may be possible given sufficient economic resources. However, insufficient data has been provided to be able to fully assess potential benefits. Based on our analysis of GoogleEarth imagery and topography, some excavation would be necessary to create aquatic/wetland habitat in areas shown on figure 3-22. The wet areas in the northern part of the parcel, upslope from the river, could receive water from the adjacent canal and then drain into the Bear River. However, without more detailed topography it is not possible to evaluate how much water or excavation would be required to create the braided system in the southern part of the parcel, or if Twin Lakes would have suitable water rights to irrigate these areas. The proposal to conduct a future study for a potential 10-acre wetland at the mouth of Battle Creek is also in the early stages of conceptual development and therefore cannot contribute to any current analysis of mitigation benefits. Therefore, we agree with Idaho Fish and Game and the Corps that the benefits of the Mitigation Plan, in its current conceptual form, cannot be assessed in terms of whether it would provide adequate mitigation for project effects along the Bear River.

The proposed mitigation map shows several areas on the northern and southern edges of the parcel where new wetlands would have abrupt edges along the property lines. Changing drainage patterns on the mitigation property could influence drainage and potentially create erosion on these adjacent properties. The proposed Conceptual Mitigation Plan does not discuss how wetlands would be confined to these areas. If the plan incorporates adjacent land use into the site development plan and addresses potential interactions between the proposed site and adjacent parcels, it could minimize concern for these potential adverse effects.

The Conceptual Mitigation Plan also does not describe the intended vegetation structure of the completed riparian areas. Twin Lakes proposes 70 acres of riparian habitats (forested wetland, scrub/shrub wetland, and upland riparian). However, the visualization photos in the Mitigation Plan, which appear to show approximately 10-15 year old trees occurring after “several years of vegetation development,” only show woody structure along the river banks and side channels. It is not clear how Twin Lakes is defining upland riparian habitat or when this habitat is expected to develop in the green-shaded areas farther away from the aquatic habitats on figure 3-22. To evaluate whether these areas would at least partially compensate for effects along the Bear River, the plan would need to include a schedule for mitigation actions, anticipated vegetation structure in these areas, and success criteria.

Existing land use and hydrologic patterns on the proposed mitigation site support a Russian olive-dominated woody riparian vegetation community. Russian olive is common along western rivers where land use and hydrologic controls constrain erosion and development of sand bars. Similar to box elder, this species can germinate under cover of existing vegetation, unlike native cottonwood, willow, alder, and birch species that typically require the bare mineral soil associated with sand bars and other flood-disturbed sites. However, where willow and cottonwood have established, these species can be co-dominates with Russian olives (Zouhar, 2005; USDA, 2006).

Twin Lakes' conceptual riparian restoration plan includes under-planting existing Russian olive stands with native species. However, the plan does not specify which native species would be included in the plantings, provide expected planting densities, or set any goals for desired vegetation structure. Incorporating cottonwood, willow, alder and birch into the plantings would increase habitat diversity and re-create stands that would be lost to inundation. Because suitable germination sites for these species may not occur in the mitigation site, these planted populations may not be sustainable without additional plantings during the term of any license that may be issued. If Twin Lakes includes measures to monitor riparian tree plantings for natural regeneration and, if needed, incorporates additional plantings during the term of a license to create multi-aged stands, the proposed enhancement and restorations sites would have greater function.

Because the proposed mitigation would not re-create the function of existing mature cottonwood woodlands, acquiring conservation rights to existing mature cottonwood forests, as Idaho Fish and Game recommends, would be needed to offset project effects. However, based on our analysis we find that it is unlikely that sufficient cottonwood resources exist along the Bear River to achieve Idaho Fish and Game's recommended 70-acre conservation goals. Therefore, with no identified measure to provide or conserve mature cottonwood habitat, the proposed project would result in long-term effects on riparian vegetation communities, at least until Twin Lakes' proposed cottonwood plantings mature.

Establishment of New Wetlands around Bear River Narrows Reservoir

Twin Lakes analyzed the topography along the perimeter of the proposed reservoir at different water elevations and states that about 10 acres of marsh and 5 acres of forest/shrub wetlands would develop around the shore of the new reservoir under its proposed action. Twin Lakes expects marsh areas to develop quickly following reservoir filling, but acknowledges that development of woody wetlands would take more time. Twin Lakes does not propose any riparian plantings around the reservoir, relying on natural colonization and establishment of wetland species to vegetate these areas.

Interior, Yellowstone to Uintas Connection, and TU comment that low water year drawdowns in the reservoir could reduce water elevation as much as 16 feet and affect wetlands that develop around the reservoir fringe.

Our Analysis

In general, vegetation development around the perimeter of the proposed reservoir would look similar to conditions around Oneida reservoir, immediately upstream. In areas with steep slopes, there would be little if any development of riparian vegetation because the lateral distance associated with fluctuations in reservoir elevation would be small, and water levels would quickly become too deep to support emergent vegetation a short distance from shore. Conversely, in areas with shallow slopes, a change in reservoir elevation of a few feet could result in inundation or exposure of larger areas. Wetland species are more likely to develop in these areas where shallow water levels allow patches of reeds and cattails to develop. These same dynamics affect other riparian species including cottonwood, willow, and box elder. As such, we expect any development of riparian vegetation to primarily occur upstream of the Redpoint Campground, where reservoir side slopes would be less steep.

Many riparian species, including sedges, cattails, cottonwood, alder, willow, birch, and box elder, rely on wind or water for seed dispersion. Seeds of herbaceous species are frequently capable of persisting in the soil for multiple years until suitable germination conditions are present. Woody species on the other hand are generally short lived and become unviable if germination requirements are not met within several days of seed dispersion. Following reservoir filling, existing wetland plants in the reservoir footprint would be submerged and unlikely to produce seed. Small patches of broadleaf riparian habitat located between the upper limits of the proposed reservoir and Oneida dam would be the principal seed source for colonization of new wetland zones. Over multiple years, these species would likely disperse to suitable areas around the new reservoir.

Following establishment of wetland communities in suitable areas around the reservoir, drawdowns associated with irrigation supplements would add stress and could temporarily reduce wetlands in these areas. However, riparian communities are highly resilient and have evolved to thrive in zones that experience frequent wetting and drying. Drawdowns would expose bare soils and provide potential germination sites for wetland species. If propagules for wetland plants are present, exposed slopes likely would support vegetation during the first growing season. Upon return to average pool levels, these sites would be submerged, but would harbor seeds that would germinate during subsequent drawdowns. The result would eventually be a band of potential wetland areas that would exist in vegetative form wherever reservoir elevations create appropriate conditions for seed germination and growth. Generation of the band of potential wetlands though, would require multiple growing seasons under different water levels. Relying on natural colonization of wetland species would likely require many years for these described dynamics to develop. The process of re-establishing wetlands would be facilitated if Twin Lakes includes the reservoir perimeter in proposed riparian plantings.

<u>Downstream Bear River Migratory Bird Refuge Wetlands</u>

The Bear River Migratory Bird Refuge is located at the mouth of the Bear River near Great Salt Lake, Utah, about 140 miles downstream of the proposed project.

Reduced flows in to the Bear River could reduce flows into the refuge, affecting wetland resources and associated wildlife habitat.

During years of system-wide irrigation shortages, Twin Lakes proposes to supplement irrigation water with water stored at the project (see section 3.3.2.2, *Aquatic Resources, Environmental Effects*, for further details). Twin Lakes would release up to a maximum of 5,000 acre-feet from the project reservoir. Following the irrigation season, Twin Lakes would reduce flows out of the project during October through mid-April to raise reservoir elevations to normal levels. During years when no additional filling is required to make up for supplemental irrigation drawdowns, releases from the project would match releases for Oneida dam, so there would be no change from existing conditions.

Interior and TU commented that reduced downstream flows could decrease marshland availability along the Bear River downstream of the proposed project, and specifically at the Bear River Migratory Bird Refuge.

Our Analysis

Reductions in flow in the Bear River associated with periods of reservoir filling would occur during migration periods for many bird species. Table 3-36 presents predicted net changes in Bear River flows downstream of the Mink Creek confluence during refilling periods relative to flows measured at Corinne, Utah, just upstream of the Bear River Migratory Bird Refuge. Substantial depletions during these periods could reduce inundation levels in wetlands and mud flats surrounding the mouth of the Bear River, affecting habitat availability in these areas. However, Twin Lakes' proposed reductions would make up a small portion of average flows entering the refuge, typically resulting in about 1 percent reduction outside the irrigation season. As such, there would be minimal effects on wetlands in the Bear River Migratory Bird Refuge Area.

Table 3-36. Net instream flow effects on Bear River at Corinne, Utah (USGS Gage 10126000) assuming 5,000 acre-feet of storage is used to supplement water shortages and flows are reduced during subsequent reservoir filling (Source: staff).

Month	Bear River Average Flow 2000-2009 at Corinne, Utah(cfs)	Net Change in Bear River Flows Downstream of Mink Creek Confluence (cfs)	Percent of Average Flow
January	1,100	-10	-1
February	1,130	-10	-1
March	1,700	-20	-1
April	2,090	-25	-1
May	1,760	0	0

Month	Bear River Average Flow 2000-2009 at Corinne, Utah(cfs)	Net Change in Bear River Flows Downstream of Mink Creek Confluence (cfs)	Percent of Average Flow
June	1,080	0	0
July	117	0	0
August	100	0	0
September	241	0	0
October	589	-10	-2
November	784	-10	-1
December	955	-10	-1

Wildlife

As discussed previously, construction and operation of the proposed project would affect vegetation through disturbance and changes in habitat conditions. Wildlife occurring in these areas would also be subject to similar effects because vegetation cover types and wildlife habitat are interdependent. Construction of the proposed reservoir, roads, recreation sites, and other facilities would reduce, fragment, or eliminate individuals or communities and cause the permanent loss or conversion of about 425 acres of wildlife habitat. Both temporary and permanent effects on wildlife resources would result from vegetation clearing or conversion, obstructions to movement patterns, increased human presence and noise, and the loss or degradation of native habitats that may be used for foraging, nesting, roosting, and other necessary life cycle functions.

Operation of the project could modify existing elevation, duration, and timing of inundation periods. These changes in water availability would reduce habitat suitability in permanently inundated areas and modify vegetation community structure in areas with fluctuating water levels.

Wildlife Habitat Loss, Fragmentation, and Disturbance

Construction and operation of the project would have unavoidable effects on wildlife in the project area through temporary and permanent habitat loss and alteration, barriers and hazards to movement, habitat fragmentation, and disturbance.

Twin Lakes proposes to implement an Erosion Control Plan to minimize vegetation disturbance and soil loss during construction, as well as a Noxious Weed Prevention and Revegetation Plan to restore as much construction-disturbed wildlife habitat as possible. In its Conceptual Mitigation Plan, Twin Lakes contends that its proposed mitigation measures would offset the potential project effects by providing for

the long-term health of the watershed and associated terrestrial resources through implementing riparian vegetation/habitat enhancement along Mink Creek, Condie reservoir, and Winder reservoir. In addition, Twin Lakes proposes a riparian restoration project on the Ben Johnson Family Farm site, including at the confluence of Battle Creek and the Bear River. Twin Lakes also expects new wetland/riparian vegetation to develop along the shore of the new reservoir that would support existing wildlife species.

Twin Lakes proposes to construct and maintain three raptor nest platforms: one at the Bosen diversion on Deep Creek, about 1 mile west of the Ben Johnson Farm site, one along the shoreline of the new reservoir, and one at an undetermined location between the other two platforms and along the Bear River. Similarly, Twin Lakes would install nest boxes in the Deep Creek drainage to enhance landbird habitat.

Idaho Fish and Game comments that the proposed project effects on wildlife would not be consistent with the goal of the Comprehensive Wildlife Conservation Strategy (CWCS), which identifies conservation measures to benefit Idaho's wildlife, particularly those species and habitats in the state that warrant conservation attention (Idaho Fish and Game, 2005a). The CWCS identifies the factors that may adversely affect these species and outlines appropriate conservation actions to support the species' continued existence. Idaho Fish and Game states overall that Twin Lakes' measures would not be consistent with the CWCS' recommended actions for many of these wildlife species. However, if the project proceeds, Idaho Fish and Game states that mitigation acres of wildlife habitat in a quantity and quality equal to or greater than those lost due to inundation could be provided although they would not totally offset the effects on wildlife.

As mitigation for some of the effects on birds, Idaho Fish and Game recommends that Twin Lakes provide additional suitable habitat for all lifestages of water birds of equal or greater quantity and quality including at least 200 acres of nesting and brood-rearing habitat that provides ice-free winter foraging and nesting areas equivalent to about 5 miles of riverine habitat. In addition, Idaho Fish and Game recommends that at least 132 acres of wetland and riparian habitat as well as grassland habitat should be provided for landbirds.

Furthermore, Idaho Fish and Game states that, if a property should be protected with a conservation easement or by purchase of property, the conditions of the easement should ensure that it is maintained and managed to provide benefits for wildlife and is transferred to a management agency for appropriate protection and management.

The Shoshone-Bannock Tribes recommend the Commission develop measures to increase acreage of lands held in trust by the United States on behalf of the tribes and/or increase lands held in fee and title by the tribes for benefit of fish and wildlife.

Our Analysis

Loss or change of habitat, particularly riparian habitat, would likely change the diversity of wildlife species and the abundance of wildlife in the immediate project area.

Wildlife would continue to use the area, but reduction in available habitat would displace some animals. Movement might be possible for some highly mobile species such as larger mammals and birds, which would most likely move to available habitat outside the project area. Many mammal species in the Bear River region are generalists and opportunists that can occupy a variety of habitats. Although in the short term, medium and large mammal species such as raccoon, skunk, muskrat, badger, coyote, red fox, and porcupine may be displaced from currently occupied habitat, creation of new wetland and riparian habitats may provide long-term benefits with the potential for more abundant and diverse prey species to emerge as a result (Christensen, 1988). However, any long-term benefits would not fully compensate for lost wildlife habitat resulting from the proposed project. Inundation, provided it occurs gradually, would allow these animals to readjust to the new system and shift their local range within and adjacent to the river.

For species such as small mammals, adjacent territories may be occupied, and re-establishment would be difficult. The greatest effect would be on species that rely heavily on riparian habitats, especially species that have limited mobility such that they would be less capable of migrating to adjacent territories, such as amphibians and reptiles, and nesting wildlife, depending on the timing of reservoir inundation.

The proposed project would inundate up to 200 acres of nesting and brood-rearing habitat and impound 4.5 miles of riverine, ice-free, winter foraging and resting habitat. Avian community structure following inundation and increases in open-water habitat tend to favor a transition from a community dominated by generalists and passerines to one dominated by waterfowl, shorebirds, and wading birds (Seigel et al., 2005). The proposed action would increase the amount of open water habitat for wetland- and water-dependent bird species such as bittern, great blue heron, Canada goose, common merganser, trumpeter swan, grebes, egrets, and mallard. However, during winter, habitat for waterfowl and wading birds would be lost as the reservoir ices over. Under existing conditions, the Bear River remains riverine during the winter, providing winter foraging and resting habitat for these species. Generalist landbird species could potentially be affected in the long term by reduced nesting and feeding opportunities as woodland and shrub habitat are replaced by open water and shoreline vegetation. However, these generalist populations would persist in the uplands surrounding the project area and at the wetland/upland edge where some habitat would remain after inundation. These areas would continue to provide nesting, foraging, and perching sites for warblers, flycatchers, thrushes, crows, jays, sparrows, finches, woodpeckers, grouse, and other passerine and non-passerine species along the upland border.

Although the Bear River in the project area currently remains riverine during the winter, it provides winter foraging and resting habitat for only a few waterfowl species. Aside from mallard, Canada goose, and common goldeneye observed during the waterfowl/waterbird surveys (Ecosystem Sciences, 2009a), no other waterfowl were present in noteworthy abundance during the winter months. The greatest abundance and diversity of waterfowl occurs in the Bear River during the spring migration season (typically beginning in late March).

Nearby wildlife refuges, such as Bear River Migratory Bird Refuge, Grays Lake National Wildlife Refuge, and Bear Lake National Wildlife Refuge, provide known nesting and breeding habitat for waterfowl and waterbirds. These refuges could provide equivalent year-round habitat for waterfowl displaced by the proposed project. However, these refuges are 20-60 miles from the project area.

Idaho Fish and Game's recommendation for Twin Lakes to secure a mitigation parcel and provide habitat for all lifestages of water birds, including at least 200 acres of nesting and brood-rearing habitat that provides ice-free winter foraging and nesting areas equivalent to about 5 miles of riverine habitat would provide some offset mitigation for loss of waterfowl and water bird habitat. As part of its proposed Conceptual Mitigation Plan, Twin Lakes would enhance the mitigation site to provide more wetland and island habitat suitable for waterfowl nests, and the compensatory habitat would provide benefit to waterfowl remaining in the area during the winter months. However, it is not clear whether the Conceptual Mitigation Plan would result in 200 acres of waterfowl nesting and brooding habitat and we find it unlikely it would result in 5 miles of riverine habitat. Development of a final terrestrial mitigation plan, in consultation with Idaho Fish and Game, to include areas for habitat conservation, enhancement, and restoration would help to identify appropriate mitigation for water bird and waterfowl habitat losses.

In its Conceptual Mitigation Plan, Twin Lakes proposes to construct and maintain three raptor nest platforms: one at the Bosen diversion on Deep Creek, about 1 mile west of the Ben Johnson Family Farm site, one along the shoreline of the new reservoir, and one at an undetermined location along the Bear River between the other two platforms. Twin Lakes contends that this would provide nesting sites for raptors to offset the loss of mature cottonwood trees that would be inundated by the new reservoir or in the process of maturing at the proposed mitigation sites. As discussed previously in the *Loss or Conversion of Riparian and Wetland Vegetation* section, Twin Lakes proposes riparian mitigation and enhancement measures that would include a restoration planting scheme using native species. Incorporating cottonwood, willow, alder and birch into the plantings would increase wildlife habitat diversity and re-create stands that would be lost to inundation.

The mature trees that exist in the proposed project area provide cover, resting and/or nesting opportunities for raptors. Construction of the proposed project would disturb and potentially displace individual birds or pairs of raptors in the immediate project area. Loss of roosting and nesting trees and snags for raptor foraging would be experienced at the population level. Under Twin Lakes' proposal, 96 acres of bald eagle nesting habitat and 132 acres of roosting habitat would be lost due to inundation. Habitat suitability for osprey and golden eagle are similar to bald eagles; therefore, habitat losses to these raptors would be comparable to effects on bald eagles. The direct loss of twelve raptor stick nests identified within the study area during the bald eagle and peregrine falcon survey would be unavoidable. Although Twin Lakes proposes to construct and maintain three raptor nest platforms to offset this effect, the number of nesting platforms

would not be adequate to mitigate for the predicted number of acres of habitat and winter roosting opportunities that would be lost due to inundation.

Similarly, Twin Lakes would install nest boxes in the Deep Creek drainage to enhance landbird habitat. Nesting box installation is an acceptable mitigation measure used to provide beneficial habitat enhancement to affected avian species. However, Twin Lakes does not provide details in the Conceptual Mitigation Plan of what species would be targeted with the nest box installation, nor does it identify the total number of nest boxes it would install. Without this information, we cannot determine whether these boxes would be used by targeted species with any success unless they are placed in association with other suitable habitat features for that specific species. Therefore, we cannot conclude that these proposed nest boxes would provide suitable mitigation for loss of avian habitat and productivity. However, if Twin Lakes' final Mitigation Plan is developed in consultation with Idaho Fish and Game, and details of the existing landbird habitat in the Deep Creek drainage, target species, and placement for nesting structures is specified, some mitigation for the adverse effects of the proposed project from habitat inundation could be achieved as long as there is not already an abundance of such habitat at the proposed mitigation site.

Nesting platforms and nesting boxes should not be considered the only mitigation for habitat loss of the extent that would occur at the proposed project. As such, consultation with Idaho Fish and Game regarding the development of a final terrestrial mitigation plan for raptor and landbird habitat losses would assist in identifying additional measures that could be developed for appropriate replacement or enhancement habitat. This would ensure harmful effects are minimized and mitigation efforts are successful.

The Shoshone-Bannock Tribe's recommendation to increase acres held in trust on behalf of the tribes, or in fee by the tribes, lacks specificity about how many acres the recommended measure would affect or how the lands would be managed to benefit fish and wildlife. As such we cannot analyze the benefits of this recommendation.

Construction Effects on Wildlife

Construction of the proposed project would affect both resident and migratory wildlife through changing habitat characteristics. Construction of the proposed project would require heavy vehicle traffic during the construction period, extended human presence, increased noise levels, and increased levels of artificial lighting. These factors have the potential to disturb and disorient wildlife, thereby increasing the susceptibility to predators, reducing foraging success, or disrupting breeding behavior. The potential for direct mortality associated with vehicular collisions would also increase. Construction activities could be particularly harmful if they occur during periods that could be stressful to animals such as winter conditions, migration periods, or breeding seasons.

Twin Lakes proposes to develop a final construction schedule in consultation with resource agencies that would, to the greatest extent possible, minimize disturbance to wildlife during sensitive periods such as raptor nesting or mule deer fawning.

Our Analysis

During the 3.5-year-long construction period, increased human presence and noise associated with vehicles and heavy machinery would have unavoidable effects on local wildlife. Construction activities would also create hazardous areas for wildlife, including open pits and trenches and increased potential for vehicular-wildlife collisions. Clearing of vegetation and grading to prepare vegetated areas for project facilities have the potential to disturb nesting birds and disturb or destroy animal burrows. More mobile wildlife species would be expected to temporarily disperse to less disruptive locations if available. We expect the more tolerant, generalist species would likely return when construction is complete and attempt to re-establish in the restored areas or shift their local range within and adjacent to the river. Less mobile species in the immediate proposed project area would not likely survive due to inundation and loss of existing habitat.

Human-animal interactions may occur during both construction and operation, but would occur most frequently during construction, when human activity would be most intensive and wide-ranging (see appendix D, *Construction Equipment Use Estimates*). The rate of human-animal interactions would be further increased by the attraction of opportunistic predators and scavengers, specifically foxes, raccoons, and ravens, to areas of human activity. The most prevalent causes of attraction of animals to the construction area would include human foods, garbage, and ease of access to the new sites. Implementing BMPs pertaining to such waste material, as proposed by Twin Lakes in its draft Erosion Control Plan discussed in sections 3.3.1, *Geology and Soils Resources*, and 3.3.2, *Aquatic Resources*, would minimize such effects.

Inappropriate timing of reservoir filling could limit and disrupt breeding, foraging, and nesting of wildlife if water levels increase suddenly. Gradual inundation, as described in section 3.3.2, *Aquatic Resources*, would allow time for many affected wildlife populations to relocate to suitable habitat. Twin Lakes' proposed final construction schedule would include details on inundation timing, which could reduce harmful effects of the initial water elevation increases associated with filling the reservoir during vulnerable time periods.

Winter construction would cause habitat disturbance and displacement and would likely affect overwintering birds and game species of conservation concern during this time. During migratory periods, birds would experience disruption in resting and foraging/refueling efforts during migration stopovers. Larger mammals such as mule deer and elk using the project area for winter range and for spring fawning habitat would be displaced by the proposed inundation since the filling would likely occur during October 1and April 15, which corresponds to its winter and early spring use. Although Twin Lakes indicates that about 8,000 acres of equivalent quality summer and winter

mule deer habitat is available within 1 mile of the inundation area, habitat use in the riparian areas would be eliminated.

Construction of the project would create noise and human-associated disturbance that would affect wildlife species and cause them to leave the area. While it is not possible to completely eliminate all direct and indirect effects of construction, Twin Lakes' proposed consultation with resource agencies to establish a detailed construction schedule that minimizes disturbance to wildlife during sensitive periods would help to reduce potential impacts on big game during breeding and fawning seasons and winter conditions. Consideration of the migratory bird nesting season (April 1 through August 1) and bald eagle nesting period (January through August) in developing the construction schedule would help protect avian species from disturbance and potential mortality.

Operation Effects on Wildlife Movement

The proposed inundation may inhibit or create a barrier to movement of mammals between habitats on either side of the river, in addition to the existing barrier caused by Oneida reservoir.

Twin Lakes proposes to construct fencing on site to limit cattle impacts on shoreline habitat and to influence big game movement in the proposed project area following inundation. The fences would be situated in an effort to reduce Bear River crossing related stress by directing big game to narrower river crossing sites.

Our Analysis

Specific movement corridors were identified during the big game survey indicating that large mammals currently cross the Bear River at the narrower locations ranging from 60- to 120-feet wide. Construction of the reservoir would increase water width and depth over the 4.5-mile inundation area, increasing existing conditions to 300- to 600-feet wide in the narrow part of the canyon downstream of Redpoint Campground to more than 1,200-feet wide in the wider valley upstream of Redpoint Campground where wildlife crossing are now common.

Twin Lakes' Conceptual Mitigation Plan suggests that the larger game species would simply swim across the reservoir. This would require an increase in expended energy, however, to swim across the reservoir or travel around it to make a river crossing. A big game animal would be exerting energy otherwise needed to survive the harsh winter conditions in southeastern Idaho. Further, large reservoirs can create hazards when deer and elk attempt to cross on thin ice, resulting in increased mortality caused by drowning. We agree with Idaho Fish and Game's comment that fencing may direct big game to safer crossing locations, but it could also impede other wildlife from entering and leaving the reservoir.

Although Twin Lakes provides marginal predictions of project effects on game populations, it is evident that the proposed project could affect wildlife migration corridors for species other than deer and elk, such as moose or wild turkey, because they

would not likely be able to freely and efficiently move through the project area during migratory periods.

Twin Lakes' proposed measure to provide fencing for big game attempting to travel through the Bear River corridor would need to be assessed for appropriateness, as fencing could create an additional barrier that negatively affects big game and other wildlife movement and population potential in the area. While fencing could exclude cattle and benefit riparian vegetation, restricting access to project land and water with fencing may impede access to important foraging and resting areas during migratory seasons. It could also influence predator/prey interactions if the fences create barriers to safety. Twin Lakes includes provisions for fence consultation with landowners and agency personnel in its draft fencing plan and provided estimated locations in its April 1, 2014, response to the Commission's additional information request. However, final fencing details would need to be determined following verification of existing fence lines and further consultation. Working with Idaho Fish and Game to develop the fencing placement and timing would help to ensure safe wildlife passage and reduce potential adverse effects on wildlife migration. Furthermore, development of a final terrestrial mitigation plan, in consultation with FWS, BLM, and Idaho Fish and Game, to include proposed areas for habitat conservation, enhancement, and restoration, including the fencing plan, could reduce potential effects on these species.

Proposed Transmission Line Effects on Birds

Above-ground transmission lines may result in avian mortality from electrocution from phase-to-phase or phase-to-ground contact or collisions with conductors or grounding wires. These risks are greatest on small voltage lines where there is closer spacing of conductors, increasing risk of electrocution, and conductors are smaller and less visible. Large-bodied birds, including eagles, are at greatest risk because of their long wing spans that can reach between conductors.

Twin Lakes proposes to construct and operate a 0.7-mile-long, 46-kilovolt transmission line between the project substation to the interconnection point with the local electric grid. The lines would be supported on wood poles. To minimize potential for injury to birds associated with the project power line, Twin Lakes proposes to construct the line to current avian protection industry standards, but does not elaborate on the nature of these standards.

Idaho Fish and Game recommends that Twin Lakes reference the most recent version of the APLIC guidelines to minimize collision and electrocution hazards for birds (APLIC, 2006, 2012).

Our Analysis

To promote and facilitate industry-wide mitigation of these concerns, APLIC, a consortium including FWS and utilities, has published guidelines for conductor spacing to prevent electrocutions (APLIC, 2006) and measures to increase line visibility to

prevent collisions (APLIC, 2012). These publications provide specific recommendations for separation of conductors from grounding materials to prevent electrocution and measures to minimize risks associated with collisions. APLIC notes that conductor spacing of 60 inches is sufficient to minimize risk of electrocution. To reduce potential risk of collisions, APLIC recommends constructing lines parallel to primary flight pathways, constructing lines near existing land forms or trees as opposed to open areas, and using line markers to increase line visibility.

Twin Lakes' proposed transmission line is relatively short and would follow the contour of the Bear River downstream of the powerhouse, between the existing access road and the river. The riparian corridor is a major flyway for local birds and interactions between birds and the transmission line are likely. The drawing of a transmission line structure on Exhibit F-5 of the final application shows the conductors would have at least 60 inches of separation between the phase conductors and 40 inches between the phase conductors and neutral conductor.

Twin Lakes' proposed configuration of conductors is consistent with current APLIC guidelines, thereby minimizing risk of electrocution. The majority of the line would be in the southern end of Oneida Narrows with steep canyon walls on one side and the river on the other side, running parallel to the primary flight path in the area. The line would not cross the river. This location of the line would minimize risk to birds flying along the river. Several other transmission lines are present in the area. As such, we conclude that the proposed line is consistent with APLIC guidelines and would not be likely to substantially increase collision risk for birds over existing conditions.

Proposed Shoreline Buffer Effects on Wildlife Habitat

To allow public access to project lands and waters and to protect the habitat, scenic, recreational, cultural, and other environmental values of the reservoir shoreline, Twin Lakes proposes to provide a 100-foot buffer around the proposed reservoir shoreline. The buffer would provide recreational boaters and hikers with access to project lands and eliminate potential development in this area (as discussed further in section 3.3.5, *Recreation Resources*, and section 3.3.6, *Land Use and Aesthetics*).

Our Analysis

The proposed buffer would preserve upland habitat in the immediate project area and could offset some the need for mitigation habitat restoration off site. However the potential benefits of this measure on wildlife habitat are not quantified. To better evaluate the effects of the proposed shoreline buffer on wildlife habitat, we conducted a GIS analysis of acreage of cover types (as mapped in the Land Cover Study [Ecosystem Sciences, 2010]) within buffer distances from the proposed full-pond, 4,734-foot reservoir elevation. Table 3-37 presents the results of this analysis.

Table 3-37. Cover types within potential conservation buffers around the proposed reservoir.

	Potential Conservation Buffer (acres)				
Cover Type	**100-foot**	**200-foot**	**300-foot**	**500-foot**	**1,000-foot**
Agricultural Land	10.4	22.3	30.7	42.2	50.8
Broadleaf Dominated Riparian	3.0	3.4	3.6	4.3	6.3
Disturbed Low	0.6	0.6	0.6	0.6	0.6
Douglas-Fir/Limber Pine	0.0	0.3	1.3	7.0	20.9
Exposed Rock	7.4	17.3	26.3	34.0	49.5
Foothills Grassland	39.5	80.4	123.1	207.2	392.6
Graminoid or Forb Dominated Riparian	0.2	0.2	0.2	0.2	0.2
Low Intensity Urban	0.0	0.0	0.0	0.0	0.6
Maple	55.0	104.5	148.5	231.2	469.7
Road	3.7	5.3	5.8	6.5	9.2
Utah Juniper	6.3	18.0	38.3	96.3	271.9
Water	0.6	1.2	1.8	2.8	4.8
Grand Total	**126.7[a]**	**253.5**	**380.2**	**632.4**	**1,277.1**

[a] The column total is 126.7 acres, but to maintain consistency with the acreages presented in the final license application, we are using 124 acres for our discussion.

Twin Lakes' proposed 100-foot reservoir buffer would prevent future development in proximity to the proposed reservoir shoreline which would preserve wildlife habitat. However, acreage of habitat within the 100-foot buffer would be small relative to acreage of inundated habitat. Although Twin Lakes' proposed restoration of habitat at the Ben Johnson Family Farm site would provide mitigation for some habitat loss, this site is removed from the affected section of the Bear River and local wildlife populations. Increasing the buffer distance would provide protection for habitats adjacent to the proposed reservoir and provide some onsite mitigation for effects on wildlife. An additional buffer would also be more likely to encompass any riparian and wetland vegetation that develops along the reservoir perimeter.

For most habitat types, increases in acreage are proportional to increases in buffer distance. For example, a ten-fold increase in buffer width from 100 feet to 1,000 feet

would result in about ten times the acreage of foothills grassland. However, as shown in table 3-37, this is not always the case. Between the 100-foot and 300-foot buffers, there are substantial, non-proportional increases in Douglas fir/Limber pine, exposed rock, and Utah juniper habitats. These areas would provide habitat value for rock squirrel, bats, wild turkey, and mule deer.

Although large sections of the reservoir would be on BLM lands, portions of the northeast quarter of the project boundary would be adjacent to PacifiCorp lands. Currently, PacifiCorp manages these areas to protect riparian values, as part of its settlement agreement. However, because the proposed reservoir would remove the habitat value of these lands, it would in effect nullify intent of the PacifiCorp settlement and increase potential for development in these areas. Although Twin Lakes' proposed buffer would provide some protection for wildlife between the reservoir shoreline and adjacent development, the 100-foot corridor would have low value as a wildlife movement corridor. To minimize proposed effects, the reservoir banks should function as wildlife corridors, similar to existing conditions. Appropriate corridor widths to support this function for deer and elk range from 330 feet to 1.5 miles (Bentrup, 2008). As discussed previously, we expect the riparian vegetation structure around the reservoir to develop slowly and provide limited cover for large mammals. Increasing the buffer around the proposed Bear Narrows reservoir to 300 feet would provide more corridor function than Twin Lakes' proposed 100-foot buffer.

Effects on Special Status Wildlife

Northern Leopard Frog

Northern leopard frogs would be directly affected by the proposed project operation through conversion of suitable habitat and changes to water temperature. These activities could affect frog distribution, abundance, and timing of breeding. Modifying hydrology through inundation could affect temperature and ultimately disrupt breeding, destroy egg masses, and flush tadpoles downstream.

As a component of the Conceptual Mitigation Plan, Twin Lakes proposes to provide at least 76 acres of northern leopard frog habitat to replace the existing habitat that would be inundated. Twin Lakes contends that this habitat would be developed or created along the shores of the new reservoir and Mink Creek and at the Ben Johnson Family Farm site. Furthermore, Twin Lakes would establish provisions that would ensure the mitigation sites are managed and maintained to provide benefits for northern leopard frogs and other amphibians and reptiles.

Idaho Fish and Game indicates that the project effects would not be consistent with the goal of CWCS, which is to implement conservation measures to benefit Idaho's wildlife. Idaho Fish and Game also indicates that, by its calculation, construction of the project would result in the loss of 264.8 acres of northern leopard frog habitat and that the proposed habitat enhancement and protection proposed by Twin Lakes would not be equivalent to the predicted number of acres of habitat that would be lost. Idaho Fish and

Game states that mitigation acres of wetland and riparian habitat in a quantity and quality equal to or greater than those lost to inundation could be provided to offset some of the effects of the lost habitat. Therefore, Idaho Fish and Game recommends that at least 264.8 acres of northern leopard frog habitat should be protected or created. Idaho Fish and Game further states that mitigation acres could be protected through conservation easements or by purchase of property that is then transferred over to a management agency for appropriate protection and management.

Our Analysis

The project would result in the loss of 264.8 acres of northern leopard frog habitat, which constitutes about 58 percent of the predicted habitat in the study area. Twin Lakes' Conceptual Mitigation Plan states that an estimated 29 acres of new potentially suitable northern leopard frog habitat would be developed along the shores of the new reservoir and Mink Creek. Additionally, 47 acres of wetland and aquatic habitat could be created at the Ben Johnson Family Farm site. The Conceptual Mitigation Plan also suggests the possibility of creating additional acres of wetland associated with Battle Creek. Twin Lakes does not propose specific mitigation for the loss of northern leopard frog habitat that would be inundated by the proposed reservoir, including three breeding sites documented along the river near Redpoint Campground. Proposed mitigation would only create 76 acres of new habitat, representing a net loss of 188.8 acres of habitat, for which no other mitigation is proposed. Overall, the loss of suitable habitat due to project construction would be likely to reduce the population of northern leopard frogs by an expected 50 percent along the affected reach of the Bear River in the area between Highway 36 and Oneida dam. We find that the proposed habitat enhancement or protection would not fully mitigate for the predicted number of acres of habitat that would be lost.

Development of a final terrestrial mitigation plan, in consultation with FWS, BLM, and Idaho Fish and Game, to include areas for conservation, enhancement, and restoration for 264.8 acres of habitat for northern leopard frog, could reduce potential effects on this species. Establishing the goals of a wildlife mitigation plan would help to establish the geographic scope of potential suitable parcels. For example, if the goal is to provide habitat that would be suitable for the frogs displaced by inundation, the parcels would need to be in relative close proximity to the proposed reservoir and of equal or greater habitat quality and quantity. Smith and Green (2005) report in their movement and dispersal study that the maximum dispersal distance for northern leopard frogs ranged from 0.1 mile to 5 miles and an average of 1.7 miles. Given the Ben Johnson Family Farm site, the largest proposed mitigation parcel, would be located more than 12 miles downstream of the proposed dam, it is unlikely that the displaced northern leopard frogs or similar amphibians would have the ability to readily disperse to this area on their own. In addition, there would need to be a reasonable chance that such protected or created habitat would eventually be occupied by frogs. Stocking any such locations with frogs collected prior to inundation by the reservoir could better enable this habitat to mitigate effects on local northern leopard frog populations. Nearby locations that could

provide suitable habitat include Mink Creek upstream from its confluence with the Bear River and along the Bear River below Highway 36.

Changes in water temperature resulting from proposed operations would also have the potential to affect northern leopard frogs. As discussed in section 3.3.2.2, *Effects of Project Operation on Dissolved Oxygen and Temperature*, during late spring, summer, and early fall, temperature and DO stratification would likely develop in the new reservoir, leading to possible low DO or anoxic conditions in the hypolimnion. Release of low-DO or anoxic waters through the powerhouse would be detrimental to downstream biota, including amphibians, if that occurred. However, DO modeling by Twin Lakes showed that DO levels may be slightly higher than current conditions during the spring and early-summer, although could be lower in other parts of the year. Measures to enhance DO in project discharges would be implemented by Twin Lakes, if required, and additional measures could be considered if the proposed measures are not effective in meeting water quality standards. Similarly, releases of cool, hypolimnetic waters when the proposed reservoir is stratified would result in a cooler temperature regime in downstream reaches which, although beneficial to trout, could reduce the rate of amphibian development and metamorphosis (Catenazzi and Kupferberg, 2013). Providing mitigation acreage of equal or greater quantity and quality as mitigation for the loss of suitable frog habitat would offset this project effect.

The project has potential to reduce habitat quantity and quality for northern leopard frogs. Establishing northern leopard frog habitat suitability criteria, in consultation with Idaho Fish and Game, would ensure that any parcels acquired, or habitat created, would represent acceptable frog habitat. However, once appropriate criteria are developed, the benefits of acquiring or creating such habitat would not be able to be realized until after the sites would be acquired or created. This uncertainty could be reduced by creating frog habitat within the proposed project boundary using such techniques as constant level ponds[49] along the perimeter of the proposed reservoir.

Townsend's Big-eared Bat and California Myotis

Activities related to the construction, maintenance, and increased recreational use associated with the project may disturb Townsend's big-eared bats and California myotis, which are highly sensitive to human disturbance. Project operation would inundate habitat that provides potential roosting habitat for bats.

Although Twin Lakes does not propose specific measures for any bats, Idaho Fish and Game states that all bats found in Idaho are protected non-game species and that

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[49] Constant-level ponds are sometimes used to stabilize shoreline habitat at reservoirs with periodic water level fluctuations. A small dyke is created that allows water into the site at full pond, and retains water in an area when the reservoir is drawn down (see Pechmann et al., 2001).

potential project effects on all bat species, not just the two studied, should be evaluated and considered in any wildlife mitigation plans for the project. In addition, Idaho Fish and Game recommends that Twin Lakes provide mitigation through providing compensatory mitigation acres of suitable bat roosting and foraging habitat in a quantity and quality equal to or greater than those lost because of inundation. Idaho Fish and Game further states that mitigation acres could be protected through conservation easements or by purchase of property that is then transferred over to a management agency for appropriate protection and management.

Our Analysis

The inundation of cliff, cave, and tree roosts and foraging habitat is expected to affect bat distribution and, depending on the timing of inundation, may result in the direct mortality of bats if their roosts are flooded and bats cannot escape. Loss of wetland, riparian, and riverine habitat may also affect the food base of bats using the project area. Twin Lakes' Bat Populations Use and Habitat Assessment (Ecosystem Sciences, 2009b) indicates that potential roosting habitat occurs within the exposed rock and broadleaf-dominated riparian cover types in the project area. The proposed project would inundate about 60 acres of potential roosting habitat (including broadleaf riparian and exposed rock cover types). Construction and use of the proposed access road for summer homes in the southern part of the project boundary would be in proximity to the lower cave site surveyed during the study, and could provide increased human disturbance for bats roosting in this area. Although no sensitive bat species were observed or recorded during the surveys, these areas provide suitable habitat for these species. Therefore, we find that the project has potential to reduce habitat quantity and quality for bats.

Development of a final terrestrial mitigation plan to provide bat habitat at equivalent locations in the project vicinity that includes areas with cliff and rock formation surface area and similar cave features would help to mitigate the loss of habitat caused by the proposed inundation. Providing mitigation acreage of equal or greater quantity and quality for the loss of suitable bat roosting and foraging habitat would partially offset this project effect. Based on Twin Lakes' surveys, this would entail conservation, enhancement, and restoration for 59 acres of potential bat roosting habitat, comprising about 1 acre of exposed rock and 58 acres of mature cottonwood.

Rock Squirrel

The proposed project would inundate rock squirrel burrowing and foraging habitat. These effects have a potential to result in decreased habitat quantity and quality for the local rock squirrel populations and could result in a decline in population size.

Twin Lakes' rock squirrel habitat assessment (Ecosystem Sciences, 2009c) indicates the proposed project would inundate 19 acres of rock squirrel burrowing habitat. In total, Twin Lakes estimates 237.8 acres of permanent and 64.9 acres of temporary loss/change to upland vegetation used by the rock squirrel (foothill grassland, maple, agriculture, Utah juniper, and disturbed low cover classes). Twin Lakes notes that

the majority of habitat loss is located in the vicinity of Oneida Narrows Road and that squirrels use the road as a migration corridor to access foraging habitat in riparian areas. Twin Lakes expects the project would result in a decrease in the local population, but does not expect the project to affect the greater meta-population of rock squirrels up and down the Bear River corridor. Twin Lakes states that maple, juniper, and grassland habitats that provide primary food resources within and adjacent to the project area would remain plentiful for surviving rock squirrels. Twin Lakes notes that it has worked to minimize these effects by designing the project to limit disturbance areas as much as possible. Twin Lakes' proposed mitigation for lost rock squirrel habitat is the removal of the present Oneida Narrows Road and the potential creation of wetland and riparian habitat at the Ben Johnson Family Farm site and possibly the Battle Creek wetland site.

Idaho Fish and Game states that the project effects are not consistent with CWCS goals to implement conservation measures to benefit Idaho's wildlife. The agency's comments indicate it does not have confidence in Twin Lakes' habitat model for this species, as most of the recorded observances fell outside the predicted habitat areas and the model only incorporated data for burrowing habitat, discounting the value of foraging habitat and travel corridors. Idaho Fish and Game also disagrees with Twin Lakes' assessment that although the proposed project may affect the local population, it would not affect the greater meta-population along the Bear River because there is no data describing the extent or population size of a meta-population. Idaho Fish and Game recommends that Twin Lakes use the rock squirrel model to reevaluate potential losses to rock squirrel habitat, recognizing the value of all rock squirrel habitat and not limiting the model to burrowing habitat. To mitigate for effects to this species, Idaho Fish and Game recommends Twin Lakes perform a survey of the proposed mitigation site to determine if there is adequate upland habitat to support rock squirrels. Idaho Fish and Game further states that mitigation acres could be protected through conservation easements or by purchase of property that is then transferred over to a management agency for appropriate protection and management.

Our Analysis

Twin Lakes' habitat modeling identified 1,613 acres of potential burrow habitat in the rock squirrel study area; 19 acres of this potential habitat would be lost within the proposed reservoir inundation area. Additionally, the proposed reservoir would inundate about 59 acres of broadleaf-dominated riparian habitat. This habitat provides prime foraging opportunities for rock squirrel. This 59 acres includes the Redpoint Campground, which is a particularly favorable foraging location for local rock squirrels.

Although the proposed inundation of Oneida Narrows Road would reduce rock squirrel mortality associated with road kills, there is no evidence to suggest the removal of this mortality factor would offset any reduction in the rock squirrel population due to inundation of its habitat. There is also no indication why the replacement access road would not provide similar mortality risk. Consequently, we conclude there would be no

measurable gain or loss to the local rock squirrel population associated with inundation of Oneida Narrows Road.

Twin Lakes' model for rock squirrel habitat presented in the study (Ecosystem Sciences, 2009c) only evaluates burrowing habitat and did not adequately consider foraging habitat. We agree with Idaho Fish and Game that this assessment represents an underestimate of effects to this species. Without a more complete model that better defines rock squirrel habitat in the inundation area, we find it more appropriate to use the cover class analysis to estimate project effects on habitat for this species. Providing mitigation for 19 acres of burrowing habitat without incorporating considerations for foraging habitat would not adequately compensate for effects of the project. If final mitigation efforts provide 237.8 acres of habitat for rock squirrel, including 19 acres of burrowing habitat, mitigation would more accurately represent habitat lost to inundation.

Idaho Fish and Game's recommendation to perform a survey of affected areas and proposed mitigation sites would assist in the evaluation of upland habitat to support rock squirrels. The wetland and riparian habitat associated with the Ben Johnson Family Farm site, which includes the Battle Creek site, may have the potential to provide rock squirrel foraging habitat. However, because Twin Lakes has not been able to access the site, there is no information about whether burrowing habitat is present on or adjacent to the proposed mitigation area. Performing a survey of the Ben Johnson Family Farm site, as Idaho Fish and Game recommends, would enable a determination of whether there is a rock squirrel population present on or adjacent to the proposed mitigation site and if foraging and burrowing habitat currently exists at the site. Given the distance between the proposed mitigation site and the proposed reservoir, we find it unlikely that squirrels in the project area would naturally disperse to the mitigation site. There are no suitable travel corridors connecting these sites.

Additionally, development of habitat on a single large parcel cannot re-create the corridor function of habitat that the project would remove along the Bear River. Within a landscape context, riparian corridors allow animals to travel up and down the river, accessing suitable habitat patches away from the river, thus supporting habitat connectivity. Removal of the corridor would require animals to spend more time in low-quality habitat when moving between high-quality habitat patches. This landscape pattern, with connected patches of suitable habitat dispersed through a larger matrix of less suitable habitat, reduces intraspecific competition throughout the metapopulation while maintaining gene flow though subpopulations. In this scenario, adverse conditions in one patch are less likely to affect the population as a whole. Conversely, combining subpopulations into a single area of suitable habitat, with limited opportunities for dispersal to other habitat patches, may increase population susceptibility to disease, occasional low food availability, or other sporadic adverse conditions that may only affect a subpopulation under existing conditions. Therefore, while the Ben Johnson Family Farm site may provide similar acres of habitat, the habitat could be less favorable than current habitat patch dynamics in Oneida Narrows.

Protected habitat buffers around the proposed reservoir, as discussed earlier in this section and in section 3.3.6.2, *Land Use and Aesthetics, Environmental Effects,* would provide some benefit in this regard. The reservoir perimeter, however, is unlikely to support similar vegetation cover as the existing habitat and is likely to be of lower quality. If surveys indicate that the Ben Johnson Family Farm site is not currently inhabited, and would provide suitable burrowing and foraging habitat for rock squirrel, there could be potential for Twin Lakes to implement a relocation program for this species. Including provisions in a final terrestrial mitigation plan that revises the proposed Conceptual Mitigation Plan to include proposed areas for conservation, enhancement, and restoration for 237.8 acres of habitat for rock squirrel, including 19 acres of burrowing habitat, potential effects on rock squirrels could be reduced. Whether any of these 19 acres could be appropriately included at the Ben Johnson Family Farm site would need to be assessed following onsite surveys.

Mule Deer and Elk

The project area lies within Idaho Fish and Game Big Game Management Unit 77 and within the Bear River Elk Zone. The proposed project would inundate habitat for deer and elk and, as discussed previously in this section, create barriers to movement in the project area. Inundation of Oneida Narrows Road could also reduce public access to hunting areas.

Twin Lakes proposes to develop a 538-acre parcel on the Bear River downstream of the proposed project at the Ben Johnson Family Farm site, to maximize wildlife habitat types that could benefit mule deer and elk. Twin Lakes states that restoration of this area would increase riparian habitat that would contribute to the overall quality and quantity of wildlife habitat available following project construction. Twin Lakes also proposes to develop a construction schedule in consultation with Idaho Fish and Game to minimize disturbance to key wildlife activities, and to maintain a 100-foot buffer around the reservoir perimeter. Twin Lakes does not propose mitigation for effects on deer or elk movement corridors or for loss of public access for big game hunting opportunities.

Interior, FCFGA, GYC, and TU all comment that the project would have adverse effects on wintering ranges of big game if the lower elevations of the canyon are inundated by the proposed reservoir. These entities note that deer, elk, and moose are particularly at risk of drowning if they try crossing the proposed reservoir in the winter if there is thin ice.

Idaho Fish and Game states that Twin Lakes proposed project would not be consistent with the Idaho Mule Deer Management Plan for the Bannock deer management unit, which includes the directive to improve key winter, summer, and transitional habitats for mule deer populations. Idaho Fish and Game recommends that Twin Lakes provide at least 435 acres of mule deer fawning and wintering habitat to partially mitigate for the effects of the proposed project. Idaho Fish and Game further states that mitigation acres should be protected through conservation easements or by

purchase of property that is then transferred over to a management agency for appropriate protection and management.

Interior, BLM, FCFGA, GYC, and TU further recommend providing a ratio of 5 acres of riparian habitat for every acre of riparian habitat affected by the proposed project to mitigate effects on deer and elk.

Our Analysis

According to Twin Lakes' study, the proposed project would inundate or otherwise remove 435 acres of mule deer habitat, most of which is considered to be good to excellent quality habitat (Ecosystem Sciences, 2010). A large amount (> 8,000 acres) of equivalent quality summer and winter mule deer habitat is available within 1 mile of the inundation area. Most of the upland habitat currently existing at elevations above the proposed reservoir would remain unchanged by the project, therefore, we find that it is reasonable to expect that mule deer would continue to use the project vicinity for summer and winter range if the project is constructed. However, use patterns within the proposed project boundary would change following inundation of the riparian corridor. Additionally, as discussed previously, the reservoir would impede crossing over the river and could result in increased injury and mortality associated with ice crossings.

Among the land cover types in the vicinity of the project, the forested broadleaf-dominated riparian areas, Douglas-fir/limber pine, maple, and Utah juniper cover types all provide good to excellent habitat for mule deer in various seasons, providing slightly better winter habitat than summer habitat. The agricultural land provides additional food resources to deer, while the foothills grassland areas provide good winter habitat, based in part on their aspect. Because the area's vegetation types are heavily defined by slope, aspect, and elevation, the landscape has a diversity of vegetation types that are correlated with topography, as well as a large amount of edge habitat. These factors all influence the quality and quantity of habitat throughout the year.

Riparian zones constitute an important land cover type for mule deer and elk because of their high productivity, complex habitat structure, and role as movement corridors. The loss or change of this habitat would likely change the migration patterns for these species. We do not expect the proposed reservoir shoreline to develop sufficient riparian vegetation to reproduce the character of the existing riparian areas based on the length of time it would take to re-establish mature vegetation. Therefore, the value of the reservoir perimeter as a travel corridor or as fawning habitat would be lower than the existing river corridor.

Excellent quality mule deer fawning habitat is located primarily in the riparian areas of Oneida Narrows along the Bear River. About 72 percent of this available fawning habitat would be lost with proposed project construction. Although some new riparian areas would develop along the shores of the new reservoir and in the lower reaches of Mink Creek, net loss of high quality fawning habitat would constitute the most significant potential adverse effect on mule deer from project construction. Deer would

be displaced to lower quality habitat on agricultural land and grasslands downstream of the new reservoir or in upland areas adjacent to the new reservoir. Twin Lakes, however, concludes that the availability of significant amounts of equivalent habitat throughout the larger regional area makes it unlikely that overall mule deer production would decline. Idaho Fish and Game argues that, for any species, a net loss of excellent habitat limits productivity and, therefore, the net loss of excellent fawning and rearing habitat would adversely affect the productivity of mule deer in the project area. We expect that mule deer productivity would decrease in the project area because of the loss of quality fawning and rearing habitat.

Twin Lakes emphasizes reservation and development of new wildlife habitat, especially riparian habitat, in its development of mitigation measures to offset project-induced habitat loss. Riparian vegetation could be developed or enhanced around the fringe of the new reservoir and along the stream channel in the Mink Creek corridor below the Twin Lakes diversion. Restoration and expansion of wetlands and riparian habitat on the low-gradient floodplain along the conservation parcel site could provide alternative high quality fawning habitat for mule deer. However, these measures would not offset the loss of winter habitat that is more critical to big game survival than summer range. Consulting with Idaho Fish and Game in the preparation of a final terrestrial mitigation plan to address loss of suitable winter range for elk and mule deer would minimize long-term impacts on big game species.

Providing at least 435 acres of mule deer habitat in a quantity and quality equal to or greater than those lost to due to inundation could partially mitigate for project effects. If development of the Ben Johnson Family Farm site proceeds as proposed, the site could provide some mitigation for inundated habitat along the Bear River. Consultation with Idaho Fish and Game to develop a final terrestrial mitigation plan could help to identify additional parcels that could be protected and conserved as appropriate replacement habitat. Twin Lakes would need to establish provisions that would ensure the mitigation parcels are suitable for mule deer. As currently proposed, the Ben Johnson Family Farm mitigation parcel would not replace travel corridor functions lost with inundation of Oneida Narrows and is unlikely to fully mitigate for project effects.

Large mammals common in the project area, including mule deer and elk, would benefit from larger setbacks than the proposed 100 feet, especially in open sage meadows lacking visual barriers to human activity. On the other hand, the steep slopes of the reservoir would provide elevation separation between wildlife and human activities on the water surface or shoreline. Implementing a 300-foot buffer would better promote movement of wildlife along the reservoir perimeter and provide some mitigation for project effects on habitat connectivity.

Although Interior, BLM, and TU recommend a 5 to 1 mitigation ratio to mitigate for effects on deer and elk habitat in riparian areas, our review of the project vicinity indicates there is not sufficient habitat available to meet this ratio. The agencies provide minimal evidence to support this ratio, other than stating that using existing riparian

habitat at the Ben Johnson Family Farm to offset project effects would result in a net loss of habitat. We agree that using existing habitat for mitigation could result in a net loss of habitat. However, existing conditions at the Ben Johnson Family Farm include cattle grazing, agriculture, and limited habitat diversity. Therefore, we find that existing conditions at the proposed mitigation site are of lower quality without any enhancements compared to that present in the proposed project area. Twin Lakes' proposed measure to enhance this habitat, as well as providing for the conservation of cottonwood stands and a 300-foot buffer corridor around the reservoir, would help offset project effects on deer fawning habitat.

Wild Turkey

Project operations would inundate broadleaf-dominated riparian, maple, Douglas-fir/limber pine, foothills grassland, agriculture, and Utah juniper land cover types, all of which provide suitable habitat for wild turkey at various time of year. This reduction in habitat could result in declines in the local population of this species.

Twin Lakes states the existing overall low turkey population density implies that roosting turkeys could easily relocate to other areas without crowding other birds. No species-specific mitigation is proposed by Twin Lakes.

Idaho Fish and Game states that the project effects are not consistent with the Idaho Fish and Game Upland Game Management Plan, specifically the management directives to: (1) maintain or improve available habitat; and (2) emphasize recreational hunting, but promote non-consumptive uses as well. Idaho Fish and Game, therefore, recommends that Twin Lakes provide at least 435 mitigation acres of equal or greater quantity and quality to support wild turkey populations and for the loss of access for public hunting opportunities. Idaho Fish and Game further states that mitigation acres could be protected through conservation easements or by purchase of property that is then transferred over to a management agency for appropriate protection and management.

Our Analysis

Based on Twin Lakes' study, the proposed project would inundate or otherwise remove 435 acres of wild turkey habitat, including 174 acres of excellent quality and 160 acres of good quality habitat (Ecosystem Sciences, 2009d). Components of the inundated areas include broadleaf-dominated riparian and maple cover types, which are especially important for winter habitat. Although additional suitable habitat for wild turkey is available in the project vicinity, outside of the project area, the proposed project would remove large sections of contiguous habitat that functions as a travel corridor through the local area. As such, we conclude the project would affect the local wild turkey population. Providing at least 435 acres that would protect existing wild turkey habitat, as Idaho Fish and Game recommends, would mitigate for habitat lost from construction of the proposed project but might not provide similar quality of habitat (excellent and good quality habitat) that would be lost.

Suitable mitigation land would include areas that would provide habitat for summer nesting, brood rearing, and winter foraging, as these time periods are associated with turkey reproduction (nesting and brood rearing) and most mortality (chicks lost during rearing and over winter mortality). Proposed habitat modifications at the Ben Johnson Family Farm site could result in suitable habitat for wild turkey and could replace hunting opportunities lost from the project area by providing public access to this site that is now privately held. However, additional site investigation would be needed to determine if the proposed habitat enhancements are practical and the extent to which wild turkey already occupy the proposed mitigation parcel or adjacent land, and therefore would benefit from protection and enhancement measures at the site. Additionally, development of habitat on a single large parcel cannot re-create the corridor function of habitat that the project would remove along the Bear River. Protected habitat buffers around the proposed reservoir, as discussed in section 3.3.6.2, *Land Use and Aesthetics, Environmental Effects*, would provide some benefit in this regard; although, it is unlikely the reservoir perimeter would support similar vegetation cover as the existing habitat that would be lost and is likely to be of lower quality because young tree stands would lack the protective cover of mature stands. It would take many years for new riparian areas to develop the cover habitat and foraging resources of the existing riparian zone.

Developing a final terrestrial mitigation plan that to include conservation of 435 acres of wild turkey habitat would reduce potential effects on this species. Twin Lakes would need to establish provisions that would ensure any such parcels identified for mitigation are suitable for wild turkey. A more thorough assessment of the Ben Johnson Family Farm site would indicate whether wild turkeys are present or proposed habitat restoration measures would create suitable turkey habitat that would be successfully colonized by turkeys and would create associated hunting opportunities.

Bald Eagle

Project construction would create noise and human-associated disturbance that could disturb nesting eagles, resulting in reduced reproductive success. Construction and operation of the project could remove broadleaf riparian habitat that currently provides perching, roosting, and nesting habitat for bald eagle through both inundation and construction disturbance. These areas support mature cottonwood trees that provide tall structure favorable for eagles. Inundation of the Bear River could also alter a prime winter foraging area by converting 4.5 miles of river to a deep water reservoir that would often freeze, precluding any access to bald eagle preferred prey, fish.

Twin Lakes proposes to mitigate for effects on bald eagle habitat through the enhancement and restoration of riparian habitat, as previously discussed in the vegetation section and through the installation of nesting platforms, as discussed in the *Wildlife Habitat Loss, Fragmentation, and Disturbance* section.

Interior, FCFGA, GYC, Wasatch Audubon, and TU all comment that the project would flood areas, completely inundating nesting trees that currently provide nesting

habitat for eagles. Further, the project would turn a riverine stretch that provides winter fishing opportunities for eagles into a slack-water reservoir that could eliminate winter fishing opportunities if frozen.

Idaho Fish and Game recommends that Twin Lakes acquire a mitigation parcel that provides similar habitat, in equal or greater quality and quantity to that lost, to provide mitigation for some of the net loss of important bald eagle nesting, roosting, and foraging habitat. Idaho Fish and Game recommends the land include at least 5.0 miles of riverine habitat along the Bear River and at least 70 acres of currently established cottonwood riparian habitat.

Our Analysis

The National Bald Eagle Management Guidelines (FWS, 2007) recommend buffer distances from active eagle nests to reduce potential for noise disturbance to nesting eagles. Buffer distances vary depending on surrounding topography, land use, and proposed noise levels. The maximum recommended buffer distance is 0.5 mile and is suggested as a protection distance from activities resulting in loud staccato noises similar to blasting or fireworks. The existing active eagle nest is located more than 2.5 miles from the proposed dam site and separated by steep canyon topography. The nest is about 1 mile from the proposed new campground and boat ramp. No construction activities are proposed in the vicinity of the nest. Therefore, proposed construction activities would be in compliance with the recommended buffer guidelines to protect nesting eagles.

The proposed project would inundate broadleaf riparian habitat consisting of mature cottonwood stands, eliminating one active bald eagle nest site and 59 acres of suitable roosting and perching habitat. Because existing vegetation along the proposed reservoir elevation is devoid of the tall, supercanopy trees bald eagles prefer, we conclude that all existing eagle nesting habitat in the reach would be removed. Creation of the reservoir would increase water depth, allowing fish to swim below the reach of foraging eagles. The project would turn the river stretch that provides winter fishing opportunities for eagles into a slack-water reservoir that could be covered with ice during the winter months, thus eliminating winter foraging opportunities for eagles. Twin Lakes' Bald Eagle and Peregrine Falcon Use and Habitat Assessment (Ecosystem Sciences, 2009e) estimates the project would inundate about 50 percent of the existing winter foraging habitat in the study area, including 61 percent of optimal foraging habitat and 43 percent of good foraging habitat. The study notes that winter roosting habitat is directly related to vegetation types and proximity to foraging habitat. As such, the removal of foraging habitat would also result in substantial loss of roosting habitat. While the report quantifies acreage of existing roosting habitat that the project would inundate, it does not quantify the acreage of existing roosting habitat that would no longer be suitable due to reductions in foraging habitat resulting from winter ice on the proposed reservoir.

The majority of winter roost locations observed during the Bald Eagle and Peregrine Falcon Use and Habitat Assessment were located in three areas: Redpoint

Campground and the surrounding broadleaf riparian vegetation; near Maple Grove Hot Springs on Oneida reservoir; and above Oneida reservoir at the confluence of Cottonwood Creek and the Bear River. Creation of the proposed reservoir would remove the roosting sites associated with the broadleaf riparian forest near Redpoint Campground, resulting in increased eagle density at the other two winter roost locations and placing increased pressure on resources in those areas.

Twin Lakes' proposed measures to plant native riparian trees and construct three nest platforms would not adequately mitigate for the loss of eagle habitat. Planting replacement trees would provide little if any benefit to eagles until the trees reach maturity, which, assuming successful establishment, is not likely to occur until the end of a 30- to 50-year license term (the length of a license if the Commission were to issue a license for the project). Nesting platforms may help offset loss of nesting sites, but would provide minimal resources for wintering eagles that roost in large trees. These measures provide no mitigation for loss of foraging resources associated with river inundation. Eagle foraging opportunities at Winder and Condie reservoirs would remain unchanged with the proposed project, and proposed riparian vegetation enhancement efforts at these locations would be unlikely to change bald eagle nesting, perching, or roosting opportunities.

Idaho Fish and Game's recommendation for conservation of existing cottonwood forest would be an effective method for off-setting project effects on bald eagles. However, based on our review of aerial imagery along the Bear River upstream and downstream of the proposed project, it is not clear that a 5-mile stretch of river with 70 acres of cottonwood woodland exists outside of the proposed project area. There appear to be small pockets of cottonwood stands between the proposed project and the downstream Ben Johnson Family Farm site. However, Russian olive becomes increasingly dominant as distance from the project increases. Russian olive woodlands do not provide similar bald eagle habitat as cottonwood because they are shorter and do not provide the supercanopy perching and nesting habitat that bald eagles prefer. Upstream of the proposed project, riparian woodlands are scarce with agriculture land use extending to the river banks.

If Twin Lakes secures conservation rights for cottonwood stands along the Bear River between the proposed project and the Ben Johnson Family Farm site, as part of a final terrestrial mitigation plan, effects on bald eagle nesting, perching, and roosting habitat would be reduced. However, because it is unlikely Twin Lakes could conserve existing cottonwood stands equal to 70 acres, we conclude that the proposed project would have adverse effects on bald eagle, at least until Twin Lakes' proposed cottonwood plantings mature.

Trumpeter Swans

Trumpeter swans use the riverine Bear River downstream of Oneida dam during winter. There is no evidence of summer breeding in the project area, although breeding

is known to occur in wetlands and lakes surrounding Island Park, Idaho, and the Market Lake and Sand Creek wildlife management areas, roughly 40 miles north of the project. Project operation may limit the use of the proposed reservoir as an ice-free winter foraging area. Water impoundment resulting from the project would increase potential for ice formation in the project area, which could remove winter foraging resources for trumpeter swans.

Twin Lakes' concludes that no mitigation is required for trumpeter swans and suggests that the new reservoir could expand swan use of the area. It further concludes that the Ben Johnson Family Farm site would increase swan habitat.

Idaho Fish and Game comments that it has implemented extensive conservation activities targeting winter expansion of trumpeter swan, to disperse congregations near Island Park, north of the project area, to other suitable habitat in the state. Idaho Fish and Game identifies Oneida Narrows as an important area for swans during the translocation effort and expects future efforts to focus on expanding winter trumpeter swan populations in the project area. To mitigate for losses in winter swan habitat, Idaho Fish and Game recommends that Twin Lakes provide ice-free winter foraging and resting areas equivalent to the 5 miles of riverine habitat that would be lost to inundation. Idaho Fish and Game further recommends Twin Lakes conduct an assessment of potential trumpeter swan habitat at the Ben Johnson Family Farm site to determine if the proposed acquisition would adequately mitigate for project effects on trumpeter swans.

Our Analysis

The proposed project would convert about 74 acres of riverine wetlands to new lacustrine wetlands suitable for trumpeter swan during most seasons; however, it is not certain these areas would be available during the winter, when swans are most likely to occur at the project. Under current conditions, the river provides ice-free foraging habitat with water depths where food resources are available to swans. If the reservoir freezes during winter months, it would remove access to this habitat, as the swans cannot break through the ice to access aquatic vegetation underneath. Therefore, although the project may increase habitat during open water periods, removing foraging resources during the winter, when foraging resources are scarce, would constitute an adverse effect on this species. Likewise, project effects would not be consistent with Idaho Fish and Game's regional conservation actions to disperse wintering swans from other locations within the state, in part, by establishing a wintering population in the Bear River watershed.

Developing a final terrestrial mitigation plan to include conservation of trumpeter swan habitat could partially mitigate potential effects on this species. This habitat would be synonymous with 200 acres of waterfowl nesting and brooding habitat and 5 miles of ice-free riverine habitat discussed previously in *Wildlife Habitat Loss, Fragmentation, and Disturbance*. Twin Lakes would need to establish provisions that would ensure any parcels identified for mitigation are suitable for trumpeter swan winter foraging habitat. Creation of side channels and islands on the Ben Johnson Family Farm site would provide such habitat, although it is not possible to determine the quality or quantity of

habitat until further planning for the site is completed based on site-specific field surveys. Consequently, additional mitigation parcels may be needed to fully mitigate for the effects of the project.

Recreational Development Effects on Wildlife

Twin Lakes' proposed recreational measures that may affect terrestrial resources include the addition of a 4.1-acre multi-use recreation facility on the east side of the new reservoir to replace Redpoint Campground. Twin Lakes would also construct a new Oneida Narrow hiking trail connecting the proposed campground on the new reservoir to the Narrows cliffs. Boat launches, parking lots, and portable toilets would also be developed in the Narrows below the powerhouse and within the Ben Johnson Family Farm site.

Our Analysis

Proposed recreation measures at the project would result in minor vegetation removal (4.3 acres) and displacement of wildlife during construction, and possibly as a result of any newly developed recreational use in these areas. As noted in section 3.3.5, *Recreation*, recreation survey results indicate that visitors' primary purpose for visiting the project area was to access Oneida Narrows recreational resources to fish in the river, camp, view wildlife, float or boat in the river, picnic, and spend time with family and friends (see section 3.3.5, *Recreation Resources*, table 3-37). Only 2.1 percent of visitors use the proposed project area for big game and upland hunting. The temporary and permanent access provided by project construction and operation could facilitate increased recreation activity in the Bear River Basin, namely fishing, camping, and wildlife viewing. However, recreation survey results indicate that, if the project is constructed, very few visitors (8.7 percent) would recreate on the reservoir, and most (about 80 percent) would go elsewhere for their recreational pursuits. This suggests a decline in recreation use of Oneida Narrows and a possible reduction in potential threats to wildlife under the proposed project. Wildlife species present in the basin, such as grouse, ducks, geese, turkey, and big game, would still experience disturbances through increased human presence and hunting pressures potentially facilitated by improved access.

Wildlife would continue to use the area but reduction in available habitat would displace some animals. These animals would most likely move to available habitat found outside the project area and continuous areas with similar habitat throughout the Bear River region in southeastern Idaho (i.e., tracts of nearby National Forest and BLM public land) or to proposed restoration parcels. The loss or change of habitat, particularly riparian habitat, would likely change the mix of wildlife species and the amount of wildlife present in the immediate project area. However, if restoration parcels are protected with conservation easements as Idaho Fish and Game suggests, the conditions of the easements should ensure that the parcels are maintained and managed to provide benefits for game species, as well as hunting opportunities.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

Canada lynx was listed as threatened under the ESA in 2000. Canada lynx are medium-sized cats adapted to habitats with deep snow. In Idaho, lynx habitat includes conifer forests with an abundance of snowshoe hare, its preferred prey. Such forests typically support a dense, multi-layered understory, which provides forage and vegetative cover for snowshoe hare at snow depths up to 6 feet. Lynx are highly mobile, making long-distance exploratory movements outside their home range, especially during periods of low prey availability (FWS, 2005). The Canada lynx recovery plan designates recovery units in parts of Idaho, but these areas are outside the area of potential project effects (FWS, 2005). Outside the designated recovery units, there are no specific actions specified in the recovery plan to facilitate Canada lynx recovery.

There is no designated critical habitat for Canada lynx in the project area. The nearest critical habitat unit (Unit 5—Greater Yellowstone Area) is located in western Montana, about 40 miles east-northeast of the project area.

The Canada lynx is known to occur in Franklin County. Although the majority of preferred habitat likely exists in the mountains to the east of the project area, along the eastern boundary of the county, the elevation of the project is within the typical elevation range for lynx in Idaho (>4,000 feet) (Idaho Fish and Game, 2005b). The proposed project does not support preferred habitat for snowshoe hare or Canada lynx. Although it is possible that lynx may pass through the project area during long-distances movements, these occurrences are likely to be rare.

3.3.4.2 Environment Effects

Noise and human activity associated with construction have the potential to disturb Canada lynx if they should be in the vicinity of the proposed project during long-distance exploratory movements. Similarly, human activities associated with project operations, including recreation use, have the potential to disturb Canada lynx if they should occur in the vicinity of the proposed project.

Twin Lakes does not propose any specific measures that would protect or enhance Canada lynx or its habitat. No entity, including FWS, filed any specific recommendations pertaining to Canada lynx.

Our Analysis

Given the current absence of preferred habitat for lynx and its preferred prey, snowshoe hare, in the project vicinity, we do not expect that construction, operation, and maintenance of the project would affect the lynx. In the unlikely event that Canada lynx should occur in the vicinity of the proposed project, noise and human activities may cause the lynx to avoid the area.

3.3.5 Recreation Resources

3.3.5.1 Affected Environment

Regional Recreation Resources

Recreational resources in the region are extensive and provide a full range of activities, from golf and skiing at resorts, to sightseeing in national parks, and hiking, fishing, and boating in rural and wilderness areas.

The lakes and reservoirs in eastern Idaho provide a variety of recreational opportunities and many types of developed facilities for camping and day-use activities. Paved roads and boat launches at the area's larger water bodies provide opportunities for motorized boating. Bear Lake (see figure 3-1), about 80 miles upstream and 25 miles due east of the proposed project, is an important regional recreational area. The lake has more than 50 miles of shoreline, and public access is provided through a number of beaches, day-use sites, boat launches, and marinas. Other important lakes used primarily for fishing and camping in the vicinity of the project include Blackfoot reservoir, and American Falls reservoir. There are many small reservoirs with warmwater fisheries and boating opportunities in the immediate vicinity of the project, including Oneida, Treasureton, Condie, Lamont, Glendale, Swan Lake Marsh, Weston, and Twin Lakes.

Oneida reservoir is located immediately upstream of the proposed project and has similar characteristics. The setting is more rural than other parts of the Bear River, and the reservoir is relatively long and narrow, contained on both shores by mountains. The reservoir supports a warmwater fishery, and PacifiCorp maintains two recreational sites on Oneida reservoir, including the Maple Grove campground with a boat launch about 1.4 miles upstream from the Oneida dam, and a day-use area with a boat launch near the dam (figure 3-23). Oneida reservoir is featured as an important site for birding in the *Guide to Idaho Birding Trail* website (Idaho Fish and Game, 2015a).

Coldwater trout fisheries are located throughout the region (Idaho Fish and Game, 2014). The Snake River, including the South Fork and the Henry's Fork, are located two to three hours north of the proposed project and are internationally known for their outstanding native and stocked cutthroat trout fishery. Diamond Creek and tributaries to the upper Blackfoot River, about 80 miles north of the proposed project, are native cutthroat trout fisheries, managed as no-take for cutthroat, and limited to fly fishing with barbless hooks. The tributaries of the upper Bear River near Bear Lake, including Smith Fork and Thomas Fork, are about 35 miles due east of the proposed project and have excellent native cutthroat trout fishing opportunities. The Logan River, about 40 miles south of the proposed project, is a blue ribbon trout fishery (Utah Department of Natural Resources, 2015). The Weber and Provo Rivers, about 80 miles and 160 miles south of the proposed project, respectively, also support a good trout fishery close to urban areas.

Public lands in the project vicinity provide a wide range of recreational opportunities. Caribou-Targhee National Forest, just east of the project, lists more than

30 recreational activities that occur on the forest, including horseback riding, camping, hunting, picnicking, fishing, climbing, skiing, and mountain biking (Forest Service, 2015). Off-highway vehicle use on Forest Service and BLM land is also popular in the region (Idaho Parks and Recreation, 2013).

Whitewater boating and tubing are popular recreational activities in this arid region. American Whitewater lists three whitewater runs on the Blackfoot River, about 70 miles north of the project that are available during snow melt and range in difficulty from class II to IV+[50] (American Whitewater, 2015). The Dead Mans Bar run on the Snake River, about 120 miles north of the proposed project in Wyoming, provides boating opportunities during spring, summer, and fall. In Utah, the Weber River, about 2 hours south of the proposed project, provides a range of boating opportunities on nine designated runs, ranging from a whitewater play park in Ogden to difficult class IV+ rapids on the Scrambled Egg run. The Provo River, about 3 hours south, is a popular river for tubing in the summer. The Logan River, 40 miles south of the proposed project, provides about 15 miles of class III-IV whitewater during spring runoff. The Bear River upstream of the proposed project also provides whitewater boating opportunities. Black Canyon is a class IV+ reach in the bypassed channel of the Grace development (part of the Bear River Project) about 20 miles upstream of the proposed project.

Existing Recreational Resources in the Proposed Project Area

The project area contains three existing recreational facilities within the footprint of the proposed reservoir: a river access site just downstream of Oneida dam on PacifiCorp-owned land, Redpoint Campground about 2 miles downstream of Oneida dam, and a boater take-out on BLM land about 4.5 miles downstream of Oneida dam near the downstream end of Oneida Narrows (figure 3-23). In addition to developed recreation sites, there are many informal parking areas and pullouts along Oneida Narrows Road. Franklin County owns a river access site at the intersection of highways 34 and 36 about 5.5 river miles downstream of the proposed project. There are no recreational facilities at the Ben Johnson Family Farm mitigation site downstream of the proposed dam. The farm is predominantly pasture and grassland (see figure 3-21).

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[50] The American Whitewater Scale of River Difficulty: Class I, Easy: Fast moving water with riffles and small waves; Class II, Novice: Straightforward rapids with wide, clear channels which are evident without scouting; Class III, Intermediate: Rapids with moderate, irregular waves which may be difficult to avoid and which can swamp an open canoe; Class IV, Advanced: Intense, powerful but predictable rapids requiring precise boat handling in turbulent water; Class V, Expert: Extremely long, obstructed or very violent rapids which expose a boater to added risk; Class VI, Extreme and Exploratory: These runs have almost never been attempted and often exemplify the extremes of difficulty, unpredictability, and danger.

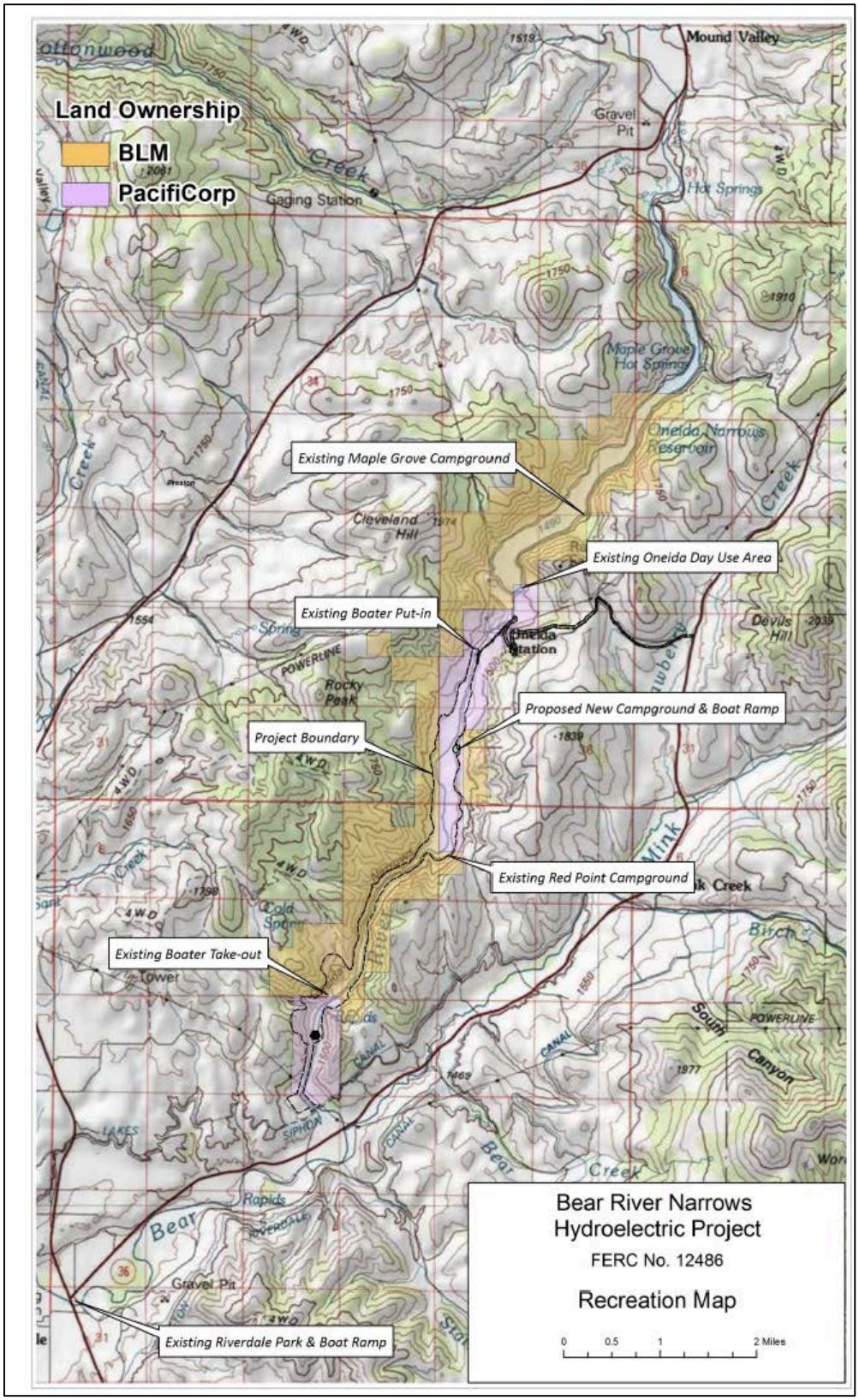

Figure 3-23. Existing and proposed recreational resources (Source: Twin Lakes, 2013).

The river access is located at a bridge immediately downstream of Oneida powerhouse. The site has parking for about 10 vehicles, a portable toilet, and information about flows and fishing in the reach. Anglers, boaters, tubers, and other visitors access the river on a gravel beach next to the parking area. PacifiCorp made site improvements to formalize parking and install information signs at this access point over the last 10 years as part of its current license for the Bear River Project.

Redpoint Campground is located on BLM land and provides 10 campsites designed to accommodate larger recreational vehicles and trailers. The campground has potable water, a vault toilet, and picnic tables. PacifiCorp rehabilitated the campground and upgraded infrastructure as part of its Bear River Project license. BLM manages the site and receives annual financial support from PacifiCorp to address project-related effects on the site. In 2011, BLM added an accessible campsite and made other upgrades to comply with the Americans with Disabilities Act (ADA) (BLM, 2013).

BLM also maintains a boater takeout at the downstream end of Oneida Narrows. The takeout has a designated parking area, toilet, and a kiosk where river-related visitor information is posted.

Access to recreational facilities within the proposed project boundary is from Oneida Narrows River Road that parallels the Bear River from Highway 36 to Oneida dam. The first mile of this road upstream of Highway 36 is paved and maintained by Franklin County. The remaining 7 miles are gravel-surfaced and maintained by PacifiCorp as part of the Bear River Project. The road crosses the river from the west side to the east side about 3.5 miles below Oneida dam. In addition to the formal recreational sites, BLM has documented numerous informal sites used for picnicking, camping, and fishing access to the river along the entire road. Most of these informal sites, as well as Oneida Narrows Road, are within the footprint of the proposed reservoir.

Idaho State Comprehensive Outdoor Recreation and Tourism Plan 2013-2017

Idaho Parks and Recreation has statewide responsibility for assisting local, state, and federal agencies in planning, acquiring and developing recreational resources in the state. Idaho Parks and Recreation periodically studies recreational resources and needs in the state and publishes its findings about every 5 years in the Idaho State Comprehensive Outdoor Recreation and Tourism Plan (SCORTP). The most current version of the plan covers 2013-2017 and is published on a web site for public use (Idaho Parks and Recreation, 2013).[51]

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[51] This plan is an update to the Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORTP): 2006–2010, which is on the Commission's List of Comprehensive Plans.

The plan was developed from survey data gathered from recreation professionals and Idaho residents. A steering committee, made up state, federal and local outdoor recreation professionals, used the survey data to develop high-level goals and objectives to address issues that at least two-thirds of survey respondents listed as important or very important. The goals listed in the SCORTP include:

- aligning demand for outdoor recreation with funding;
- protecting and enhancing water quality in order to support water-based recreation;
- coordinating environmental and outdoor recreation education;
- recognizing and encouraging outdoor recreation that adds to the economic, health and social value to local communities;
- reducing the spread of invasive species by informing and educating visitors;
- developing local solutions that protect endangered species; and
- building and improving outdoor recreation facilities to improve accessibility for all citizens.

The plan shows that outdoor activities are very important to Idaho residents, including walking, hiking, picnicking, bike riding and water based sports. The plan identified a need for recreational resources supporting most outdoor activities. In particular, the plan prioritizes the development of trails for walking, sightseeing, and bicycling that allow access to wild areas, and connect communities.

Idaho SCORTP is an overview policy document and does not specifically address recreational use and needs in Franklin County or the project area.

Recreational Use

Twin Lakes conducted an intercept study of recreational users to understand use patterns and preferences in the proposed project area and nearby recreational sites. Visitors were interviewed at recreational sites in three zones, including (1) sites within the proposed project area from Oneida dam downstream to the proposed dam; (2) sites on Oneida reservoir; and (3) sites downstream of the proposed project dam to Highway 34 bridge at Riverdale, Idaho.

Survey results indicate that visitors' primary purpose for visiting the study area was to access project area recreational resources to fish in the river (21.6 percent), camp (14.7 percent), float or boat in the river (14.2 percent), picnic (11.4 percent), and spend time with family and friends (10.4 percent). Most groups participate in multiple activities when visiting the proposed project area. For example, although a group's primary reason for visiting may be river fishing, some people in the group would participate in other activities. Table 3-38 summarizes recreational activities and participation rates of the

425 respondents during their visits. Overall, respondents to the survey reported a high level of satisfaction with their recreational experience.

Table 3-38. Recreational activities (Source: Reiter et al., 2010).

Activity	**Percent Participated (%)**
Spending time with family or friends	86.10
Bird watching/wildlife viewing	79.10
Picnicking	73.40
Swimming	61.60
Camping	54.40
River fishing	47.30
Walking or hiking	43.80
River boating or floating	38.40
Reservoir fishing	35.10
Reservoir boating or waterskiing	30.60
Nature photography	36.70
Exercising a pet	23.80
Spiritual activities	16.00
ATV or dirt bike riding	14.80
Bicycling	10.40
Seeking fossils, rocks, or minerals	11.10
Running or jogging	9.20
Firearms shooting	8.00
4-wheel driving/jeeping	7.50
Herb gathering	3.10
Archery shooting	2.10
Horseback riding	1.40
Big game hunting	1.40
Upland game hunting	0.70
Paint ball shooting	0.50

Most visitors, more than 95 percent of the 425 respondents to the intercept survey, live in Idaho or Utah. More than half of the surveyed visitors are local residents, living in either Franklin County, Idaho (28.9 percent), or Cache County, Utah (25.2 percent). Most of the Idaho residents that visit the project live in Preston (47.9 percent) and Pocatello (15.2 percent), and most of the Utah residents that visit the project live in Logan (25.3 percent).

Twin Lakes did not develop formal recreation use estimates for the proposed project area. Instead, Twin Lakes used the intercept survey results to estimate total recreational use within the project vicinity, including facilities downstream and upstream of the footprint of the proposed reservoir. Based on its analysis, Twin Lakes estimated annual visitation in the project area at about 55,559[52]recreation-days (Krannich et al., 2010). PacifiCorp also estimated visitor use to prepare its FERC Form 80 filing for the Bear River Project (PacifiCorp, 2009). Based on traffic count data collected over one year from November 2013 to November 2014, PacifiCorp estimates that annual visitation at the Bear River Project recreational sites totals 66,450 recreation-days.[53]

River Recreation

The Bear River in the proposed project, a riverine reach about 6 miles long extending from Oneida dam to Highway 36, provides high-quality whitewater recreational opportunities in a setting consisting of a scenic canyon with rocky outcroppings, little development, numerous wildlife viewing opportunities, and an accessible, riverine mainstem river. This section of the river supports a successful coldwater fishery, a long stretch of whitewater, easy access from the gravel-surfaced road that parallels the entire reach, and has regular releases and predictable flow levels through the summer months. Land managers, including BLM and PacifiCorp, maintain developed camping and river access facilities, and have partnered with state agencies to improve aquatic and shoreline habitat in support of the recreational experience and the fishery.

According to the State of Idaho, the Bear River flowing through the project area is the longest section in Idaho, Utah, and Wyoming with continuous public access (State of

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[52]The Commission defines "recreation day" as each visit by a person to a project development for recreational purposes during any portion of a 24-hour period (FERC, 1996). Recreation days are used by the Commission on the licensed hydropower development report (FERC Form 80), which is a summary of recreational use at licensed projects filed with the Commission every 6 years.

[53] PacifiCorp's estimate of recreation days includes all of the sites in Twin Lakes' estimate, except for the Riverside Campground, a site downstream of the proposed project.

Idaho Agencies letter filed on December 16, 2014). The State of Idaho estimates that there are 177 river miles of Bear River in Idaho and about 94 percent of the land that borders the river is privately owned.

Whitewater Recreation

Kayakers use the class I and class II whitewater run at higher flows, and tubers tend to use the run at lower flows, particularly in the warm summer months. An internet search for "Oneida tubing" returned a number of YouTube videos showing families and friends floating the whitewater run in Oneida Narrows during warm summer days.

Historically, variation in flows downstream of Oneida dam made the reach difficult for whitewater recreation. As a condition of its 2003 license, PacifiCorp now operates the Oneida development with more stable flows that are conducive to whitewater boating and floating. The flows are generally greater than 900 cfs between Memorial Day and Labor Day, with moderate ramping rates and little overall variation. PacifiCorp also publishes flow information on a flow phone and internet site so visitors can determine if flow conditions are suitable for their activity. Based on studies for prior hydroelectric proposals in Oneida Narrows, Twin Lakes estimates that minimum flow for hard-shell kayaks is about 500 cfs, and minimum flow for canoes and tubers is about 1,000 cfs. More stable releases from Oneida dam have improved suitability of the reach for whitewater boating and floating over the last decade.

Neither Twin Lakes nor PacifiCorp maintains current estimates of whitewater use in Oneida Narrows, but Twin Lakes estimates that about 38 percent of visitors (about 21,000 recreation-days), participate in whitewater boating or floating each year.

Angling

Angling is a very popular activity in Oneida Narrows. Twin Lakes estimates that more than 47 percent of visitors fish the Narrows, which accounts for about 26,000 recreation-days per year, consisting of about 9,500 anglers. In 2003, Idaho Fish and Game completed a creel survey of angler use in Oneida Narrows that showed about 7,074 anglers fished the area over a 7-month period (State of Idaho Agencies letter filed on December 16, 2014). The same study found that only 937 anglers fished in the adjacent downriver reach during the study period.

One of the reasons the reach is such a popular recreational fishery is that Idaho Fish and Game stocks about 12,000 sterile rainbow trout downstream of Oneida dam every year (Idaho DWR, 2012). The cold water and habitat in the Narrows supports high numbers of stocked fish and provides for a high rate of fishing success. Downstream of Oneida Narrows, river conditions change to low-gradient, slow-moving water that supports a warmwater fishery dominated by nongame fish such as common carp and Utah suckers. In its December 16, 2015, comment letter, Idaho Fish and Game states that creel survey data show that trout are not caught by recreational anglers in the reach immediately downstream of the Narrows.

Idaho Fish and Game surmises that part of the reason for the difference between the two reaches is that the downstream section has limited public access sites, the water is slow moving, with fewer riffles and complex habitat, and water temperatures are warmer.

The state of Idaho points to an economic study conducted in 2003 that estimated the amount of money anglers spent to fish the Bear River in Franklin County, Idaho, and other fisheries in the surrounding counties (Grunder et al., 2008). Idaho Fish and Game estimated that anglers spent about $1,070,000 to fish the Bear River in Franklin County, the majority of which was in Oneida Narrows, $338,000 to fish Glendale Reservoir, $21,000 to fish Condie Reservoir, $114,000 to fish Treasureton Reservoir, $320,000 to fish Cub River, $6,000 to fish Mink Creek, $188,000 to fish the Bear River in Bear Lake County, and $170,000 to fish the Bear River in Caribou County.

3.3.5.2 Environmental Effects

Twin Lakes proposes to create a new reservoir that would inundate three formal recreational sites, numerous informal recreational sites along Oneida Narrows Road, and permanently remove Oneida Narrows as a recreational river-fishery and whitewater resource.

To address the effects of the proposed project on recreational resources, Twin Lakes proposes to construct new recreational facilities downstream of the proposed dam and on the shore of the proposed reservoir.

Whitewater Boating and Angling Opportunities in Oneida Narrows

Twin Lakes proposes to inundate most of the recreational corridor downstream of Oneida dam, including all existing whitewater recreational resources, and formal and informal recreational sites along Oneida Narrows Road. Twin Lakes offers no measures to mitigate project effects on whitewater recreational opportunities, but suggests that the proposed minimum bypass flow of 10 cfs in Mink Creek and angling opportunities provided by the proposed reservoir would offset some lost angling opportunities in Oneida Narrows. Twin Lakes also proposes to construct a parking area and hiking trail with interpretive signs on the Ben Johnson Family Farm site for access to 4.4 miles of Bear River shoreline for fishing and other river-based recreation (see figure 3-22).

Our Analysis

Boating and Floating

Twin Lakes' proposal would permanently remove about 4.5 miles of whitewater boating and angling resources from the Bear River downstream of the Oneida dam. Twin Lakes estimates that about 85 percent of visitors boat, tube, and/or fish the Bear River in the project area, which accounts for approximately 47,000 recreation-days per year. Data results from Twin Lakes' intercept study shows that current visitors to Oneida Narrows would be displaced (table 3-39). Although the data do not break out boaters, tubers, and

anglers from other users, it shows that a high percentage of existing visitors would be displaced by the proposed project to other sites and activities in the region.

Table 3-39. Activities if displaced from Oneida Narrows (Source: Reiter et al., 2010).

Responses	Number of Respondents	Percent of Total (%)
Go to a different segment of the Bear River	22	6.40
Go to a different river	55	12.90
Recreate on the new reservoir	37	8.70
Do something else in Cache and Franklin counties	86	20.20
Do something else outside of Cache and Franklin counties	87	20.50
Not recreate because there is no adequate alternative	31	7.30
Construction of the dam and reservoir would not change my recreation activities	91	21.40
Don't know	11	2.60

A small subset of existing boaters and floaters may continue to use the lower 1 mile of the Bear River from the proposed dam to Highway 36. However the downstream flows are slower and visitors would meander through private agricultural land before reaching the take out at the county boat launch near Highway 34 or at other informal pullouts along the Bear River.

For the displaced boaters and floaters, there are no nearby rivers that provide a similar recreational experience for whitewater boaters and tubers with class I and class II whitewater in a canyon environment. Nearby resources for boating and tubing in Utah include the Weber and the Provo Rivers, which are between 1 and 3 hour drive from the project area and close to population centers of Park City, Ogden, and Provo. The two rivers are regularly used for whitewater recreation and may be able to absorb some of the displaced boaters and tubers from Oneida Narrows. However, the Weber and Provo Rivers receive high levels of use during summer months, and the displaced Oneida Narrows boaters and tubers may contribute to crowding and other management issues at the rivers they instead choose to visit.

Most visitors to Oneida Narrows are local and participate in daytrips to the project area. However, whitewater boaters and tubers willing to drive 3 hours or more could find similar resources to Oneida Narrows on the Snake River in Wyoming and south-central Idaho. Traveling to regional rivers for class I and class II whitewater resources would require more travel time to participate in the same activity. Further, the Snake River in Wyoming requires a fee or permit to help regulate use on the river.

In addition, publishing reservoir water surface elevations as part of an operation compliance plan (see section 3.3.2.2, *Aquatic Resources, Environmental Effects*) would allow stakeholders to monitor reservoir levels in relation to environmental resources in the reservoir, including recreational resources, and whether variations in reservoir water levels affect such resources. Boating may be feasible or desirable only within a specific range of elevations, and knowing when those elevations would occur would be beneficial to those recreating in the reservoir.

Angling

Twin Lakes' proposal to create a new reservoir would result in a permanent loss of the existing coldwater recreational trout fishery in Oneida Narrows. Oneida Narrows supports a unique fishery on a wide, mainstem river. Currently, based on an economic study conducted in 2003 that estimated the amount of money anglers spent to fish the Bear River in Franklin County, Idaho, and other fisheries in the surrounding counties, anglers spent more money on fishing the Bear River in Franklin County than other fisheries in nearby Idaho counties (Grunder et al., 2008). Further, fishing expenditures were higher for river-based fishing compared to reservoir fishing in all counties. The intercept survey results, about half of which represented river-based anglers, indicated that only 8.7 percent of the people surveyed would recreate on the reservoir, and most (about 80 percent) would go elsewhere for their recreational pursuits. Displaced anglers may travel to other resources in the area, such as the Logan River, a tributary of Bear River. Although this river has lower flows, especially during summer months, it is a blue-ribbon fishery, with abundant brown, cutthroat, and brook trout populations and may accommodate additional anglers (Utah Department of Natural Resources, 2015). Anglers displaced to the Logan River and other nearby trout fisheries may contribute to crowding, fishing pressure, and other management issues at the other rivers they instead choose to fish.

Some portion of the anglers that use proposed project area may be displaced onto smaller streams and tributaries in the region. The Caribou-Targhee National Forest provides a wide range of fishing opportunities on streams, many of which receive less fishing use than mainstem rivers near population centers. These streams often support native and/or self-reproducing trout populations. However, many of the streams on the forest are inaccessible because of road closures from snow for much of the year.

Twin Lakes proposes a minimum flow of 10 cfs during summer months in Mink Creek could offset some of the lost angling opportunities from the proposed project. Although the proposed Mink Creek minimum flow may enhance the trout fishery and aquatic habitat, Mink Creek is a very small tributary flowing at a volume about 100 times less than typical summer flows in Oneida Narrows. Based on the size class and length of the stream, alone, Mink Creek would support very few anglers. Further, the creek downstream of the diversion dam flows through private land, making public access difficult. Anglers interested in a coldwater trout fishery on a mainstem river with abundant stocked trout are unlikely to consider Mink Creek to be a reasonable substitute.

Twin Lakes suggests that anglers could wade about 4 miles of the stream to avoid trespassing on private land. This means of accessing Mink Creek would be impractical and possibly dangerous because most anglers prefer to walk along the shoreline to access fishing areas, wade while fishing, and then walk the shoreline to the next fishing area. Shoreline walking allows anglers to avoid deeper pools, areas with thick riparian vegetation, and rocky or inaccessible sections of the stream that would preclude wading. Additionally, walking on the shoreline reduces the chances anglers would disturb or scare the fish they are trying to catch. Based on Commission staff observations made during the environmental site review,[54] it would not be possible to access the entire 4.2 miles of Mink Creek downstream of the diversion dam by only wading in the channel.

Twin Lakes proposes to construct a trail on the Ben Johnson Family Farm that would parallel the Bear River and mitigate some of the lost angling opportunities in Oneida Narrows, as discussed later in this section. The proposed trail may provide new recreational opportunities and possibly accommodate some of the displaced non-river-related recreational use (e.g., hiking, wildlife viewing). The scenic environment would consist of an open meadow, and slow-moving river and an aquatic habitat that supports a warmwater fishery consisting primarily of common carp and Utah sucker (85 percent of the catch in Twin Lakes' fishery sampling in this reach; see table 3-9). However, Idaho Fish and Game states that that there would be no way to adequately mitigate for the loss of recreational opportunities currently provided in Oneida Narrows. They assert, along with comments from other stakeholders, that the unique recreational attributes of Oneida Narrows cannot be replaced. The downstream environment is very different than what exists at Oneida Narrows. Narrows provides anglers with a coldwater trout fishery and fast-moving riffle/whitewater habitat located in a scenic canyon. Staff agree that the conditions downstream of Oneida Narrows Canyon are fundamentally different.

Recreation Enhancements

Twin Lakes proposes to develop a new, 4.1-acre, multi-use recreation facility, including a campground, day-use area, boat ramp, and hiking trail, on the east shore of the proposed reservoir. The boat ramp would be designed to provide access at full reservoir drawdown of 5,000 acre-feet, or about 16 vertical feet below the high water mark. Twin Lakes would construct the facility prior to closing the Redpoint Campground. The proposed facility would include: 11 camp sites for trailers and larger recreational vehicles (RVs) (with 1 ADA-accessible campsite); a group campsite; one ADA-accessible restroom; one ADA-accessible group day-use pavilion; a tent camping area; a day-use picnic area; a boat launch with a parking area; and a floating boat dock. Twin Lakes also proposes to construct a hiking trail that would be located on the east side

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[54] Commission staff participated in an environmental site review on October 12, 2011.

of the reservoir from the proposed campground to the cliffs at the Oneida Narrows Canyon. Twin Lakes proposes to construct two boater access facilities downstream of the proposed dam. The upper site would be located immediately below the powerhouse and include parking for about eight vehicles, a portable toilet, and a path to a launch site at the river.

The lower site would be located about 12.7 miles downstream of the proposed dam on the Ben Johnson Family Farm site. Twin Lakes proposes to acquire the 538-acre Ben Johnson Family Farm site and conserve most of the property for aquatic, wetland, riparian, and wildlife uses. Twin Lakes proposes to develop an area near the Bear River for recreational uses that would include a boat ramp that could accommodate trailered boats, parking, and portable toilets (see figure 3-22). Twin Lakes also proposes to construct a hiking trail with interpretive signs on the property that would provide access to about 4.4 miles of Bear River shoreline.

Twin Lakes states that it would operate and maintain all of the proposed new recreational facilities.

Idaho Fish and Game recommends installing more parking spaces at the river access site because the proposed project would inundate numerous existing parking facilities, including designated and undesignated sites along Oneida Narrows Road. It states that the proposed boat launch should be sized to accommodate public use for the term of any license that may be issued for the project without building more capacity than needed. Idaho Fish and Game also recommends that Twin Lakes increase the numbers and diversity of planted woody vegetation with an emphasis on cottonwoods and other local riparian tree and shrub species within the proposed campground.

BLM preliminary 4(e) condition 4 specifies that the applicant develop an LEESP that includes provision for coordination and funding of law enforcement and emergency services personnel with jurisdiction within the project area. The plan would address medical response measures, including number, placement, and time availability of quick response units and certified first responders. At a minimum, the plan would include one strategically placed quick response unit and a certified first responder available at each unit during all high use periods. The LEESP would include provisions to coordinate with the local counties and BLM to assess law enforcement needs and establish triggers to determine when and/or if additional law enforcement personnel are necessary to patrol BLM-administered land that would be affected by the proposed project. The LEESP would also include provisions for coordination with BLM to evaluate the need for enhanced fire protection on BLM-administered land, including monitoring and evaluation of human-caused fires that affect BLM-administered land. If monitoring demonstrates an increased need for fire prevention, detection, and suppression, Twin Lakes would provide for 100 percent of the costs of these activities.

Our Analysis

Campground and Day-use Site

Twin Lakes' proposed recreational site would provide day and overnight use opportunities for reservoir boating and angling. Additionally, the proposed campground would have some features that are not currently available at the Redpoint Campground, including group facilities, tent camping area, and designated day-use sites. These facilities could represent an improvement over existing conditions. PacifiCorp estimates that the Redpoint and Maple Grove campgrounds are at capacity about 80 percent of the time. If capacity constraints occur during peak use periods, there may be a need for additional campsites and facilities beyond those proposed over the term of a new license.

Although constructing a new campground would close Oneida Narrows Road and eliminate access to Redpoint Campground, Twin Lakes' proposal to construct a new road and campground prior to flooding the existing Redpoint Campground may lessen some of the disruption caused by developing the proposed project. The campground would be constructed near the shore of the proposed reservoir, even though the reservoir-based uses would not be available until the dam is completed and the reservoir filled, about 2 years after the new campground would open. While the river would be available for some recreation during construction of the dam, the new campsite would be distant from the shoreline, which may reduce recreation use at the new campground until the reservoir fills.

The physical characteristics of the proposed new campground differ from the existing Redpoint Campground. The existing campground is located in the riparian corridor of the Bear River, with a mix of riparian vegetation including mature cottonwood trees. The proposed campground would be located in an upland field next to a new reservoir. To mitigate some of the habitat loss from inundating the Redpoint Campground and to create shade and shelter within the proposed new campground, Idaho Fish and Game recommends planting more riparian woody vegetation and trees. Planting additional vegetation would improve the visitors' experience by eventually providing shade, helping to stabilize the shoreline and campground from erosion caused by dispersed use, and helping to define the public areas and protected areas.

However, the overall need for a new reservoir recreational site is unclear. As identified in Idaho Fish and Game comments, there are at least nine reservoirs with public access for camping, picnicking, fishing, and boating within Franklin County, Idaho, and there are many others sites nearby. Additionally, day and overnight use opportunities adjacent to a reservoir, including a boat ramp, day-use area and campground, already exist within a mile of the proposed site at the Oneida reservoir. Further, based on the recreation use estimates and conceptual design information provided by Twin Lakes in its application, we are unable to determine whether the reservoir recreational facilities proposed by Twin Lakes would serve a public need. Including final designs for any new recreational facility on the proposed reservoir as part

of a recreation plan developed in consultation with agencies and stakeholders would ensure that the site is adequate to meet demand and visitor needs during the term of a new license, and designed in a manner that would protect environmental resources.

The proposed reservoir trail would offer public access to the shoreline of the reservoir and allow visitors to walk through the remaining canyon portion of Oneida Narrows. Twin Lakes' intercept survey found that walking, hiking, and wildlife viewing are important to visitors in Oneida Narrows. The record is not clear where visitors currently walk and hike, but the primary corridor connecting public access sites in the Narrows is along Oneida Narrows Road. The road can be busy with traffic and dusty when vehicles pass, which may interfere with the quality of the walking and hiking experience. Overall recreational use through the Narrows is high, which may displace birds, deer, and other wildlife, reducing opportunities for wildlife viewing. The proposed trail would follow an undeveloped, quiet, and more rural corridor than the existing road, which would enhance walking, hiking, and wildlife viewing opportunities and allow continued access to the unique scenic resources in the Narrows.

River Access Facilities Downstream of the Dam

Twin Lakes' proposed river access facility downstream of the proposed dam would provide public access to the remaining river section from the proposed dam site to the Highway 36 bridge. Installing more parking spaces at the river access site to replace existing parking facilities that would be inundated would alleviate public access issues, however, there is insufficient information to determine the correct size of parking or other facilities at the proposed river access facility directly below the dam. Further, overbuilt sites can cause unnecessary resource damage. Developing the final designs for the proposed river access facility downstream of the proposed dam as part of a recreation plan in consultation with agencies and stakeholders would ensure that the site is adequate to meet current and future demand, and designed in a manner that would protect environmental resources.

The proposed boat launch facility at the Ben Johnson Family Farm site would be located 12.7 miles downstream from the proposed dam. As explained above in boating and angling opportunities, the river downstream of the proposed dam is very different than what currently exists in Oneida Narrows. Further, the distance of 12.7 miles from the dam to the proposed river access would likely be too far for most tubers to comfortably float, and the general lack of current, even with regular releases from the proposed dam, would make the reach unattractive to whitewater boaters. In its comments, Idaho Fish and Game identified possible barriers, including an irrigation pipe and a low bridge, which may preclude the use of the proposed boat launch for the intended motorized boaters. However, the downstream river access site may open the Bear River to other types of boating, such as flatwater canoeing, stand-up paddle boarding, or motorized boating.

The proposed river trail at the Ben Johnson Family Farm may accommodate a portion of the displaced recreational use from the proposed project area. Twin Lakes' intercept survey shows that existing use in Oneida Narrows includes family spending time together, wildlife viewing, hiking and walking, exercising pets, and other activities that are not specifically flow-dependent. The scenery, recreational resources, and type of recreational uses that the proposed Ben Johnson Family Farm site would support are different from those opportunities in the Narrows. However, the proposed trail would be very close (about 4 miles) to the town of Preston and may induce additional recreational use from nearby developed areas.

Although Twin Lakes asserts abundant new recreation opportunities would be created along the river by the proposed project, it also cites benefits for wildlife and aquatic and riparian resources. Recognizing that the benefits to one resource may affect the quality or realization of a benefit to another resource, it is likely that shoreline access along the entire reach within the Ben Johnson Family Farm site may not be possible. For example, it may not be appropriate to provide a shoreline trail along the entire reach because it would reduce riparian habitat or encourage visitor disturbances to wildlife and, possibly, cultural resources. There may be fewer recreation benefits created at the parcel than what is described by Twin Lakes in its application because of potential resource conflicts. As discussed in section 3.3.2.2, *Aquatic Resources, Environmental Effects, Water Quantity*, it is not clear where the 20 cfs of water Twin Lakes proposes to use for restoration purposes would come from and whether existing rights could be legally transferred for such purposes. As discussed in section 3.3.3.2, *Terrestrial Resources, Environmental Effects,* it is unclear how much water or excavation would be required to create riparian habitat, or if Twin Lakes would have suitable water rights to irrigate these areas needed to provide habitat. As discussed in section 3.3.7.2, *Cultural Resources, Environmental Effects,* the proposed mitigation site has high value for cultural resources, which could preclude excavation associated with mitigation efforts. For these reasons alone, the feasibility of the proposed restoration at the Ben Johnson Family Farm site is questionable.

Law Enforcement and Emergency Services Plan

BLM preliminary 4(e) condition 4 specifying the development of an LEESP would help quantify the effects of project operations on law enforcement, emergency services, and fire suppression on BLM-managed land. The county sheriff, state police, and federal rangers are obligated to provide law enforcement in the project area. Emergency services are provided by Franklin County, with an ambulance and search and rescue equipment stationed in Preston, Idaho. Fire suppression is provided by the Franklin County Fire District for private land and federal agencies for federal land. A plan coordinating delivery of these services within the project area could increase the overall efficacy and efficiency of these services.

However, Twin Lakes and the Commission would have no authority over how any funding provided to law enforcement, emergency service, and fire suppression agencies

would be spent and if such spending has a direct relationship to the project. Further, if the project is constructed, Twin Lakes would provide funding for these services through public land use fees and county taxes. Consequently, requiring Twin Lakes to develop a plan that coordinates and possibly provides additional funding for these agencies would not be an appropriate condition of a new license.

Recreation Plan

Idaho Department of Parks and Recreation (Idaho Parks and Recreation) recommends that Twin Lakes develop a recreation plan in consultation with a stakeholder group. The stakeholder group would include local, state, and federal agencies, as well as recreational user groups and local residents, and would review and revise Twin Lakes' proposed enhancements for recreation. Idaho Fish and Game recommends that the recreation plan include a systematic approach to identifying current and future recreational and aesthetic resource needs and environmental measures to address the project effects on these resources.

Our Analysis

Idaho Parks and Recreation recommends development of a recreation plan in consultation with stakeholders. Because Twin Lakes' proposed recreational site enhancements are not described in sufficient detail in its license application, developing a recreation plan for the project would ensure the adequacy of the proposal to meet recreational needs for the term of any license. The proposed project would result in the permanent loss of numerous recreational opportunities in Oneida Narrows, including the loss of a heavily used recreational trout fishery and a class I and class II whitewater boating and tubing resource in a scenic canyon with easy public access. A recreation plan would help address and mitigate for some of the loss of recreational opportunities in Oneida Narrows. Further, developing the plan in consultation with agencies and stakeholders would ensure existing recreation use and future demand are met at the project over the term of a new license.

The recreation plan for the project should be developed in consultation with local, state, and federal agencies and stakeholders, including but not limited to BLM, Idaho Parks and Recreation, Idaho Fish and Game, American Whitewater, and PacifiCorp. The recreation plan would serve as the roadmap for operating, maintaining, updating, and improving recreational facilities over the term of a new license and would provide a process for meeting recreation needs as they change over time. At a minimum, an effective recreation plan should address the following:

1. A comprehensive discussion of all the proposed recreation developments at the project, including a new, multi-use recreation facility with a campground, boat ramp, and hiking trail on the new reservoir; a new river access and boat launch with parking; and portable toilets immediately below the new dam.
2. Detailed site plans and construction schedules.

3. Provisions for operation and management of project recreation facilities.
4. Provisions for monitoring recreational use recreation-related impacts on environmental resources
5. A description of how the need for any new measures to support recreational use and/or protect environmental resources and/or construct new project facilities will be identified based on recreation use over the term of a new license.
6. A schedule for consultation with agencies and stakeholders on a periodic basis to identify updates to the plan, if a needed based on the monitoring of recreational use at the project, and a process for review of the updated plan before submitting it to the Commission for final approval.
7. A description of how flow-related information will be made available to the public to ensure that the public is aware of flow-related recreational opportunities that exist downstream of the project.

The recreation plan would provide a comprehensive description of the site design and construction of project recreation facilities, clarify long-term operation and maintenance responsibilities, establish a protocol for revising the plan in response to changing recreational demands, and provide for coordination between relevant land managing agencies and stakeholders to ensure existing and future recreation use at the project is managed for the term of a new license.

3.3.6 Land Use and Aesthetics

3.3.6.1 Affected Environment

Regional Land Use

The proposed project would be located on the Bear River in Franklin County, Idaho. Upper Bear River, extending from Bear Lake to the proposed project, is characterized by a wide valley with forested hills and mountains in the distance, rangeland and agricultural land along the river corridor, and dispersed homes and small towns on the valley floor. Conifer forests occupy upland slopes, grasslands and aspen groves are found on the middle slopes, and agricultural land and rangeland are found mostly in the river valley. The overall character of the landscape is rural with some urban areas associated with the towns of Montpelier, Soda Springs, and Grace. Land adjacent to the Bear River is primarily privately owned, with some BLM, Reclamation, and Forest Service managed public land adjacent to the river.

Downstream of the proposed project, the Bear River follows a meandering course through irrigated agricultural land and larger towns, passing through Preston, Idaho, and near Richmond, Smithfield, and Logan, Utah. Land ownership downstream of the project is primarily private. Extensive agricultural uses occur on private and federal land throughout the region.

Hydropower and water storage are important industrial uses of the Bear River, with three hydroelectric projects located on the main stem of the river between Bear Lake and the Great Salt Lake, and more than 60 water storage and irrigation dams in the watershed. PacifiCorp's Oneida dam, reservoir, powerhouse, transmission lines, recreational sites in Oneida Narrows, and other facilities are part of the Bear River Project.

Oneida Narrows Road is the primary access to the land, reservoir, and hydropower facilities in the vicinity of the proposed project. Franklin County paves and maintains the first mile of the road at the south end of the road, and PacifiCorp maintains the remaining 4.5 miles.

Land Use within the Proposed Project Boundary

Figure 3-24 shows the land ownership, primary land use, the existing Bear River Project boundary, the proposed project boundary, and existing and proposed access to the project area. Existing land use in the proposed project area is a mix of agriculture and grazing, hydropower, public recreation, and conservation, totaling about 658 acres (table 3-40).

Table 3-40. Acres of existing land use within the proposed project boundary (Source: Twin Lakes, 2013, as modified by staff)

Land Use	PacifiCorp Land	Other Private Land	BLM	Total
Agriculture	0	62	152	214
Conservation	350	0	89	439
Recreation	3	0	2	5
Total	353	62	243	658

The majority of land within the proposed project boundary is currently managed for conservation as part of the Bear River Project license and settlement. PacifiCorp conservation land within and adjacent to the proposed project boundary is used as a shoreline buffer and to protect ecologically sensitive areas, particularly riparian zones and wetlands (PacifiCorp, 2011). BLM conservation land within and adjacent to the proposed project are managed through the Pocatello Land Management Plan, discussed in the following section.

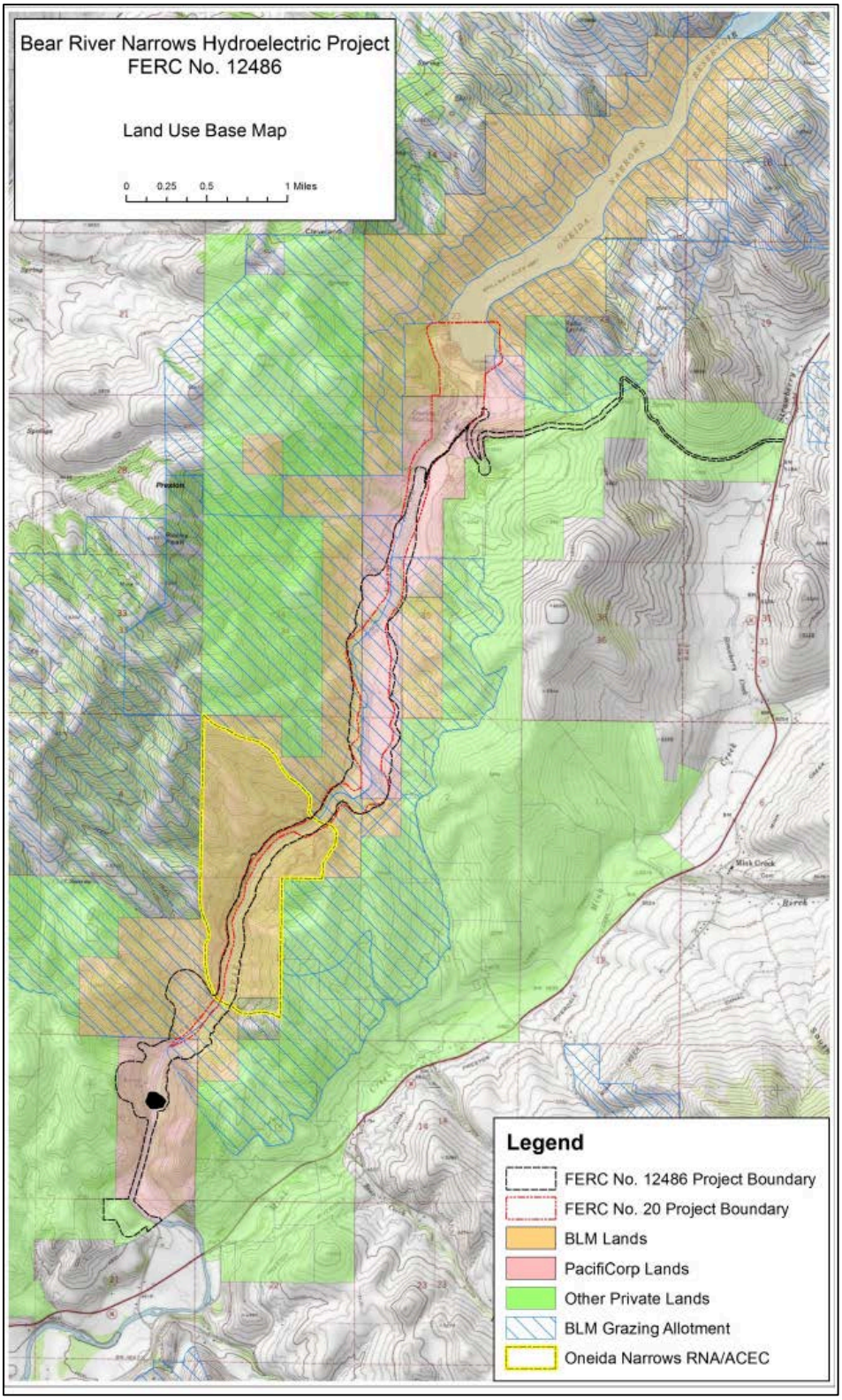

Figure 3-24. Existing and proposed land use in the project area (Source: Twin Lakes, 2013, as modified by staff).

Agricultural land use within the proposed project boundary includes about 214 acres, primarily for grazing, with a small area used for crop production. However, PacifiCorp started a process of retiring agricultural leases on its land within and adjacent to the Bear River Project as part of its2011 management plan, and converting this land to conservation uses. About 152 acres of BLM land within the project boundary are managed as grazing allotments. BLM's Pocatello Land Management Plan for the project area specifies that livestock grazing in these allotments would be adjusted to ensure protection of "pristine vegetative and soil characteristics" in Oneida Narrows (BLM, 2012).

Existing recreational land use in the proposed project boundary includes campgrounds, river access sites, and dispersed recreational sites in Oneida Narrows. All of these recreational sites are in the Bear River Project boundary and are located on land owned by PacifiCorp or public land managed by BLM.

Twin Lakes proposes to acquire the Ben Johnson Family Farm for conservation and recreational purposes. The farm, located 12.7 miles downstream of the proposed dam, is 538 acres of private land currently used for agricultural purposes, including cattle operations. The farm parallels the Bear River on both sides of Highway 95 and agricultural operations generally extend to the riverbank except for a few bends in the river and springs where riparian habitat is the dominant land use (see figure 3-21). The farm is about 2 miles from Preston, Idaho, and the surrounding landscape is primarily private agricultural land in an open, productive valley. Historically, this area was used by Native Americans, and cultural sites are known to exist on the property.

Applicable Land Regulation and Plans

Bear River Project Land Management Plan

PacifiCorp's license for the Bear River Project includes land use articles that require PacifiCorp to develop and implement a land management and buffer zone plan (LMP) (PacifiCorp, 2011). The LMP, prepared in consultation with agencies and stakeholders, was approved by the Commission in 2005 and updated periodically through 2011. The LMP addresses land use on PacifiCorp lands—673 acres within the project boundary and 763 acres outside of the boundary—and establishes measures for shoreline buffers as well as wetland protection and enhancement. PacifiCorp uses the LMP to manage its land within and adjacent to its project boundary in order to provide consistency in management practice and protocol. The primary purpose of the LMP is to minimize the effects of project operation on natural resources, particularly shoreline and riparian/wetland habitats that are important for aquatic ecosystem functions and wildlife habitat. PacifiCorp set aside land to be primarily managed for recreation and conservation purposes. As agricultural leases expire, PacifiCorp is converting agricultural land uses to conservation uses (see table 3-40).

Franklin County Comprehensive Plan

The Franklin County Comprehensive Plan, adopted on August 13, 2007, is the current guiding document for planning and development on private land within the county (Franklin County, 2007a). The plan has 12 policies to guide development in the county that are relevant to the proposed project, including a natural resources and land use policy. A strategy of the natural resources policy calls for the county to use its development code to protect surface water resources, including stream corridors, by requiring or requesting water quality protection, runoff and erosion control, wetland protection, and development setbacks along stream beds and lake or reservoir shores. The plan states that development should be sensitive to the needs of wildlife, wetlands, and stream corridors, including setbacks from water bodies. One important goal of the land use policy is to maintain the natural values of the recreational and scenic areas within the county by prohibiting industrial uses in these areas. The plan is not on the Commission's List of Comprehensive Plans.

Pocatello Resource Management Plan

In 2012, BLM approved the Pocatello Resource Management Plan, which established Oneida Narrows as a Special Recreation Management Area to be managed and maintained for river and water based recreational opportunities (BLM, 2012). The designated land includes 3,600 acres in the project vicinity, of which 1,900 acres surround the riverine section of Oneida Narrows. BLM's goals for the management area include maintenance of the riverine character.

BLM designated a subset of the 1,900 acres surrounding Oneida Narrows as RNA/ACEC, which consists of 617 acres on both sides of the Bear River, 89 acres of which lie within the proposed project boundary (see figure 3-24). BLM's goals for the RNA/ACEC include protection of the nearly pristine plant communities (e.g., bigtooth maple, box-elder riparian, Rocky Mountain juniper, and bunchgrass), and bald eagle and rock squirrel habitats by implementing the following management practices:

- The area will be discretionarily closed for solid leasable minerals and salable minerals.
- The off-highway vehicle designation will be closed with the exception of Oneida Narrows Road, which will be a designated route.
- Wildland fire will be suppressed.
- Public land will be retained.

- The area will be identified as an exclusion area for rights-of-way.[55]
- Fluid minerals will be leased with a no surface occupancy stipulation.
- Livestock grazing will be adjusted, if necessary, to maintain the values of the RNA.
- A withdrawal for locatable minerals will be pursued.
- Vegetation will be monitored to understand natural ecological processes and/or determine trends.
- Vegetation will be inventoried to establish baseline information and identify threats.
- The area will be a priority for weed control.
- Interpretive sign(s) will be placed at key location(s) to explain resource values and area use restrictions.

The plan is not on the Commission's List of Comprehensive Plans.

Wild and Scenic River

In 1995, BLM identified a 2.4-mile stretch of the Bear River in Oneida Narrows within the proposed project boundary as eligible for designation as a Wild and Scenic River (BLM, 1995). This segment of river was found to be eligible for its recreation, geologic, and wildlife values. A subsequent suitability study was completed as part of the Pocatello Resource Management Plan planning process. Because of the small size, BLM did not recommend that congress include Oneida Narrows in the National Wild and Scenic Rivers system. BLM continues to manage this river to preserve the values that established its "eligible" status because state and local governments or private citizens may initiate efforts in the future to designate the river under the Wild and Scenic Rivers Act. Congress may someday act to designate this section of the Bear River as part of the Wild and Scenic River System.

Bureau of Reclamation's Withdrawn Lands

Twin Lakes indicates that all but 0.1 acre of the BLM-managed land within the proposed project boundary was withdrawn by Reclamation from the public land system to evaluate hydropower and water storage development under the Reclamation Act of 1902.

In the early 1960s, Reclamation completed a study of the Bear River drainage for water storage, from which it proposed constructing a large dam, about 300 feet tall, at

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[55] BLM's Land Use Planning Handbook (2005) states that right-of-way exclusion areas are not available for the location of rights-of-way under any conditions.

Oneida Narrows to impound more than 300,000 acre-feet (Reclamation, 1964). The reservoir would have inundated both Oneida Narrows and the area currently occupied by the Oneida development of the Bear River Project. Reclamation evaluated the potential for hydropower at the dam, but concluded that it was not feasible because, during dry years, the entire river flow would be diverted for irrigation. During project planning, Reclamation withdrew land along the Bear River that would support the water storage project. Reclamation has not pursued development of the project, but more than 2,700 acres of BLM-managed land along the Bear River retains withdrawal status for a possible future water storage project.

Aesthetic Resources

Twin Lakes conducted a visual assessment of the proposed project, which found that the dominant natural features in the proposed project area include the river corridor, steep canyon slopes, and ridge tops and defined skylines at the top of the canyon. The existing dominant artificial features in the landscape are associated with the Oneida development, including the access road, reservoir, powerhouse, transmission line, and dam.

Twin Lakes identified two areas where the visual character of the project area has moderately different landscapes. The lower canyon, between the location of the proposed dam and a point about 2.4 miles upstream, is very steep and narrow. The canyon walls rise to about 5,000 feet in elevation and have prominent rocky outcroppings, cliffs, and talus slopes. The vegetation includes thick stands of fir, juniper, and maple, with open ridges of sagebrush and grasses. The steep canyon walls and Oneida Narrows Road limit riparian vegetation to within a few yards of the river. Views in the canyon are confined to the near and middle ground, with distant views of mountains upstream and downstream of the canyon.

The upper 2.5 miles of the proposed project area is more open than the downstream section, but still presents a rural, riverine landscape. The river channel is braided, with small islands, wetlands, and areas of thick riparian vegetation. Vegetation on the valley walls, particularly the north slopes, is a mix of tree species, with south-facing ridges that predominantly consist of grassland and sagebrush.

PacifiCorp conducted a visual assessment of existing conditions as part of licensing the Bear River Project in 2003. PacifiCorp used BLM's Visual Resource Analysis, which aggregates findings into a visual assessment classification on a scale of I (wilderness landscape) to IV (highly modified landscape). These inventory classes represent the relative value of the visual resources, with Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value (BLM, 1986). PacifiCorp determined the existing landscape meets BLM Class II visual resource definition for most of the proposed project area and Class IV near Oneida dam.

The objective of Class II visual resources is to retain the existing character of the landscape with a low level of change. Management activities may be seen, but should

not attract the attention of the casual observer. Any changes to the landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The objective of Class IV is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

3.3.6.2 Environmental Effects

Twin Lakes proposes to construct a dam and reservoir that would inundate about 4.5 miles of the Bear River. The normal maximum water surface elevation of the proposed reservoir would be elevation 4,734 feet, with a corresponding normal maximum water surface area of 362 acres and a gross storage capacity of 12,647 acre-feet. The proposed project boundary would total 1,195 acres. Twin Lakes estimates that 657 acres would be used to construct the hydroelectric facilities, reservoir, and access road on BLM-managed and private land (table 3-41); of which 124 acres would provide a shoreline buffer; and about 61 acres would be used for the new access road, dam, powerhouse, and other infrastructure.

Table 3-41. Proposed land use in the project boundary (Source: Twin Lakes, 2013, as modified by staff).

Land Owner or Manager	Acreage	Proposed Use
Federal land	243.0	Reservoir, buffer, and hydro facilities
Ben Johnson Family Farm	538.0	Conservation
PacifiCorp	353.0	Reservoir, buffer, access road, and hydro facilities
Lyle Bosen	28.4	Staging area
Hobbs	16.2	New access road
Free	8.0	New access road
W. Smith	5.4	New access road
Hickman	1.6	New access road
B. Smith	1.1	Borrow area
Keller	0.3	Mink Creek diversion
TOTAL	1,196.0	

Conservation Land Use

Twin Lakes indicates that proposed project would affect about 439 acres that are currently designated and managed for conservation purposes. The reservoir would permanently inundate about 222 acres of PacifiCorp conservation land, and about 55 acres of BLM RNA/ACEC land. Project facilities, including the dam, powerhouse, and road, would permanently remove an additional 28 acres from conservation uses, and about 46 acres would be temporarily lost due to project construction. The remaining conservation land would be included in the proposed shoreline buffer.

BLM draft 4(e) condition 2 specifies that Twin Lakes, in consultation with BLM, would prepare and provide a written report documenting and/or evaluating measures necessary for the continued protection and use of BLM-administered land and resources affected by the project.

Our Analysis

The conservation land in the proposed project area is managed to protect regionally significant landforms and ecosystems through the preservation of open space, riverine and wetland habitats, scenic resources, recreational opportunities, and wildlife. Individually, each of these resources is regionally significant. When each of these resources are considered together, their overall importance is compounded because there are few, if any, comparable sites with a similar combination of values across these resource areas. BLM's and PacifiCorp's designation of conservation status on the land within Oneida Narrows enhances and protects these values.

Interior, Great Salt Lakekeeper, GYC, TU, and other stakeholders state that agencies and private organizations have invested considerable time and money to improve wildlife habitat and develop recreational facilities, the existing and future benefits of which would be lost if the project is constructed. As part of licensing the Bear River Project, and in consultation with agencies and stakeholders, PacifiCorp applied a conservation management approach and limited development potential on its land within and adjacent to the Bear River Project boundary. PacifiCorp invested in habitat restoration, reduced environmental effects of agriculture and grazing, and defined recreational site footprints to contain recreational uses to designated areas that are appropriate for such use. Likewise, BLM recognized the importance of the plant communities and wildlife in Oneida Narrows by designating and managing the RNA/ACEC. The benefits of these conservation efforts would be permanently lost, along with the habitats, wildlife, scenic, and recreational resources that are currently protected by the conservation status of land in Oneida Narrows.

The connections between habitats at a landscape scale are important to the function and composition of plant and animal communities. These ecological systems, although not specifically evaluated by Twin Lakes, are complex and maintained to some degree by connectivity through Oneida Narrows. The proposed reservoir would permanently separate habitats managed by BLM in the RNA/ACEC on the east and west

side of the Bear River, limiting the sites where large and small wildlife could cross, and separating plant communities. Fragmentation of the RNA/ACEC would make managing land more difficult, and separating core habitats for certain species could result in changes to the type and abundance of plants, wildlife, and birds that currently use the proposed project area. See section 3.3.3.2, *Terrestrial Resources*, *Environmental Effects*, for a more detailed discussion of project effects on vegetation and wildlife. These changes could undermine the values for which the RNA/ACEC was established and diminish the value of the remaining conservation land outside of the proposed project boundary by fragmentation under the proposed project.

Twin Lakes proposes to create a 100-foot shoreline buffer around the reservoir that would total 124 acres, 88 acres of which are currently managed by BLM and PacifiCorp for conservation purposes. Although this measure would not replace the lost or fragmented conservation values, it is unclear whether 100 feet would provide sufficient protection for the remaining adjacent lands. As part of the Bear River license and the Bear River settlement agreement, most of PacifiCorp's private land within and adjacent to the project boundary is managed for conservation purposes. BLM and PacifiCorp land are currently contiguous and connected, providing protections for wildlife and scenic resources. Consequently, the fragmentation of private conservation land would diminish existing conservation values, which could result in PacifiCorp and neighboring private landowners developing this land for private or commercial uses rather than managing it for conservation.

Additionally, shoreline buffer width considers open space necessary to encourage riparian regrowth, stabilize the shoreline, connect habitats, provide setbacks for large mammals and nesting birds, protect natural landscapes, and establish wetlands. See section 3.3.3.2, *Terrestrial Resources,* for additional discussion about wildlife habitat connectivity and habitat corridors. A footprint wider than 100 feet would allow for a properly functioning buffer to serve these purposes. For example, naturally vegetated slopes of the buffer would serve to absorb and disperse runoff. However, development or disturbance only 100 feet from the shoreline would provide a narrow land base for these functions on very steep slopes. Consequently, a 100-feet buffer would have a greater potential to increase shoreline erosion than if development or disturbance were restricted within 300 feet of the shoreline.

The Bear River has a long history of conservation management in the proposed project area; increasing the shoreline buffer from the proposed 100 feet to 300 feet, particularly on private lands, would help ensure the remaining natural landscape and conservation values are maintained through the term of any license. BLM (4)e condition 2 specifies that Twin Lakes document, in consultation with BLM, project effects on, and management measures to protect federal lands. This document would be similar to a comprehensive land management plan for the project area that would establish policy for managing all project land to protect and enhance remaining conservation values associated with the project.

Agricultural Land Use

The proposed project would inundate agricultural land managed by BLM and PacifiCorp, and the proposed project boundary would include some agricultural land in the shoreline buffer adjacent to reservoir. Twin Lakes estimates that the proposed project would result in the loss of about 152 acres of BLM grazing land and about 62 acres of private agricultural land (see table 3-40). On BLM-managed land, loss of agricultural land would reduce livestock productivity in proportion to the amount of land removed by the proposed project. BLM would potentially lose some fees from agricultural leases.

Our Analysis

The proposed project would permanently inundate private agricultural land and disrupt the operations of individual farmers and ranchers. Landowners that desire to continue similar agricultural practices would have to limit their operations in the project area or move to new locations. Although Twin Lakes proposes to form agreements with, and provide compensation to, private agricultural landowners for lost agricultural land due to the proposed project, it is unclear if this compensation would minimize disruption to their current operations or if these farmers would be able to purchase replacement lands.

Although the proposed project would disrupt operations of individual farmers and ranchers, there are extensive private and public agricultural lands in the proposed project vicinity. The loss of agricultural land within the proposed project area would have minimal effect on the overall agricultural production in the region.

Right-of-Way for the Project

Twin Lakes proposes to acquire a right-of-way[56] from BLM to construct the project.

Interior, TU, Great Salt Lakekeeper, GYC, and other stakeholders' comment that, because the proposed project is not in conformance with the goals, objectives, and actions of the Pocatello Resource Management Plan, BLM cannot issue a right-of-way for the project. Interior also comments that Twin Lakes would need to obtain a mineral permit for any borrow sources located on BLM land, and pay for any removed material.

Our Analysis

The proposed project would create an exclusive use of federal land, which would require a right-of-way for the construction and operation of the project. BLM's Pocatello Resource Management Plan designation of the Oneida Narrows RNA/ACEC identifies

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[56]The Energy Policy Act of 1992, section 2401, requires projects occupying federal land that is licensed on or after October 24, 1992, to receive a right-of way from the applicable land managing agency (letter from Interior, filed on December 15, 2014).

the proposed project land as an exclusion area for a right-of-way. BLM's Land Use Planning Handbook (2005) states that right-of-way exclusion areas are not available for the location of rights-of-way under any conditions. The remaining BLM land within the proposed project boundary is identified as an avoidance area for rights-of-way, because of the presence of special-status species, including bald eagle, BCT, and trumpeter swans (see also sections 3.3.2, *Aquatic Resources*, and 3.3.3, *Terrestrial Resources*). BLM's Land Use Planning Handbook (2005) states that right-of-way avoidance areas should be avoided but may be available for location of rights-of-way with special stipulations. The proposed project would not be consistent with the Pocatello Resource Management Plan because project land would be in right-of-way exclusion and avoidance areas, and BLM may not be able to issue a right-of-way for the project without changing the current management plans.

Site Plans

BLM preliminary 4(e) condition 1(D) specifies that Twin Lakes prepare site-specific plans for any ground-disturbing activities on BLM-administered lands required by the license, including activities outlined in BLM resource management plans. Resource management plans prepared subsequent to license issuance would be developed in reference to license articles that may be affected as a consequence of resource management plan implementation. The site plans specified by BLM would include: (1) a map depicting the location of the proposed activity; (2) a description of the land management area designation for the location of the proposed activity and applicable standards and guidelines; (3) a description of alternative locations, designs, mitigation measures considered, and implementation and effectiveness monitoring designed to meet applicable standards and guidelines; and (4) data collected from surveys, biological evaluations, or consultation as required by regulations applicable to ground- or habitat-disturbing activities on BLM lands in existence at the time the plan is prepared.

Our Analysis

The Commission requires specific plans, both preconstruction and as-built, for all land disturbed by construction of any proposed project. Design drawings and maps associated with the dam, powerhouse, transmission facilities, roads, recreational facilities, and other project-related infrastructure would be developed as required by a standard license article applicable to ground-disturbing activities.

However, for land use measures and ground-disturbing activities that arise following issuance of any license, BLM condition 1(D) would provide a basis for agencies and stakeholders to review Twin Lakes' construction and design plans. Maps of proposed facilities or ground-disturbing activities are important tools for understanding the scope and scale of new land uses. A description of how the ground-disturbing activity complies with existing, relevant management plans and how Twin Lakes would mitigate adverse effects from the activity would help minimize impacts on environmental resources. Although the standard license articles would require Twin Lakes to provide

sufficient information for the Commission's decision-making process and review, BLM has additional regulatory responsibilities for which it needs specific information on which to base its decisions. Accordingly, the requirements included in BLM condition 1(D) would ensure the agency has adequate information about any ground-disturbing activities to complete its review.

Consistency with Bear River Project License (FERC No. 20)

Interior, PacifiCorp, TU, and GYC comment that the proposed project would prevent PacifiCorp from fulfilling its requirements under the current Bear River Project license.

Our Analysis

The proposed reservoir would inundate 4.5 miles of river and 210 acres of land, 202 acres of which are designated for conservation use, that is currently within the Oneida development project boundary of PacifiCorp's Bear River Project. The proposed reservoir would reduce or eliminate the existing and future benefits associated with recreational, conservation, and habitat restoration land that was specifically intended to be protected and enhanced through the terms of the Bear River settlement agreement. If the proposed reservoir is constructed, this land would no longer serve Bear River Project purposes, and PacifiCorp would not be able to comply with the terms of its current license and settlement agreement, both of which would need to be amended.

Consistency with Wild and Scenic Rivers Act

BLM identified a 2.4-mile stretch of the Bear River in Oneida Narrows within the proposed project boundary as eligible for Wild and Scenic Rivers' designation for its scenic, recreational, and geologic values. Interior comments that the proposed project would eliminate the riverine values and potentially impact outstandingly remarkable values identified in the Wild and Scenic River eligibility determination.

Our Analysis

Although BLM did not recommend Oneida Narrows for inclusion in the Wild and Scenic Rivers system, it continues to manage this land through the Land Management Plan to protect the values that established its eligibility for the system. The proposed project would eliminate the riverine section, a minimum requirement for designation in the Wild and Scenic Rivers system. The proposed reservoir would eliminate the designated outstandingly remarkable recreational values associated with whitewater recreation. The reservoir would also diminish some of the geologic and fish and wildlife values by flooding cliffs and rocky outcroppings in Oneida Narrows and by reducing connectivity of habitats that surrounding the project. If the project is constructed, these effects would reduce the likelihood that Oneida Narrows would remain eligible for designation as a Wild and Scenic River.

Withdrawn Land Status—Reclamation

Interior comments that proposed project would inundate BLM-managed land that was withdrawn by Reclamation for a water storage development. Interior states that, because BLM has discretion for issuing a mineral material permit and the proposed borrow site 2 is on federal land that was withdrawn for a specific purpose, withdrawal would need to be revoked before the proposed project could proceed.

Our Analysis

Withdrawn land is federally owned land that has been set aside for specific project purposes, such as national parks, hydroelectricity, and water storage. Reclamation withdrew the land within Twin Lakes' proposed project boundary for a larger water storage project in the 1960s. While only Reclamation can use the land for water storage purposes when the land is in withdrawn status, it can authorize other uses as long as they do not interfere with the purposes for the withdrawal.

To construct the project and acquire minerals from borrow site 2, Twin Lakes could either seek authorization for its proposed project from Reclamation, or wait for Reclamation to terminate the withdrawal. Reclamation promulgated rules for private use of withdrawn land that includes a process whereby entities can apply for an authorization, provided the private use does not interfere with Reclamation's project purposes (Reclamation, 2008). The rules appear to support private activities that could benefit from proximity to a reservoir, but do not interfere with project operations, such as a boat launch, picnic area, or a parking area adjacent to a reservoir. Although Twin Lakes' proposed project would create a much smaller hydroelectric and water storage project than the one considered by Reclamation, the proposed reservoir would be within the footprint of Reclamation's water storage project. Consequently, Twin Lakes' proposed dam, reservoir, powerhouse, and other facilities would interfere with Reclamation's ability to develop a water storage facility at Oneida Narrows, at a minimum requiring extensive removal of infrastructure and facilities if Reclamation were to construct its water storage project.

Reclamation withdrew the land more than 50 years ago and has not made further attempts to develop the water storage project. If Reclamation determines that its project is no longer needed, it can terminate the withdrawal and Twin Lakes could proceed without authorization from Reclamation.

Fort Bridger Treaty

By letter dated December 15, 2014, the Upper Snake River Tribes Foundation, Inc., expressed concern that the construction of the proposed project would be injurious to the rights of the Shoshone-Bannock Tribes under Article 4 of the Fort Bridger Treaty

of 1868.[57] According to the letter, article 4 of the Fort Bridger Treaty of 1868 states that the Eastern Band Shoshoni and the Bannock are granted the "right to hunt on the unoccupied lands of the United States so long as game may be found there on." In its comments dated December 16, 2014, the Shoshone-Bannock Tribes reiterated this same concern (letter from N. Small, Chairman, Fort Hall Business Council, Shoshone-Bannock Tribes, Fort Hall, Idaho, December 16, 2014).

Our Analysis

We acknowledge the treaty rights of the Shoshone-Bannock Tribes to access federal land within the project area for hunting, gathering, and other traditional uses. The proposed project would reduce the land available for traditional activities by the amount of land inundated by the new reservoir.

Access Roads

Twin Lakes' proposed reservoir would inundate most of the Oneida Narrows Road that currently provides access to the Bear River, federal lands, the Oneida development of the Bear River Project, private residences and land, and agricultural land. The canyon walls are too steep to construct a new road along the proposed reservoir shoreline. To provide access to the project vicinity, Twin Lakes proposes to construct a new 3.1-mile-long road on the east side of the project, from Highway 36 to Oneida dam, where it would connect to the existing Oneida Narrows Road (see figure 3-23). The road would be built to Franklin County Class D standards for winter-maintained gravel roads, with a maximum grade of 8 percent and turning radius adequate to accommodate semi-tractor and trailer type of traffic (Franklin County, 2007b).

The proposed dam would also inundate a road that accesses private summer homes on the west side of Oneida Narrows. Twin Lakes proposes to construct a new 1.1-mile-long gravel road from Oneida Narrows Road that would cut into the canyon wall, climb past the western dam abutment, and extend northward to intersect with the existing summer home access road that currently provides access to the private land west of project area. Although the general public would be restricted from using the new road, Twin Lakes would use the road to access the dam and powerhouse facilities and would also allow access to the private landowners.

Interior, FCFGA, Yellowstone to Uintas Connection, and TU recommend that roads accessing the proposed dam area should provide public access easements granted in perpetuity. They state that Twin Lakes should be responsible for the upkeep, maintenance, and liability of any new roads that provide public access.

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[57]Letter filed with the Commission on December 15, 2014, from H. Ray, Upper Snake River Tribes Foundation, Inc., Boise, ID.

BLM's preliminary 4(e) condition 3 specifies that Twin Lakes develop an integrated travel and access management plan for land administered by BLM that would be affected by the proposed project. The plan would: (1) be developed in consultation with BLM; (2) specify road standards that comply with the BLM *Gold Book* (Interior and USDA, 2007); (3) define transportation maintenance and management; (4) provide for public safety; (5) improve habitat effectiveness on the winter range; (6) protect sensitive wildlife and plant populations from human interference during critical periods of the year; (7) manage vehicle access and numbers consistent with resource goals; (8) coordinate off-highway vehicle management between federal land use agencies and Twin Lakes; (9) manage noxious weeds; (10) improve aquatic connectivity; and (11) protect cultural resources. BLM draft 4(e) condition 3 also specifies that Twin Lakes consult with BLM prior to erecting any signs on BLM-administered lands, and obtain approval from BLM for the location, design, size, color, and content of signs.

BLM's preliminary 4(e) condition 3 specifies that the travel plan would be incorporated into or coordinated with other project-related resource plans having (e.g., integrated wildlife habitat program); however, these plans were not included in BLM's draft 4(e) conditions.

Our Analysis

Twin Lakes proposes to permanently close Oneida Narrows Road and construct a new road from Highway 36 that would allow public access to the proposed reservoir and the Oneida development of the Bear River Project. The length of the new road would be about half the length of the existing access road and would be constructed to Franklin County road standards.

In its comments, PacifiCorp states that the new road would adversely affect the ability of PacifiCorp to respond to emergencies at its Oneida development during inclement weather, and hinder its ability to repair facility equipment during the winter months. PacifiCorp contends that the gravel road with up to an 8 percent grade and switchbacks would become slippery and difficult to navigate. Further, because Twin Lakes would be responsible for maintaining and plowing snow on the new road, it would be difficult for PacifiCorp to control the quality and timing of road maintenance and snow removal.

Safe operation of the Oneida development requires timely year-round access for PacifiCorp on roads that can safely support heavy materials and large equipment. Franklin County standards specify road grades, beds, and surfaces that provide access for heavy equipment in rural areas throughout the county. Constructing the road to Franklin County standards should provide safe and efficient access to the Oneida development for recreation, agriculture, and industrial uses.

However, the shift in maintenance of the primary access road from PacifiCorp to Twin Lakes creates risk that the road may not be plowed, graded, or maintained in a manner that adequately supports the Oneida development operations. PacifiCorp

currently maintains most of the Oneida Narrows Road for project purposes. Developing measures and maintenance strategies for the proposed new road jointly with PacifiCorp would provide safe and reliable access to the Oneida development for project operations, while providing public access to both projects.

BLM 4(e) condition 3 would provide a process for Twin Lakes to design and develop project-related roads in consultation with stakeholders in a manner that would ensure year-round public access for the term of a new license. The benefits of incorporating and coordinating with other plans are unclear because BLM does not describe the content of these other plans. The 11 elements listed in BLM preliminary condition 3 highlight issues beyond travel and road design, and are more typical of land management plans.

Travel and access plans would ensure safe access to the project area. Developing these elements as part of a land management plan would define road standards and the entity responsible for maintenance for the term of the license; show the type and location of signage; ensure public access to project land and waters; and, develop road designs, alignments, and measures to address environmental effects.

Land Management Plan

Twin Lakes' project would create a new reservoir with a shoreline abutting land that is currently undeveloped, upland terrestrial habitat. As discussed in other sections, the proposed reservoir would bisect lands currently managed for conservation by BLM and PacifiCorp and adversely affect recreation, scenic, wildlife, and fisheries resources. Twin Lakes proposes a number of individual measures to address the changes in land use that would result from the proposed project.

BLM 4(e) conditions 1, 2, and 3, discussed above, point out that the proposed project is not consistent with management plans and that it is unclear how Twin Lakes would manage project lands for the term of a new license. Together, these measures specify that Twin Lakes (1) develop site plans for any ground-disturbance activities; (2) document project effects on, and management measures to protect, federal lands; and (3) develop an integrated travel and access management plan. No entity has called for a comprehensive land management plan for the project, but, taken together, these three preliminary 4(e) conditions represent elements of a land management plan that, if applied to all project lands, would organize proposed and recommended land management measures under a cohesive plan.

Our Analysis

The proposed project would permanently alter and adversely affect land use in the proposed project area. Land use and the current scenic quality of Oneida Narrows would be changed with the construction of the proposed project. Land currently managed for conservation purposes by PacifiCorp, as part of the settlement agreement under the Bear River Project license, and BLM, would be inundated and included in the proposed project boundary.

Although Twin Lakes' proposed individual land use measures (e.g., shoreline buffer, compensating landowners for lost agricultural land) may mitigate some effects from the project, these measures would not mitigate all effects. Further, it is unclear if Twin Lakes' proposed project is consistent with BLM land management plans, the purposes for Reclamation withdrawn land, and PacifiCorp's license for the Bear River Project because of the lack of specific details provided in its project proposal and the absence of consultation with relevant land-managing agencies. The altered land use that would occur with project construction would necessitate coordination among BLM and other state and federal agencies, PacifiCorp, and private landowners that would lose conservation and agricultural land at the project. Developing a land management plan that would include specific land management measures in sufficient detail would provide a basis for understanding how project land would be managed for the term of a new license. Preparing a land management plan would also provide a means to align and coordinate land management measures with existing, relevant land management plans, including BLM management plans and the Bear River Project license. An effective plan should include, at a minimum:

1. an identification and description of land use in the proposed project boundary, including a map identifying the locations of land use types;
2. measures to protect the visual and scenic resources from development;
3. road and public access measures at the project to ensure access to the public, nearby landowners, and to PacifiCorp to access the Oneida development ;
4. measures to monitor and document changes in land use for the term of a license;
5. provisions for consultation with agencies, PacifiCorp, and other stakeholders during implementation of the plan and measures to periodically review and update the plan; and
6. provisions for coordination with other project resource plans, including but not limited to erosion control, spill prevention, wetland, wildlife, recreation, and cultural plans.

Although a land management plan would not fully offset the changes to land use at the project, developing a land management plan, in consultation with these parties, would enable proposed project land to be managed in accordance with applicable plans, policies, and regulations within the altered landscape.

Aesthetic Resources

Twin Lakes proposes to construct a dam and reservoir that would inundate about 4.5 miles of the Bear River. New facilities associated with the proposed project that would affect visual resources include: a 109-foot-tall, 690-foot-long concrete dam; a 4.5-mile-long reservoir with a normal surface area of about 362 acres; a concrete intake structure and a 600-foot-long, 18-foot-wide steel penstock; an 80-foot-wide, 24-foot-tall

powerhouse at the base of the dam; a 0.1-acre electrical substation near the powerhouse; a 0.74-mile-long 46-kV transmission line from the substation to the interconnection point on a PacifiCorp transmission line; a 0.1-acre pumping station; a 3.1-mile-long road connecting Highway 36 to the Oneida dam; a 1.2-mile-long extension of an existing road to provide access to the summer homes west of the project; two 700-foot-long earthen cofferdams to bypass the river during construction of the penstock; two 250-foot-long cofferdams to dewater the dam during embankment construction; 25-acre and 33-acre borrow areas; a 9.3-acre construction staging area downstream of the dam; and a 4.3-acre staging area located downstream of the dam.

Construction would occur over about 2 years, with the first year dedicated to primarily to constructing the new project access road, bypass, and intake structure and the second year dedicated to construction of the dam, powerhouse, transmission line, and summer home access road. The project access road construction would occur over a 6-month period, after which the existing Oneida Narrows Road would be closed from a point just upstream of Highway 36 to the existing river access site downstream of Oneida powerhouse. Construction of the dam and hydroelectric facilities would include excavation from borrow sites upstream of the dam, staging areas, concrete batch facilities, and a regular stream of vehicles bringing equipment and construction workers to the project (see appendix D for an estimate of peak construction activities).

Twin Lakes proposes to operate the project reservoir at a relatively constant elevation except in dry years. During dry years, Twin Lakes proposes to draw down the reservoir 5,000 acre-feet or about 16 vertical feet for irrigation purposes.

Twin Lakes proposes two measures to minimize project effects on visual and aesthetic resources: (1) limit the reservoir drawdown to a maximum of 5,000 acre-feet, or about 16 vertical feet; and (2) paint the powerhouse a natural color.

Our Analysis

Short-term effects

Construction of the project and summer home access roads, dam, and hydroelectric facilities would cause short-term visual and noise effects from heavy equipment clearing and excavating land for the powerhouse, transmission facilities, roads, and dam.

Construction of the proposed new access roads would be seen and heard from both Highway 36 and from Oneida dam. Twin Lakes estimates that road construction noise would be audible from the farms and ranches, as well as recreational visitors, along Highway 36 south of the proposed road entrance.

The dam site would not be visible from Highway 36, but the construction project would generate noise, traffic, a staging area near the highway, and dust over a 2-year period. Residents nearest to the dam site occupy houses about 0.8 mile below the mouth of the canyon and seasonally used houses and camps about 1 mile to the west. Because of the topography of the canyon, the residents would not be able to see the construction

area, but would be able to see the staging area near Highway 36. Although Twin Lakes' proposed dust abatement measures, discussed in more detail in section 3.3.8, *Air Quality*, would help reduce fugitive dust, the area would likely be affected by construction noise, traffic, and dust during the construction period.

Long-term Effects

Once built, the proposed project would change the visual character of Oneida Narrows. At the downstream end, the proposed dam and infrastructure would dominate the visual resources of the lower canyon, with a109-foot-tall concrete and earthen dam, associated roads, parking areas, transmission facilities, switchyards, buildings, intake structure, penstock, and overflow structures.

Viewed from the upstream side, the proposed reservoir would permanently alter the visual resources in Oneida Narrows by inundating about 100 vertical feet of the Narrows and limiting public access (see section 3.3.5, *Recreation Resources*). Near the upstream end of the canyon, the elevation of the river is about 4,700 feet with steep canyon walls rising over 5,700 feet. The rocky outcroppings that dominate much of the visual character in the Narrows extend to about 5,100 feet on the west side of the river and over 5,700 feet on the east side of the river. The project would permanently change the canyon from a narrow river valley with steep mountains and cliffs on both sides, to a reservoir landscape with limited public viewing areas, especially near the steepest and most scenic part of the canyon.

However, the reservoir could become part of the natural landscape over time as shoreline habitat becomes established and the public becomes accustomed to the visual changes in the landscape. Viewed from the upstream side, no constructed facilities associated with the dam or new hydroelectric facilities would be seen. Because of its size, color contrast, and strong horizontal characteristics, the reservoir would become a dominant, natural-looking element in the landscape. New project features, including the project road, recreational site, and shoreline trail would be noticeable but would blend into the landscape.

Operating the project with seasonal drawdowns of up to 16 feet in dry water years would form a linear band around the shoreline between vegetation and water. Land within this band would likely be devoid of vegetation, and the underlying soils would contrast with the natural landforms and colors. The exposed shoreline would have a high degree of contrast with the surrounding landscape because the shoreline band exposed during drawdown would be relatively large as compared to the narrow width of the reservoir. The exposed shoreline caused by the up to 16-foot drawdown in dry water years would present an unpleasant appearance during the summer in 13 out of 20 years, on average.

BLM classifies the visual resources in Oneida Narrows as Class II, with the objective of retaining the existing character of the landscape with a low level of change. Any changes to the landscape must repeat the basic elements of form, line, color, and

texture found in the predominant natural features of the characteristic landscape. Twin Lakes conducted a visual assessment of proposed project features using BLM's Visual Resource Analysis methodology, which aggregates findings into a visual assessment classification on a scale of I (wilderness landscape) to IV (highly modified landscape). Twin Lakes found that the BLM Class II visual resource definition would be appropriate for most the proposed project area. A new reservoir in Oneida Narrows would not meet the definition of Class II because a new reservoir would not repeat the existing riverine landscape and would constitute a substantial change in form, line, color and texture as compared to existing conditions.

Twin Lakes identified two areas that would meet BLM Class IV visual resource definition: (1) the upstream end of the new reservoir near the existing Oneida dam, powerhouse, and switching yard facilities; and (2) the area at the southern terminus of the existing transmission line proposed as the location for the new interconnect, pumping station, and staging area. Twin Lakes classified these sites as Class IV, highly modified landscapes.

Interior and TU comment that the Pocatello Resource Management Plan designated Oneida Narrows as VRM Class II, with the goal of retaining the existing character of the landscape. BLM manages its land to retain existing landscape characteristics and allow limited management activities that could be seen but are not dominant to a casual observer. The natural forms of the river in a narrow canyon with a diversity of vegetation and few constructed elements, make the project area particularly sensitive to landscape-level changes. VRM Class II would require any proposed changes in the project area to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape. Twin Lakes' proposed project would not meet these standards because the existing riverine and canyon landscape would not be retained if it were replaced with a new reservoir.

3.3.7 Cultural Resources

3.3.7.1 Affected Environment

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA as amended requires the Commission to take into account the effects of licensing a hydropower project on any historic properties and allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment if any adverse effects on historic properties are identified within the project's area of potential effects (APE).

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. In this document, we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources

need enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible. TCPs are a type of historic property eligible for the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history; or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998).

Section 106 also requires that the Commission seek concurrence with the Idaho State Historic Preservation Officer (Idaho SHPO) on any finding involving effects or no effects on historic properties. If TCPs have been identified, section 106 also requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties.

If existing or potential adverse effects have been identified on historic properties, the applicant must develop an HPMP to seek to avoid, reduce, or mitigate the effects. Potential effects that may be associated with a hydroelectric project include any project-related effects associated with project construction and the day-to-day operations and maintenance of the project after issuance of a license. During development of the HPMP, the applicant is expected to consult with the Commission, Idaho SHPO, Native American tribes, Corps, BLM, and other interested parties. In most cases, the HPMP would be implemented by execution of a PA signed by the Commission, Advisory Council (if it chooses to participate), and Idaho SHPO. Other consulting parties would be part of the PA as well, and would be invited to sign the PA as concurring parties.

By letter dated September 12, 2007, the Commission designated Twin Lakes as the Commission's nonfederal representative for carrying out day-to-day consultation in regards to the proposed Bear River Narrows Project licensing effort pursuant to section 106 of the NHPA; however, the Commission remains ultimately responsible for all findings and determinations regarding the effects of the project on any historic property, pursuant to section 106.

On January 21, 2015, Commission staff issued a Restricted Services List notice to include the Idaho SHPO, Advisory Council, Twin Lakes, BLM, National Park Service (Park Service), Franklin County Board of Commissioners, PacifiCorp, Northwestern Band of the Shoshone Nation, Shoshone-Bannock Tribes, Shoshone-Paiute Tribes of the Duck Valley Reservation, Shoshone Business Council of the Wind River Reservation, and the Bear River-Battle Creek Monument Association to discuss the projects' cultural resources. Since that time, the Corps has requested to be included on the list. On February 2, 2015, the state of Idaho filed a motion to be included on the list. However, in a subsequent telephone call on February 9, 2015, the Deputy Attorney General, Natural Resources Division, Office of the Attorney General, state of Idaho, stated that, as long as the Idaho SHPO was included on the list, it would not be necessary for her and other parties from the state of Idaho to participate. On February 5, 2015, the Greater Yellowstone Coalition also filed a motion to be included on the list, but declined once

understanding that only cultural resource matters would be discussed among the parties associated with the list. The Bear River-Battle Creek Monument Association is no longer an active organization and is not a participant on the list. PacifiCorp also stated that it would not be a participant on the list.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by the issuance of a proposed new license within a project's APE. The APE is determined in consultation with the Idaho SHPO and is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the APE for the proposed Bear River Narrows Project includes lands within the proposed project boundary plus lands outside the project boundary where project operations may affect the character or use of historic properties or TCPs.

The initial APE for the proposed project was defined in the revised Study Plan filed on November 27, 2007, as the land within the proposed project boundary and encompassing the following:

- the area of the dam and pool (to 100 feet above maximum level);
- all temporary and permanent infrastructure features such as the powerhouse, substation, borrow areas, staging areas, camp/picnic grounds, and boat ramps and lands within 100 feet of the these features; and
- 300-foot-wide corridors for all linear features such as roads and transmission lines scheduled for upgrade or installation.

Twin Lakes consulted with the Idaho SHPO, BLM, and Shoshone-Bannock Tribes to define the APE, and on December 26, 2007, the Commission approved the study plan and thereby approved the APE.

In its application, Twin Lakes proposes to acquire the Ben Johnson Family Farm site, a 538-acre property on the Bear River about 12.7 miles below the proposed dam and outside of the previously approved APE. Twin Lakes proposes to develop these lands as mitigation lands to benefit aquatic, wetland, and riparian habitats; fisheries and wildlife habitat; recreational opportunities; and ecosystem function. Because of their association with the proposed project as offsite mitigation lands and because they would be affected by project-related activities, the Ben Johnson Family Farm land is also included within the APE. As a result, the APE for the project is discontiguous and contains two separate APE areas: the project area APE (658 acres) and the mitigation property APE (538 acres).

Cultural History Overview

Prehistoric Background (Adapted from Butler, 1986)

Human occupation of the Bear River watershed began more than 9,000 years ago. Three primary cultural periods have been proposed for the region that encompasses the project area: the Paleo-Indian tradition or Early Big Game Hunting period (11,500–8,000 before present [BP]), the Archaic tradition (8,000–250 BP), and the Protohistoric era (250–100 BP). The first two periods reflect changes in resource procurement strategies and technology from a focus on big game hunting to a more diversified subsistence economy. They also demonstrate adaptation from the use of large spear and atlatl dart points to the use of bow and arrow and pottery for storage. The Protohistoric era began with the introduction of the horse and the resulting change in mobility and use of European material goods. The presence of worked glass, arrow points manufactured out of iron and brass, trade beads, and other items indicate a significant cultural change.

The Paleo-Indian tradition includes the Clovis, Folsom, and Plano periods. The Paleo-Indian tradition is generally regarded as focused on big game hunting, including mammoth, bison, mountain sheep, and deer, but with contributions of plant foods and small game to the diet as well. Radiocarbon dates suggest that the earliest Clovis occupations date to ca. 11,500 BP. In the early 1960s a number of Clovis projectile points were found with many chipped stone bifaces at the Simon site in southeastern Idaho. A similar cache of Clovis points was found 10 years later in Montana. Further evidence of the Clovis period was found in the early 1980s at a site to the west of the Oneida Narrows area. At this site, archaeological deposits containing Clovis points were reportedly disturbed during the construction of fish ponds.

The Folsom period dates from 10,000 to 9,600 radiocarbon years BP. While Folsom period surface finds are abundant in Idaho, buried Folsom sites have also been identified. At a cave on the Snake River Plain north of the project area, a deposit was found that contained stone and bone tools, including four Folsom points, and the remains of elephant (mammoth), bison, and camel, which were typical Late Pleistocene fauna. The Plano period, dating to 10,600 to 7,800 BP, is a well-represented phase of the Paleo-Indian tradition. Late Plano projectile points were recovered at the same cave discussed above. This period is characterized by lanceolate points and a focus on bison hunting although mountain sheep were also taken at higher elevation sites above the Snake River Plain.

The Archaic tradition includes the Early, Middle, and Late Archaic periods. This period of time is characterized by a change to a wider subsistence economy and the beginning of warmer or drier, middle Holocene climate conditions. The Early Archaic period dates from 8,000 to 5,000 BP and is marked by the replacement of lanceolate projectile points by side-notched points and stemmed-indented base points, although many other earlier tools continued to be used. This change reflects a shift to the use of atlatl and dart weaponry. While hunting still focused on big game, smaller game such as rabbits, fish, birds, and reptiles were also taken. The Middle Archaic period dates from

approximately 4,000 to 2,000 BP. While no major changes in technology occurred during this time, change is reflected in subsistence and settlement patterns. A greater dependence on both plant and animal resources is reflected in the presence of grinding stones and smaller animal bones in artifact assemblages dating to this time. During the Late Archaic period from 2,000 to 250 BP, other technological shifts occurred. The bow and arrow replaced the atlatl, and items such as hopper mortars reflect an increasing exploitation of plant resources. Excavations of Archaic period sites in southern Idaho have also identified semisubterranean dwellings. While these do not represent villages, two to three of these structures are commonly found clustered together along the Snake River Valley.

The Protohistoric era began with the introduction of the horse and the resulting change in mobility. It is also represented by the introduction and use of European material goods. The presence of worked glass, brass and iron arrow points, trade beads, and other items are testament to this significant cultural change. Ethnographically, the Bear River watershed area was inhabited by Shoshonean people. The Shoshone occupied a large area extending east from southeastern Oregon to across the Rocky Mountains. They established important relationships with other tribes, including the Bannock. The Shoshone and Bannock established winter encampments on the Snake River Plain in Idaho. One such encampment was also located on the Bear River north of the project area. This area has been identified as within the traditional territory of the Shoshone-Bannock Tribes and the Northwestern Band of the Shoshone Nation.

Ethnography

The lands in the vicinity of the proposed Bear River Narrows Project are considered the traditional territory of the Shoshone people. Overall, the Shoshone are related to the Paiute, Bannock, and Ute peoples who before European contact ranged the Great Basin area across northern Arizona, Utah, western Colorado and Wyoming, Nevada, Idaho, and eastern Oregon. In the middle 1800s, a number of Northwestern Shoshone, led by Chief Bear Hunter, resided in Cache Valley and along the lower reaches of the Bear River. Following the Bear River Massacre in 1863 (see following discussion), an 1867 Executive Order set aside lands for the Shoshone and Bannock people and on July 3, 1868, the Fort Bridger Treaty established the Fort Hall Indian Reservation for the Shoshone-Bannock Tribes. The Fort Hall Indian reservation is located in southeastern Idaho, outside of Pocatello. Some Northwestern Shoshone also moved to Fort Hall Indian Reservation. The Northwestern Band of the Shoshone Nation became a federally recognized tribe on April 29, 1987. The Northwestern Band of the Shoshone Nation have two offices, one in Pocatello, Idaho, and the other in Brigham City, Utah.

Two other Shoshone tribal organizations have also identified ties to the area.[58] The Eastern Shoshone, represented by the Shoshone Business Council, were established on the Wind River Reservation of Wyoming under the Fort Bridger Treaty. Additionally, while the United States government attempted to relocate Western Shoshone people to the Fort Hall Reservation, many were ultimately united with the Paiute as the Shoshone-Paiute Tribes of the Duck Valley Reservation under the Indian Reorganization Act of 1934. The Duck Valley Reservation is located in northern Nevada.

All four federally recognized tribal groups have Shoshonean ancestors who inhabited the area in and around the proposed project and retain strong ties to these lands.

Historic Background (Adapted from Park Service, 1990)

The earliest Euro-Americans to visit the vicinity of the project area were American and British fur traders in the early nineteenth century. These traders, and subsequent settlers, traveled through and occupied lands in the vicinity of the Bear River and Cache Valleys. The Montana Trail, a historic road leading from Salt Lake City to mining camps located in Montana passed through the project area at the base of Cedar Point. A trading post was established in 1834 at nearby Fort Hall, and this became an important resting stop for travelers headed to the Oregon territory along the Oregon Trail. Prior to the Civil War, Mormon pioneers found these lands to be ideal for hunting, fishing, timber, and livestock grazing, and by 1860 a small community had been established around the fort. These lands were attractive to both Native Americans and settlers for the same reasons and before long, tense confrontations resulted. The natural grasslands of Cache Valley had traditionally been an attractive hunting-gathering ground and place to reside for the Shoshone and became equally attractive to the immigrant Mormons who began entering the valley by the late 1840s. There, the Mormons plowed under the grasslands, producing rich agricultural fields for both grain and grazing. The Shoshone continued to periodically reside at Cache Valley but became more dependent upon the Mormon settlers for grain and beef. An uneasy peace existed between the Mormon and Shoshone, but by the 1850s, other Euro-American settlers coming off the Oregon Trail entered the region creating increased tensions between the native inhabitants and settlers. Things exacerbated with other Euro-Americans passing through the area due to the California Gold Rush, and with other discoveries of gold in the Rocky Mountains. Violence broke out between the two groups, often started with Euro-Americans trespassing on lands which had sustained the traditional practices of the Shoshone, Bannock, Paiute, and Ute peoples of the region for millennia before.

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[58] The Eastern Shoshone and Shoshone-Paiute tribes were added as consulting Native American parties involving the Bear River Massacre Site National Historic Landmark.

Bear River Massacre

At the onset of the Civil War, Colonel Patrick Edward Connor was tasked with reoccupying previous army posts located in Nevada and Utah. Connor arrived in Utah Territory to find many of the resident tribes, including the Shoshone, Bannock, and Ute tribes, determined to retain and protect their traditional land from encroachment. In early 1863, the Territorial Chief Justice issued a warrant for the arrest of "guilty Indians," namely Shoshone chiefs Bear Hunter, Sagwich, and Sanpitch, who were suspected of killing 10 miners who had been traveling through the valley. Colonel Connor was retained to assist in the arrest, but made it clear that his intent was to execute "every Indian…who has been engaged in hostilities against whites" excluding women and children. Connor intended to confront the Indians while they were settled in their winter camps. By January 28, two companies of soldiers had reached Franklin located 12 miles from the Shoshoni village (at Cache Valley) on the Bear River that was the intended target of the mission. At that time, the village was reported to contain 75 lodges that housed 450 Shoshone men, women, and children. The Shoshone villagers had been informed of the pending military action by a Mormon Scout and local farmers and used the natural landscape, including the Bear River, in their favor as defense structures.

Horse soldiers led by Major Edward McGarry, initially confronted Shoshone warriors in the meadow west of the Bear River. Unable to surround the village with his company, McGarry ordered his men to advance. The Shoshones fired first, and within 20 minutes, wounded 20 and killed 7 of the troops. Unable to cross the Bear River, Colonel Connor and his army determined to block Indian escape from the village at Beaver Creek. Troops then attacked the village from the north and east. Upon entering the village, combat became hand-to-hand and with close-range revolvers. At the end of this initial battle, 48 Shoshone had been killed. Those attempting to flee the village by crossing the river drowned or were shot by soldiers posted on the west bank. Few were successful in their escape attempts. Additional fighting lasted about 4 hours and ended by mid-morning. According to reports, of 200 soldiers engaged in the battle, 21 died, and 3 officers and 43 soldiers were wounded. Subsequent reports of Shoshone casualties reported 255 killed. Of these, there are varying accounts of the numbers of women and children killed, ranging from only three women to as many as 120 women and children. There were no reports of Shoshone wounded or captured. Chief Bear Hunter was killed, but Chief Sagwich was able to escape. Colonel Connor was promoted to brigadier general for his efforts at Bear River. The remaining villages of Shoshone, Northwestern Shoshone, and Bannocks were kept under control by military patrols, and Connor continued to wage war against the Utes and Goshutes in the region until they complied as well. Today, the Bear River Massacre Site is listed (in 1990) on the National Register as a National Historic Landmark. The Bear River Massacre Site is considered the largest 19thmassacre of native peoples in the United States, larger than the massacres at Sand Creek, Washita River, or Wounded Knee (Park Service, 1990).

Post Civil War

The Bear River drainage saw increased activity at the end of the 1800s and into the early part of the 1900s. The need for power and water diversion for farming purposes resulted in the construction of several dams on the river, include Oneida dam and the Twin Lakes Canal system developed in 1904. This canal originated at a diversion on Mink Creek located northeast of the proposed project area and extended through Bear Valley to the Winder and Twin Lakes reservoirs. The system uses three major reverse siphons, one of which (IHSI 41-17895) is in the project area APE and eligible for listing on the National Register.

Previous Cultural Resources Investigations

Twin Lakes researched archival, unpublished literature and published sources that provide information about previous cultural resource surveys undertaken within the proposed project area. Existing information was also obtained from BLM and the Idaho SHPO.

Twin Lakes identified nine previous cultural resource studies completed in the vicinity of the proposed project boundary (Miller, 2010a). The earliest was a study for a proposed power plant site and transmission corridor that passed through the current project area APE (Butler, 1978, as cited by Miller, 2010a). The exact location of these surveys in relation to the APE was not provided.

By letter dated September 20, 2014, the Idaho SHPO stated that the Archaeological Survey of Idaho is currently conducting field work at specific areas within the Bear River Massacre Site. However, the Idaho SHPO explained that the study does not address the entire battlefield area, does not include any of the lands within Twin Lakes' proposed mitigation site located at the Ben Johnson Family Farm, and that the results of this study may not be available in the near future (Ken Reid, personal communication with members of the Restricted Service List, 2015).

Identified Resources

Prehistoric and Historic Archaeological Resources

According to Twin Lakes' research, other than field work completed for PacifiCorp's Bear River Project, previous studies documented only five isolated and non-diagnostic lithic materials. Studies completed by PacifiCorp resulted in the identification of seven archaeological sites that are also located within the project area APE (Southworth et al., 1999; Ellis, 2005, both as cited by Miller, 2010b). These seven sites consist of a historic farmstead (IHSI 41-17907), two historic period steel stringer bridges (IHSI 41-17908, IHSI 41-17909), two historic trash scatters (10FR16, 10FR38), the Twin Lakes Canal siphon and associated structures (IHSI 41-17985), and a recent trash scatter (SB-56).

For the current project, between 2008 and 2009, Twin Lakes conducted an intensive cultural resource inventory of land within the project area APE. The results are

presented in *Final Study Report: 9. Cultural Resources, Twin Lakes Canal Company Bear River Narrows Hydroelectric Project, FERC No. 12486* (Miller, 2010b) and *Archaeological and Historic Survey Report, Archaeological Survey of Idaho, Bear River Narrows Hydroelectric Project, FERC No. 12486* (Miller, 2010a). The purpose of this study was to identify, document, and evaluate cultural resources listed in or potentially eligible for the National Register. The study was guided by information obtained in reports of previous investigations in the project area APE with a focus on areas anticipated to be subject to major ground disturbance associated with the proposed project. According to the reports, a total of 45 within the project area APE were surveyed using parallel pedestrian transects placed no more than 15 meters apart. This land was not previously inventoried for cultural resources, areas identified prior to the 2008 field season, and a reported gravesite location. Areas surveyed included portions of two alternate roads and the proposed dam-to-summer home road, the route of the proposed transmission line from the proposed dam to the proposed substation, and a 30 acre area designated as a borrow source where the Shoshone-Bannock Tribes had expressed concern about potential gravesites (see *Traditional Cultural Properties* later in this section). Additionally, a "cave" or rockshelter above the Bear River was also inspected with negative results. This cave had been inspected during previous surveys and no cultural materials were identified.

In addition to the seven previously recorded sites identified by PacifiCorp, an additional three new sites were recorded within the project area APE during the current survey. These include a historic rock diversion dam (IHSI 41017951) and two granary sites with associated features (IHSI 41-17949, IHSI 41-17950). One of the granary sites also contains historic construction debris.

In correspondence dated January 28, 2010, the Idaho SHPO concluded that only the historic farmstead(IHSI 41-17907) and the Twin Lakes Canal siphon (IHSI-17985) are eligible for listing on the National Register (letter from S. Pengilly, Deputy SHPO, Idaho State Historical Society, Boise, ID, to N. Josten, GeoSense, Idaho Falls, ID, filed March 29, 2013). The Idaho SHPO also determined that the remaining eight sites are ineligible.

In response to the Commission's May 22, 2014, request for additional information, on May 29, 2014, and October 7, 2014, Twin Lakes provided information on 12 cultural resources present within the boundaries of the mitigation area APE. According to the response, this area contains one location that is listed on the National Register (Bear River Massacre National Historic Landmark [Bear River Massacre Site; HSI 41-00929]) and two that have been determined to be eligible for listing (segment of historic Yellowstone Highway [IHSA 41-17942] and West Cache Canal [IHSI 41-17977]). The Pioneer Women Historical Monument (no number) is also located in the mitigation area APE. Of the remaining eight unevaluated resources, three are prehistoric lithic scatters, two are historic townsites (Bridgeport and Battle Creek), and one is a section of a historic trail. Two named hot springs were also identified. A formal survey of this area was not completed for the proposed project due to private landowner restrictions; therefore, the

precise location, boundaries, and status of these sites are unknown. However, the pending study undertaken by the Idaho SHPO discussed above may shed light on these resources.

Traditional Cultural Properties

In its application, Twin Lakes states that informal and formal consultation was conducted with the Shoshone-Bannock Tribes and Northwestern Band of the Shoshone Nation to identify areas of traditional cultural importance. Consultation included a field trip to the project area. According to Twin Lakes, the Shoshone-Bannock Tribes expressed concern regarding possible burials in the project area.

A surface examination of this area was conducted and an initial report was prepared (Miller, 2008). According to this report, five cultural resources surveys had been previously conducted in the area of concern, two for initial Twin Lakes Canal proposals (Holmer and Holmer, 1988, as cited by Miller, 2008; Holmer, 1989, as cited by Miller, 2008), one for a BLM road upgrade (Creswell, 1984,as cited by Miller, 2008), one during a BLM site visit (Lazduaskas, 2004, as cited by Miller, 2008), and one for the relicensing of the Oneida Project (Southworth et al., 1999,as cited by Miller, 2008). All provided negative results. The field investigation for the current project also did not result in the identification of any burial sites or cultural materials in this area. The report concluded that purported "rock features" were likely natural occurrences as a result of erosion and deposition. However, the report recommended that the area either be avoided or monitored during any excavations in this area.

Both the Shoshone-Bannock Tribes and the Northwestern Band of the Shoshone Nation consider the project area to be culturally important. In a June 23, 2014, letter, the Northwestern Band of the Shoshone Nation requested that a sacred memorial site be installed at the site of the Bear River Massacre (letter from J.S. Walker, Chairman, Northwestern Band of the Shoshone Nation, Brigham City, UT, to the Secretary, Commission, Washington, D.C., June 30, 2014). Elements of the Bear River Massacre Site National Historic Landmark can be considered potential TCPs, which would have components that are of traditional religious and cultural importance to the Northwestern Band of the Shoshone Nation and Shoshone-Bannock Tribes, and to tribal members of the Eastern Shoshone and Shoshone-Paiute Tribes. A site such as the landmark would be considered hallowed and sacred to all Shoshone peoples, as well as to all native peoples in this country.

3.3.7.2 Environmental Effects

Project-Related Effects on Cultural Resources

Project-related effects on cultural resources within the APE are likely to occur from project construction, operation and maintenance, use and maintenance of project roads, recreation, vandalism, and mitigation measures associated with other project environmental resources. Project effects are considered to be adverse when an activity may alter, directly or indirectly, the characteristics of a historic property that qualify the

property for inclusion in the National Register. If adverse effects are found, such effects would need to be resolved in consultation with the Idaho SHPO and other parties.

Prehistoric and Historic Archaeological Resources

Within the project area APE, archaeological surveys conducted by Twin Lakes (Miller, 2010a, 2010b) identified 10 cultural resource sites that could be affected by the proposed project. Only two of these resources, the Twin Lakes Canal siphon system (IHSI 41-17895) and a historic-period farmstead (IHSI 41-17907) are eligible for listing in the National Register and warrant consideration under section 106. Twin Lakes has stated that the Twin Lakes Canal siphon system and associated structures are located downstream of the proposed Bear River Narrows dam but could be affected by the construction and operation of a proposed substation and pumping station in this area (GeoSense, 2013). The historic farmstead is located alongside the proposed reservoir and could be affected by project construction, reservoir fluctuation, and the development of new recreation facilities.

Along Mink Creek, Twin Lakes proposes to cooperate with agencies to remove existing fish passage barriers, cooperate with agencies regarding measures designed to control non-native species in Mink Creek, release a 10-cfs minimum flow (which may entail a release structure and means to measure the flow), and cooperate with agencies in the planning and eventual installation of a fish screen to prevent entrainment of fish at the Twin Lakes diversion. These activities have the potential to affect cultural resources that may be present along the creek.

Within the mitigation area APE, Twin Lakes proposes to acquire the Ben Johnson Family Farm site and develop the property to benefit aquatic, wetland and riparian habitats, fisheries and wildlife habitat, recreational opportunities, and ecosystem function. Twin Lakes proposes to create, restore, and enhance natural resources at the Ben Johnson Family Farm site through the creation of side channels, sloughs, or other natural features of riverine/riparian systems. Additionally, Twin Lakes proposes to analyze whether or not a 10-acre parcel of land on the north side of the Bear River would be suitable as a wetland to improve water quality. The proposed environmental mitigation measures to benefit natural resources within the mitigation area are discussed in the environmental effects discussions in sections 3.3.2.2, *Aquatic Resources*; 3.3.3.2, *Terrestrial Resources; 3.3.5.2, Recreation Resources;* and 3.3.6.2, *Land Use and Aesthetics*.

To benefit recreational opportunities within the mitigation area APE, Twin Lakes proposes to provide two new recreation areas. An access road and parking area would be constructed on the property on the east side of Highway 91where it crosses the Bear River. This site would include a restroom and motor boat launch. Additionally, a public parking area would be provided farther south on the west side of Highway 91, and a public trail would be installed that would provide access to 4.4 miles of the river.

Twin Lakes did not identify the specific potential effects on cultural resources within the mitigation area APE as a result of implementation of these proposed natural resource and recreational resource measures.

The Ben Johnson Family Farm site (where the above mitigation will occur) includes the southern portion of the Bear River Massacre Site National Historic Landmark. There are 1,691 acres enclosed in this National Historic Landmark, and most of the lands lie on the north side of the Bear River outside the Ben Johnson Family Farm site. Nevertheless, the Ben Johnson Family Farm site may contain significant components of the Bear River Massacre Site, including the original confluence area where Beaver Creek (now Battle Creek) entered Bear River. Buried archaeological components of the massacre site, and other pre-contact archaeological occupation/village components may lie in the Johnson Family Farm site, as well, including other pre-contact and historic features associated with the characteristics of Cache Valley area which made it attractive with both native peoples and Euro-American settlers.

In a letter filed on October 7, 2014, the Idaho SHPO recommended that, prior to initiation of the proposed project on mitigation lands on the Ben Johnson Family Farm site, Twin Lakes conduct archaeological surveys to document historic properties, evaluate the potential effects of all proposed activities on identified historic properties, and develop mitigation measures in consultation with stakeholders (letter from E. Morton, Idaho SHPO, Idaho State Historical Society, Boise, ID, to N.E. Josten, GeoSense, Idaho Falls, ID, September 19, 2014).

Management of Historic Properties

2013 Historic Properties Management Plan

BLM's preliminary 4(e) condition 5 specifies that Twin Lakes develop an HPMP for land administered by BLM that would be affected by the proposed project. The plan would include plans for (1) the protection of cultural resources within the project APEs evaluating eligibility, monitoring, protection and mitigation; (2) curation; (3) updated inventories; (4) interpretation and education; (5) consultation with the BLM and affected tribes; (6) record keeping and distribution; (7) maintaining confidentiality and security of sensitive site data; (8) emergency undertakings; (9) the discovery of human remains, funerary items, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act; and (10) the discovery of previously unidentified cultural resources encountered during licensee project work on BLM lands.

In consultation with the Commission, BLM, Idaho SHPO, the Shoshone-Bannock Tribes, the Northwestern Band of the Shoshone Nation, and PacifiCorp, Twin Lakes prepared a draft HPMP to address project effects on historic properties within the project area APE. The Idaho SHPO provided comments on the draft HPMP in an email dated August 2, 2011 (filed on March 29, 2013) (email from S. Pengilly, Deputy SHPO, Idaho State Historical Society, Boise, Idaho, to S. Miller, S.J. Miller Faunal Analysis and CRM

Services, Idaho Falls, Idaho, August 2, 2011). Most of the Idaho SHPO's comments were addressed in the HPMP that was provided to the Commission.

Twin Lakes' HPMP includes an overview of the proposed project, a description of the project area APE, a discussion of the historic context of the project, and a description of completed surveys and identified historic properties. In its HPMP, Twin Lakes also proposes to undertake a variety of general measures for implementing the HPMP and managing cultural resources, including:

- Appointment of a historic properties management coordinator, who would be responsible for overseeing implementation of the HPMP;
- Preparation of an annual summary report on historic preservation activities and status;
- Implementation of procedures for pre-project planning;
- Implementation of historic preservation training;
- Monitoring of specific culturally sensitive areas;
- Development of a plan to address the inadvertent discovery of cultural materials and/or human remains during preconstruction or construction activities;
- Development of a notification and coordination plan for ground-disturbing activities in sensitive areas;
- Formalization of an annual historic preservation compliance plan that would include a reporting schedule;
- Development of a plan for emergency situations;
- Development of a communications protocol to address potential project impacts during project planning; and
- As conditions allow, requirements for a shoreline survey of all reservoir areas during normal, drought, low-water, or drawdown periods within 3 years of achieving full reservoir capacity.

Specific to the individual historic properties identified within the project area APE, the HPMP recommends monitoring and further investigation of the historic farmstead (IHSI 41-17907) and monitoring of the Twin Lakes Canal siphon and associated structures during construction activities.

In its HPMP, Twin Lakes states that several sites that are located within the boundaries of the project area APE are also monitored and protected under PacifiCorp's Bear River Project HPMP (Ellis, 2005). According to Twin Lakes, one site, a steel stringer bridge that has been determined to be ineligible for listing on the National Register (IHSI 41-17908), will be re-evaluated in 2015 under the requirements of PacifiCorp's HPMP. Details pertaining to PacifiCorp's management of the other sites

addressed are not provided. However, Twin Lakes explains in its 2013 HPMP that the management of the historic and prehistoric sites currently addressed in the PacifiCorp HPMP would transfer to Twin Lakes under any license issued for the Bear River Narrows Project.

2014 Historic Properties Management Plan Addendum

In its August 15, 2014, AIR, the Commission requested that Twin Lakes consult with the affected tribes, agencies, and stakeholders and modify the HPMP to include measures to protect all existing elements of the Bear River Massacre Site National Historic Landmark. The Commission requested that the HPMP be revised to include detailed measures on how Twin Lakes would resolve any potential adverse effects on any of the elements within the Bear River Massacre Site National Historic Landmark boundaries that would be affected as a result of implementation of the measures proposed for natural and recreational resources at the Ben Johnson Family Farm property, including measures to avoid, minimize, or mitigate any adverse effects. On October 7, 2014, Twin Lakes filed an Addendum (GeoSense, 2014b) to the HPMP to address the Commission's request. In its Addendum, Twin Lakes provides a brief description of the previous cultural resources surveys and cultural resources identified in the vicinity of the Ben Johnson Family Farm property. Because access to the property had not been granted for formal survey purposes and potential project-related effects on historic properties are not known, no site-specific management measures were provided. Instead, the Addendum refers to the 2013 HPMP for general measures.

Twin Lakes' Addendum (Addendum 1) included an appendix that contained copies of correspondence related to the document. The appendix contained the above-referenced August 2, 2011, email from the Idaho SHPO and a September 19, 2014, letter from the Idaho SHPO (letter from E. Morton, Idaho State Historical Society, Boise, ID, to N. Josten, GeoSense, Idaho Falls, ID, filed October 7, 2014). In the letter, the Idaho SHPO stated that an analysis of the Ben Johnson Family Farm site (Ecosystem Sciences, 2013) did not contain an evaluation of the potential effects on historic properties as a result of Twin Lakes' proposal. The Idaho SHPO recommended a thorough survey of the Ben Johnson Family Farm property to identify historic properties and potential adverse effects as a result of Twin Lakes' mitigation proposals. If adverse effects would result, then appropriate mitigation measures would need to be identified.

The appendix also contained a June 23, 2014, letter from the Northwestern Band of the Shoshone Nation to the Commission. It its letter, the Northwestern Band of the Shoshone Nation expressed support for Twin Lakes' proposed plan to acquire the Ben Johnson Family Farm site with the following priorities: (1) prevention of any future development that could disturb ancestral burial sites; (2) restoration of the entire property to the natural habitat conditions that prevailed at the time of the 1863 Bear River Massacre; and (3) reservation of lands north of the Bear River as a sacred memorial site with controlled public access.

Our Analysis

For the most part, Twin Lakes'2013 HPMP provides measures that are consistent with the Advisory Council and Commission's joint document *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* (Advisory Council and FERC, 2002). Adherence to these guidelines ensures that appropriate measures for management of historic properties are included in hydroelectric project HPMPs. However, we consider the HPMP to be in draft form and acknowledge that further consultation with the Idaho SHPO, BLM, participating tribes, and other consulting parties is needed to finalize the document.

Twin Lakes has not proposed any specific plan or measures for cultural resources on the Ben Johnson Family Farm property. However, the 2014 Addendum 1 refers to the 2013 HPMP with regard to additional fieldwork and management measures. The HPMP states that additional field inventory would be required "if the APE is expanded." We have identified two discontiguous APEs for the proposed project: the project area APE and the mitigation area APE. Acquisition of the mitigation area APE would indeed be an expansion of the APE. Inclusion in the HPMP of specific requirements to survey all lands within the project APE and evaluate any identified resources for National Register eligibility as recommended by the Idaho SHPO would enable the development of appropriate management measures for significant properties in accordance with section 106. For adversely affected cultural resources on the Ben Johnson Family Farm property, inclusion in the HPMP of measures that are consistent with study, preservation, and interpretive measures developed for similar massacre sites would also be appropriate.

As mentioned in section 3.3.7.1, Commission staff established a Restricted Services List to discuss confidential matters related to cultural resources. The Restricted Service List was primarily formed to discuss matters involving the Bear River Massacre Site National Historic Landmark and the potential effects the proposed project might have on it. Parties on the list, otherwise known as the Cultural Resources Working Group, participated in a conference call on March 3, 2015, to discuss the Bear River Massacre Site National Historic Landmark, the HPMP, and Addendum 1. During the call, the Idaho SHPO affirmed that the Idaho State Historical Society's current work at the Bear River Massacre site is not being conducted under section 106, is unrelated to Twin Lakes' current proposal, and results are not anticipated until late 2015.

With regard to the HPMP and Addendum 1, Commission staff clarified in the call that the HPMP and Addendum 1 must identify all historic properties that could be affected by the proposed project (archaeological sites, structures, historic and natural features relate to the National Historic Landmark, and TCPs) and measures to resolve any adverse effects that might arise as a result of the proposed Project would need to be developed. The HPMP would specify what actions (e.g., intensive pedestrian inventory, magnetometer/metal detector surveys, ethnographic and historic investigations) would need to be completed by Twin Lakes prior to any ground disturbance activities. For the Bear River Massacre National Historic Landmark, these would be outlined in Addendum

1 of the HPMP. During the call, a representative from the Park Service also pointed out that section 110(f) of NHPA as it applies to National Historic Landmarks must also be considered and addressed in the HPMP. At the conclusion of the call, participants agreed that the HPMP and Addendum 1 would remain separate documents and each participant would provide Twin Lakes with comments on the HPMP and Addendum 1. Twin Lakes would address these comments in revised documents to be filed with the Commission in early May 2015. Commission staff provided Twin Lakes with comments on March 27, 2015. Others in the Cultural Resources Working Group also provided comments on the HPMP and Addendum 1 in April 2015. On April 30, 2014, Twin Lakes requested an extension of time to file the HPMP and Addendum 1 by the end of May 2015, which the Commission granted (see our letter back to Twin Lakes, issued May 6, 2015). On May 26, 2015, Twin Lakes filed a revised HPMP with the Commission and others in the Restricted Service list. Commission staff intends to send out the revised HPMP for another round of reviews and comment at the time we issue the draft EIS.

Revising the 2013 HPMP and the 2014 Addendum to address the comments received from the Cultural Resources Working Group using the Advisory Council and Commission's 2002 guidance would ensure protection of historic properties within the project area APE and mitigation area APE in accordance with section 106. Among other items identified by the consulting parties, inclusion in the revised HPMP and Addendum of (a) a clear map or maps of all lands within the project APEs; (b) plans to identify and evaluate cultural resources within the project APEs; (c) detailed plans and mitigation measures for various activities and situations that could adversely affect historic properties; (d) protocols for communication and consultation with the consulting parties throughout any new license term; and (e) regular review and revision of the HPMP in consultation with the Idaho SHPO and cultural resources working group, would be appropriate.

Additionally, with regard to the Ben Johnson Family Farm property, Commission staff notes that extensive and comprehensive surveys (including geomorphic, archaeological, ethnographic, and historic) of the Ben Johnson Family Farm site would be needed to carefully record any aspects of the Bear River Massacre Site National Historic Landmark that might be affected, as well as any other significant cultural resource which could be affected. Inclusion in the revised HPMP of a plan and schedule to identify all historic properties (including but not limited to TCPs) and to assess the potential adverse effects of Twin Lakes' proposals on documented historic properties would be in accordance with the requirements of section 106 of the NHPA. The results of these studies would be used to develop and implement appropriate mitigation measures to resolve any adverse effects in accordance with 36 CFR 800.6.

As noted above, the Bear River Massacre Site National Historic Landmark represents a supremely sad and significant event in American history that would require the utmost care and long-term commitment by Twin Lakes to ensure that such a cultural resource would be adequately protected and where any potential adverse effects on it from the proposed project would be adequately addressed. It is possible that the surveys

conducted across the Ben Johnson Family Farm site, could reveal aspects (such as undisturbed human remains) of the Bear River Massacre Site National Historic Landmark that could not be adequately mitigated. It is also very likely that some of the proposed mitigation measures at the Ben Johnson Family Farm site could not be implemented, due to such unmitigatable adverse effects on the landmark.

3.3.8 Socioeconomic Resources

3.3.8.1 Affected Environment

We define the Cache Valley area, comprising Cache County, Utah, and Franklin County, Idaho, as the study area for our socioeconomic analysis. The U.S. Department of Commerce and U.S. Census Bureau identify this two-county area as the Logan, UT-ID Metropolitan Statistical Area (MSA). It encompasses the primary population concentration from which local-origin users of the affected portion of the Bear River are drawn, and where the potential for project-induced social and economic effects is likely to be highest. All dollar values are expressed in 2013 dollars, adjusted for inflation, unless stated otherwise (Bureau of Labor Statistics, 2015).

Population and Households

Table 3-42 provides an overview of current population, household size, and household numbers as well as population trends for Franklin and Cache Counties. Information reported for the years 2000, 2010, and 2013 is derived from the U.S. Census Bureau (2000, 2010, and 2013). Figures for years later than year 2000 represent 5-year average estimates taken as part of the U.S. Census Bureau's 5-year American Community Survey.

The population of Franklin County increased by 13 percent between 2000 and 2013, and the population of Cache County grew by 25 percent during the same period (U.S. Census Bureau, 2000, 2013). Approximately one-half of Franklin County residents live in Preston, Idaho, 9 miles from the proposed project. The average household size was 3.24 persons per household, and there were 31,019 households in the study area on average between 2009 and 2013. Cache County contained approximately nine out of ten of the households in the study area during this period. Logan, Utah, located 20 miles south of Preston, is the largest city in both Cache County and the study area, with a population of 48,565 in 2013. In this two-county region, Cache County is dominant with respect to population size.

The rental vacancy rate was 0 percent on average in Preston and almost 3 percent on average in Logan between 2009 and 2013. However, there was a total vacancy rate of 9 and 5 percent of all housing in Preston and Logan, respectively, during the same period. There is one motel in Preston and several hotels and motels in Logan (U.S. Census Bureau, 2013).

Table 3-42. Selected social and economic indicators for Franklin County, Idaho, and Cache County, Utah (Source: U.S. Census Bureau, 2000, 2010, 2013).

Geography	Population (2000)	Population (2010)[a]	Population (2013)[a]	Average Household Size (2013)[a]	Number of Households (2013)[a]
Study area	102,720	119,575	126,982	3.11	31,019
State of Idaho	1,293,953	1,526,797	1,583,364	2.69	469,645
Franklin County, ID	11,329	12,497	12,801	3.24	3,476
Preston, ID	4,682	5,102	5,173	2.95	1,893
State of Utah	2,233,169	2,657,236	2,813,673	3.13	701,281
Cache County, UT	91,391	107,078	114,181	3.24	27,543
Logan, UT	42,670	46,408	48,565	2.80	16,769

[a] Statistics for the years 2010 and 2013 are 5-year annual average statistics. Annual dates are reported in the columns above for the last year in the 5-year series (e.g., 2010 is the 2006–2010 American Community Survey 5-year average and 2013 is the 2009–2013 American Community Survey 5-year average).

Employment and Income

Employment and Gross Regional Product

Employment in the area encompassing and immediately adjacent to the project area in Franklin County consists primarily of agricultural operations and services. According to the 2012 Census of Agriculture (USDA, 2012a), the number of farms in Franklin County increased by 13 percent between 2007 and 2012 (from 739 to 834). In addition, during the same time period, the total land in farms increased by 17 percent (from 224,902 acres to 262,609 acres). Between 2007 and 2012, the total market value of Franklin County agricultural products increased by 22 percent, after adjusting for inflation (from $88.8 million to $107.6 million) (USDA, 2012a). The Idaho Department of Labor's publication "Franklin County Workforce Trends" analyzes both the direct and indirect influence of agriculture and other industries on Franklin County employment as follows (Idaho Department of Labor, 2015):

> The county's economy depends heavily on agriculture but also benefits from manufacturing, retail trade and services. Over the decade, most job growth occurred in services, trade and construction. Trade, utilities and transportation provides twenty-eight percent of all jobs in Franklin County.

Farm-related employment made up the largest portion of employment in Franklin County in 2013, followed by the local government and retail trade sectors (table 3-43). Manufacturing made up the largest share of employment by industry in Cache County in 2013, followed by the retail trade and health care and social assistance industries in 2013. The construction industry grew by 14 and 2 percent, respectively, in Franklin and Cache Counties between 2003 and 2013 to 7 and 5 percent of total employment in each county, respectively, in 2013. Between 2003 and 2013, the latest year for which employment by industry data are available, most job growth occurred in the administrative and waste management services, wholesale trade, and real estate rental and leasing industries in Franklin County. In Cache County, the real estate and rental and leasing industry grew the most during this period follow by the health care and social assistance; arts, entertainment, and recreation; and finance and insurance industries.

Table 3-43. Employment by industry, 2003 and 2013, Franklin County, Idaho, and Cache County, Utah (Source: Bureau of Economic Analysis, 2013).

	Franklin County, ID			**Cache County, UT**		
Industry	**2003**	**2013**	**2003–2013 (% change)**	**2003**	**2013**	**2003–2013 (% change)**
Total employment	5,036	5,765	14%	56,693	68,581	21%
Farm employment	20%	17%	-4%	3%	2%	-20%
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	0%	(D)
Mining	(D)	(D)	(D)	(D)	0%	(D)
Utilities	(D)	1%	(D)	0%	0%	7%
Construction	8%	7%	14%	5%	5%	2%
Manufacturing	5%	4%	0%	19%	16%	6%
Wholesale trade	3%	4%	53%	1%	2%	35%
Retail trade	12%	12%	19%	11%	11%	16%
Transportation and warehousing	(D)	4%	(D)	2%	2%	30%
Information	2%	2%	-16%	1%	1%	24%
Finance and insurance	3%	4%	24%	4%	5%	54%
Real estate and rental and leasing	2%	4%	91%	3%	4%	88%
Professional,	2%	(D)	(D)	6%	7%	45%

Industry	Franklin County, ID 2003	2013	2003–2013 (% change)	Cache County, UT 2003	2013	2003–2013 (% change)
scientific, and technical services						
Management of companies and enterprises	0%	(D)	(D)	0%	1%	45%
Administrative and waste management services	1%	2%	94%	6%	4%	-19%
Educational services	0%	(D)	(D)	1%	2%	46%
Health care and social assistance	5%	(D)	(D)	7%	10%	55%
Arts, entertainment, and recreation	1%	1%	28%	2%	2%	54%
Accommodation and food services	4%	4%	-6%	5%	5%	26%
Other services, except public administration	6%	6%	13%	5%	5%	13%
Federal, civilian government	1%	1%	-6%	1%	0%	-11%
Military	1%	1%	0%	1%	1%	-2%
State government	0%	0%	-15%	9%	8%	18%
Local government	16%	16%	13%	7%	7%	26%

Note: (D) Not shown to avoid disclosure of confidential information, but the estimates for these items are included in the totals.

A total of 66,563 persons were employed in the study area in 2013. The total annual gross regional product of the study area was $4.39 million in 2013, which represents approximately 2 percent of the combined annual gross state products of the states of Idaho and Utah combined in 2013. The unemployment rate in the study area has generally followed the trend of the unemployment rate in the states of Utah and Idaho between 2004 and 2013. The unemployment rate was approximately 4 percent in 2004 and dipped to a low of nearly 2 percent in 2007, rose to a high of almost 6 percent in 2010 as a result of the national economic downturn, and was almost 4 percent again in 2013, the

latest year for which annual employment information is available. Figure 3-25 and table 3-44 illustrate the employment trends in the study area and in the states of Utah and Idaho.

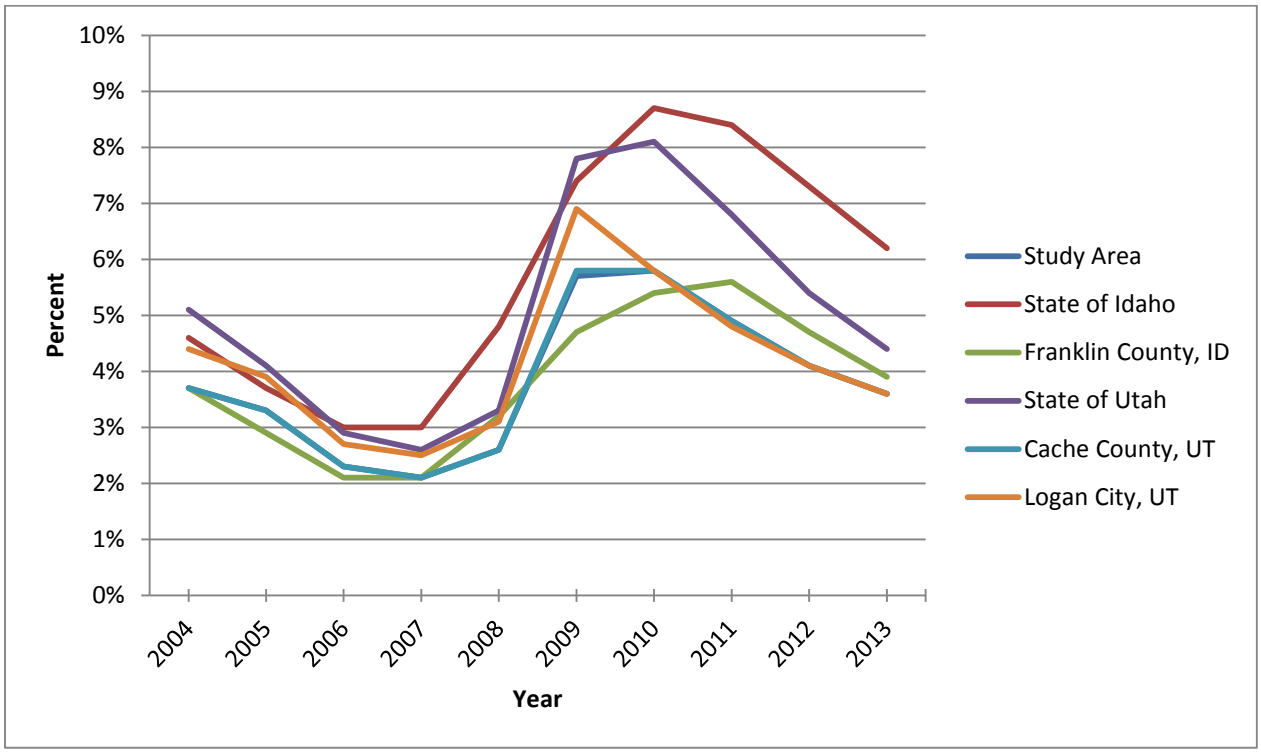

Figure 3-25. 2004 to 2013 unemployment trends (Source: Bureau of Economic Analysis, 2013).

Table 3-44. 2004 and 2013 employment statistics (Source: Bureau of Economic Analysis, 2013).

	2004			2013		
Geography	**Labor Force**	**Employed Persons**	**Unemployment Rate (percent)**	**Labor Force**	**Employed Persons**	**Unemployment Rate (percent)**
Study area	62,666	60,346	3.7	69,047	66,563	3.6
State of Idaho	698,123	666,080	4.6	775,407	727,230	5.1
Franklin County, ID	6,009	5,784	3.7	6,042	5,805	3.9
State of Utah	1,242,004	1,179,142	5.1	1,418,522	1,355,720	4.4
Cache County, UT	56,657	54,562	3.7	63,004	60,758	3.6
Logan, UT	28,029	26,790	4.4	28,591	27,568	3.6

Income

Median household income decreased by 8 percent in both Franklin and Cache Counties between 2000 and 2013. In addition, the median household income in both counties was consistently lower than the median household income reported in both respective states as summarized in table 3-45.

Table 3-45. Median household income for the study area in 2000, 2010, and 2013, with percent change (inflation adjusted, 2013$) (Source: U.S. Census Bureau, 2000, 2010, and 2013).

Geography	2000	2010	2013	Percent Change (2000–2013)
Study Area	NA[a]	$50,016	$49.056	NA[a]
State of Idaho	$50,828	$49,596	$46,767	-8%
Franklin County	$48,784	$48,804	$44,962	-8%
Preston	$47,625	$48,659	$43,218	-9%
State of Utah	$61,859	$60,180	$58,821	-5%
Cache County	$53,747	$50,226	$49,506	-8%
Logan	$41,637	$38,011	$36,131	-9%

[a] The Logan UT-ID MSA was not an MSA in the year 2000. Therefore, median household income cannot be determined for this area in the year 2000. 2010 and 2013 data are American Community Survey 5-year annual average median household income. Median income for the 2010 statistic are annual average data from 2006 through 2010, and median household income for the 2013 statistic are annual average data from 2009 through 2013.

Recreation and Visitation

Twin Lakes conducted a socioeconomic study focused on uses, preferences, and attitudes related to the Bear River Narrows Project study area. This study found that the vast majority of visitors to the project area come from a contiguous 21-county region in Idaho, Utah, and Wyoming, with few visitors traveling further than about 250 miles. This study included an economic impact analysis considering expenditures made by visitors to the area. If travel cost were entirely composed of out-of-pocket expenditures for goods such as gasoline, ice, and bait, the total amount of money spent in a year would be given by the number of trips during the year multiplied by the amount of money spent on each trip. Information from this survey provided estimates of the average expenditure of each recreation group's visits in 10 economic sectors: lodging, camping fees, restaurants and bars, retail grocery stores, retail gasoline and oil vendors, local transportation, other recreation use fees, general rentals, sporting goods, and a miscellaneous retail sector.

Using this approach, direct expenditures by visitors to the Bear River Narrows Project area within the two-county study area totaled $993,000, with just over $427,000 of this amount retained in the local area. In total, recreation at the Oneida Narrows area generates about $584,000 in gross regional output, about $202,000 in household income, and just over 7.3 full-time equivalent jobs.

Table 3-46presents the total annual direct expenditures for visitors to the Oneida Narrows area within the study area, as calculated from Twin Lakes' travel survey.

Table 3-46. Expenditures of Oneida Narrows' visitors in 2010 (inflation adjusted, 2013$) (Source: Twin Lakes, 2013, as modified by staff).

Expenditures Type	Total Visitor Expenditures
Lodging	$44,073.73
Camp fees	$61,337.27
Restaurants and bars	$56,574.22
Grocery	$292,229.66
Gas and oil	$363,254.49
Local transportation	$399.97
Recreation use fees	$25,485.32
Rental	$48,174.74
Sport goods	$87,338.52
Miscellaneous	$13,937.23
Total expenditures	**$992,805.15**

Idaho Fish and Game compiled a sport fishing economic report for fishing waters in Franklin County in 2011(table 3-47). The approximately 40-mile reach of the Bear River in Franklin County is the second lowest economic contributor among the five water bodies surveyed in the Idaho Fish and Game report. Twin Lakes' reservoirs are the most important fishery from an economic standpoint followed by Oneida reservoir, the Cub River, the Bear River, and Glendale reservoir. Table 3-47 details the number of trips and estimated annual expenditures of anglers to these water bodies.

Table 3-47. Estimated angler trips and expenditures in 2011to waters located in Franklin County (inflation adjusted, 2013$) (Source: Idaho Fish and Game, 2015b, as modified by staff).

Body of Water	Estimated Trips	Estimated Visitor Expenditures
Bear River	8,767	$567,269
Twin Lakes Reservoir	7,321	$1,168,448
Oneida Reservoir	5,033	$892,192
Cub River	2,843	$765,819
Glendale Reservoir	2,643	$99,451

The 2011Idaho Fish and Game report estimated that approximately 8,767 anglers visited all segments of the Bear River within Franklin County, which extends more than 40 river miles. In contrast, Twin Lakes' 2009 survey conducted by Krannich et al. (2010) examined all types of recreation use, including angling, on about 6.5 miles of the Bear River. The resulting river-fishing-only visitation estimate, by Krannich et al., of 9,500 visitors is about 8 percent higher than the Idaho Fish and Game estimate. Because the two surveys were undertaken at different times, it is possible that this 8 percent discrepancy is a result of a change in angling visitation over time or differences in the survey methodologies between the two surveys.

Agriculture and Irrigation

Twin Lakes provides diversion, storage, and delivery of irrigation water to farmers in Franklin County. The company has 230 shareholders who manage crop production on 18,000 irrigated acres, about 36 percent of the 49,000 total irrigated acres in Franklin County. Table 3-48 shows the economic value of agricultural production in Franklin and Cache Counties. Adjusted for inflation to 2013 dollars, farm production by Twin Lakes' farmers totaled $38.8 million in annual revenue in 2013. These values show that the agricultural industry in general, and Twin Lakes in particular, are important economic entities in Franklin County. Additionally, as the table shows, the total value of agricultural production in Franklin County is nearly 90 times greater than the value of agricultural production in Cache County.

Table 3-48. Franklin and Cache County economic value of agricultural production in 2012 (inflation adjusted, 2013$) (Source: USDA, 2012a,b).

Economic Indicator	Cache County, Utah	Franklin County, Idaho
Value of agricultural products produced by all Franklin County farmers	$1,235,000	$107,662,000
Value of agricultural products produced by Twin Lakes shareholders (36% of total)	NA[a]	$38,758,000

[a] The value of agricultural products produced by Twin Lakes' shareholders is not applicable to Cache County because all shareholders are in Franklin County.

3.3.8.2 Environmental Effects

Project Construction and Operation

Twin Lakes estimates that the project's construction would create approximately 60-full time jobs over the 3-year construction period; the study area's local workforce would fill a majority of these jobs. The project would also create a short-term demand for construction-related products and services based in Franklin and Cache Counties. Table 3-49 identifies those short-term project construction period jobs and expenses.

Table 3-49. Estimate of expenditures and job creation during project construction (Source: Twin Lakes, 2013).

No.	Description	Budget	Duration (days)	Crew Size	FTE[a]
1	Dam Construction	$7,500,000	520	15	30.0
2	Powerhouse Construction	$1,355,000	260	5	5.0
3	Penstock	$1,336,500	40	5	0.8
4	Turbine and generators	$3,750,000	260	5	5.0
5	Transmission line and interconnect	$919,000	20	8	0.6
6	Access roads	$1,396,000	130	10	5.0
7	Mitigation measures	$2,3115000	30	6	0.6
8	Engineering	$2,000,000	650	5	12.5
	TOTAL	**$22,476,200**			**59.6**

[a] One FTE (full time equivalent) equals employment for one person for 1 year; i.e., 30 FTE would provide employment for one person for 30 years or 30 persons for 1 year.

Twin Lakes estimates that project operation would result in the creation of one to two full-time jobs, and the project's regional, annual long-term operating expenses would be $286,000. In addition, Twin Lakes estimates that the project would contribute about $250,000 annually to the Franklin County tax base. Furthermore, Twin Lakes anticipates that the study area would provide the operational workforce for the project.

Our Analysis

In the short-term, construction of the proposed project would contribute additional employment and income to the regional economy. Depending on contractor hiring practices, some portion of the project-induced employment would likely benefit individuals residing within the study area. Because workforce requirements for the project would be relatively modest, and because at least some portion of those employed would likely commute from existing residential locations in the region rather than relocate temporarily from more distant points of origin, the project would not generate major population growth associated with the in-migration of construction-phase workers. As a result, the project would not generate the major increases in demand for local housing, strains on public services, or social disruption effects commonly observed in other settings where larger scale resource development projects have occurred.

The location of the project area at some distance from established residential areas and away from primary travel routes also precludes the potential for widespread construction-phase disturbance to residents as a result of project noise, dust, or construction vehicle traffic effects, beyond the effects experienced in immediate proximity to the project area by onsite visitors. Current roads are adequate to accommodate traffic and transportation related to the project. Project related spending on supplies or by construction workers in the study area would result in a positive short-term effect on local tax revenues, income and employment.

If any construction personnel temporarily relocate to the study area to work on this project, some existing lodging or rental housing in and around Preston would be available, which can provide adequate housing for the anticipated construction crew sizes. Logan, Utah, also has housing and lodging available if Preston has no vacancies. Because there would be no significant influx of new population into the economic area, this project would not impact government services. The new facilities and reservoir constructed as a result of this project would not displace any businesses or residences.

As a result of operations spending on supplies and staff salaries there would be long-term positive but negligible effects on local income, sales, employment, and tax revenues in the study area. Because the long-term increase in total employment would be relatively small, no long-term effects would occur to population, housing, infrastructure, or government services as a result of the construction or operation of this project.

Recreation

Approximately 30 percent of all visitors indicated that construction of the new dam would not change their visitation to the project area in anyway, while others said that they

would visit less often, but would still visit. The change in direct expenditures of those visitors who indicated that they would recreate outside the study area if the project is constructed was used to determine the economic impact from changes in recreation visitation as a result of the construction of the dam. The last column in table 3-50 shows that estimated annual expenditures of those who would go elsewhere total $208,817. Stated another way, if the project is constructed, it is likely that the annual visitor expenditures in the Logan UT-ID MSA (the project area) would fall by approximately $208,817.

Table 3-50. Annual losses in total sales, household income, and employment due to changes in expenditure within the economic region (Source: Twin Lakes, 2013).

Economic Parameter	All Visitors	Visitors Who Would Recreate Elsewhere [a]
Direct Expenditures	$929,593	$208,817
Locally Retained Direct Expenditures	$401,393	$98,683
Direct, Indirect, and Induced Effects (multiplier effects)		
Regional Gross Output	$547,420	$129,288
Household Income	$189,266	$31,576
Employment	7.3 jobs	1.6 jobs

[a] This would be the impact if the Bear River Narrows Project is constructed.

The third column of table 3-50 presents a best estimate of the actual annual economic impacts of lost recreation if the project is constructed. An estimated $98,683 in locally retained direct expenditures would be lost. Including multiplier effects, the loss in regional gross output would be an estimated $129,288, with an associated annual loss of $31,576 in household income. Fewer than two jobs would be lost.

Our Analysis

Given the relatively large scale of the local economy as compared to these effects, impacts occurring from the loss of recreation would represent a less than significant economic impact on the study area.

Agriculture and Irrigation

The new reservoir would allow Twin Lakes to store 12,647 acre-feet of water. Under proposed project operations, Twin Lakes would draw up to 5,000 acre-feet from the reservoir during water shortages. During the period between 1990 and 2010, this would have resulted in an annual withdrawal of between zero and 5,000 acre-feet annually, or

3,110 acre-feet, on average annually. This additional supply of water would reduce the loss of farm production during periodic drought conditions. We estimate that the average value of production from these withdrawals would have been between $0 and $235,000, resulting in an annual average value of production of $146,170[59] assuming 2 acre-feet of water are required to irrigate 1 acre of land, and assuming an average farm income of $94/acre. Twin Lakes, in its final license application, states: that "revenue from power sales would go directly to Twin Lakes' shareholders for improvements to the irrigation delivery system." These improvements include replacing 42 miles of canal with pipeline. Twin Lakes finds that expenditures on this improvement project would be $48 million over a 10-year period, and would create about 75 full-time jobs over 10 years (see table 3-51).[60] Twin Lakes anticipates that most of the materials and services for the improvement project would be procured locally. Additional benefits of the project would be water conservation through elimination of conveyance losses and conversion of pumped to pressurized irrigation, which reduce energy costs to Twin Lakes.

Table 3-51. Estimate of expenditures and job creation during Twin Lakes' irrigation delivery system upgrades (Source: Twin Lakes, 2013).

Description	Budget	Crew Size	FTE [a]
Pipe 42 miles of canal	$45,000,000	10	57.8
Engineering	$3,600,000	4	20.0
Total	$48,600,000		77.8

[a] One FTE (full time equivalent) equals employment for one person for 1 year; i.e., 30 FTE would provide employment for one person for 30 years or 30 persons for 1 year.

Our Analysis

The use of project revenues to improve the irrigation delivery system would have a net benefit on local income, sales, employment, and tax revenues. The irrigation system upgrades and construction of the project would provide up to 5,000 additional acre-feet of water for farming annually, which would have a beneficial effect on farm production and on the long-term stability of the agricultural industry in Franklin County

[59] This is the annual average value of agricultural production that would remain as a result of the removal of 3,110 acre-feet from the reservoir, on average each year. In reality, as shown in table 3-7, annual water withdrawals for irrigation would fluctuate year to year.

[60] This project would not fund the entire amount of $48 million in expenditures for the canal improvements, and the canal improvements are independent of the development of this project.

by stabilizing Twin Lakes' ability to provide water for agricultural production for the future.

The project would not generate major population growth associated with the in-migration of construction-phase workers. As a result, the project would not generate a major increase in demand for local housing, strain on public services, or social disruption commonly observed in settings where much larger scale resource development projects have occurred. Project-related spending on construction of the dam and reservoir, along with project-related spending on canal improvements, would result in a short-term positive but negligible impact on local income, sales, employment, and tax revenues in the study area. This project would reduce the total regional gross output associated with recreation, which includes the loss of less than two recreation jobs in the long-term. However, we expect that the project would produce the same number of full-time jobs through project operations staff. Furthermore, we expect the value added to the local economy through project-related spending, income, employment, and taxation to be greater than the value lost due to a decrease in recreation spending. Therefore, overall, we predict that the project, if constructed, would have a positive economic impact on the study area due to short-term and long-term benefits to local sales, income, employment, and tax revenues.

3.3.9 Air Quality

3.3.9.1 Affected Environment

Idaho DEQ is responsible for protecting public health and the environment from the harmful effects of air pollution. Pollutants associated with air emissions, such as ozone, particulate matter (PM), and nitrogen dioxide (NO_2), are associated with respiratory illness. Carbon monoxide (CO), another air pollutant, can be absorbed through the lungs into the bloodstream and reduce the ability of blood to carry oxygen. Sources of air emissions include commercial facility operations, fugitive dust, on-road vehicles and trucks, aircraft, boats, trains, and natural sources such as biogenic and geogenic hydrocarbons and wildfires.

The Clean Air Act and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by EPA for six criteria air pollutants: CO, sulfur dioxide, ozone, PM, NO_2, and lead. There are two types of NAAQS:(1) primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly; and (2) secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (EPA, 2014a). Idaho has adopted the federal air quality standards in Idaho Administrative Procedures Act, section 58.01.01.575-587. Table 3-52summarizes the primary and secondary NAAQS for the criteria pollutants.

The proposed project would be located within the bowl-shaped, topographically isolated Cache Valley, which encompasses portions of southeastern Idaho and northern Utah. The Wellsville Mountains lie to the west and to the east lies the Bear River Range. These mountain ranges are approximately 3,000 to 5,000 feet above the Cache Valley

floor. The Wellsville Mountains, Bear River Range, and northern Wasatch Range converge in southern Cache County, Utah, to form a topographical barrier between Cache Valley and other adjacent counties (Idaho DEQ, 2014). While air quality is generally good for most of the year, the topography of the Cache Valley contributes to air stagnation events in the winter when cold air is trapped in the basins by a prolonged inversion layer that limits vertical mixing. As a result, pollutants can be trapped near the valley floor, which has resulted in wintertime exceedances of the 24-hour ambient air quality standard for fine particulate matter (PM). PM is a broad class of air pollutants that exist as liquid droplets or solids, with a wide range of size and chemical composition. Particulates that are smaller than or equal to 10 and 2.5 microns in size (PM_{10} and $PM_{2.5}$) are of particular health concern because they can get deep into the lungs and affect respiratory and heart function. Particulates can also adversely affect visibility; damage soil, plants, and water quality; and stain stone materials (EPA, 2014b).

Table 3-52. National ambient air quality standards (Source: EPA, 2014a).

Pollutant	Primary/Secondary	Averaging Time	Level	Form
Carbon monoxide	primary	8-hour	9 ppm	not to be exceeded more than once per year
		1-hour	35 ppm	
Lead	primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$	not to be exceeded
Nitrogen dioxide	primary	1-hour	100 ppb	98th percentile, averaged over3years
	primary and secondary	annual	53 ppb	annual mean
Ozone	primary and secondary	8-hour	0.075 ppm	annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate matter $PM_{2.5}$	primary	annual	12 $\mu g/m^3$	annual mean, averaged over 3 years
	secondary	annual	15 $\mu g/m^3$	annual mean, averaged over 3 years
	primary and secondary	24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
PM_{10}	primary and secondary	24-hour	150 $\mu g/m^3$	not to be exceeded more than once per year on

Pollutant	Primary/Secondary	Averaging Time	Level	Form
				average over 3 years
Sulfur dioxide	primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	secondary	3-hour	0.5 ppm	not to be exceeded more than once per year

Notes: ppb – parts per billion ppm – parts per million, $\mu g/m^3$ – micrograms per cubic meter.

Areas that have never been designated nonattainment for a pollutant and NAAQS are considered attainment areas. Areas that do not meet the NAAQS are classified as nonattainment areas for that pollutant. Former nonattainment areas currently meeting the NAAQS are designated maintenance areas. The proposed project would be located in Franklin County, Idaho. Portions of Franklin County (including the project area) are within the Logan, UT-ID (Cache Valley) nonattainment area for the 24-hr standard $PM_{2.5}$ of 35 micrograms per cubic meter ($\mu g/m^3$). Franklin County is an attainment/unclassified area for the remaining criteria pollutants: ozone, carbon monoxide, sulfur dioxide, NO_2, PM_{10} and lead (EPA, 2014c).

As a result of the Cache Valley nonattainment designation for the 24-hr $PM_{2.5}$ NAAQS, EPA requires Utah and Idaho to develop State Implementation Plans (SIPs) to demonstrate how the $PM_{2.5}$ standards would be attained, including identification of control measures. Idaho's most recent SIP for the Cache Valley was submitted to EPA in December 2012 and remains under review for adequacy at EPA as of December 2014 (EPA, 2014d). Idaho's SIP submission projected attainment of the 24-hr $PM_{2.5}$ NAAQS by January 1, 2015 (Idaho DEQ, 2012).

Table 3-53 presents the available 2013 air quality monitoring data for the Cache Valley. With the exception of $PM_{2.5}$, monitoring for the criteria pollutants is not conducted in the Idaho portion of the valley and the data presented is from Logan, Utah. $PM_{2.5}$ monitoring is conducted in Franklin, Idaho. Data from 2013 are available for all pollutants except carbon monoxide and sulfur dioxide, monitoring was discontinued for these pollutants in Logan in 1999 and 2006, respectively.

Although the concentrations in table 3-53 are not in the statistical form required for official compliance with the NAAQS (i.e., the 98th percentile 24-hour concentration averaged over 3 years for $PM_{2.5}$), general conclusions can be drawn from the 2013 data. $PM_{2.5}$ concentrations exceeded the NAAQS, with the 98th percentile 24-hour

concentration of 54.9 μg/m^3. Concentrations of the remaining monitored criteria pollutants were below the NAAQS in 2013. The highest $PM_{2.5}$ concentrations occurred between December and February, consistent with the pattern of winter inversions trapping pollutants in the valley being the primary air quality problem for the area (Idaho DEQ, 2014).

EPA provides pre-calculated pollutant concentrations (called design values) that take into account the statistical form of the NAAQS as shown in table 3-53(i.e., 98th percentile, averaged over 3 years for the 24-hourhour standard). In other words, the design value is a way of presenting air quality data that is directly comparable to the NAAQS and is used by EPA to assess compliance with the NAAQS. The most recent available official EPA 24-hour $PM_{2.5}$ design value calculation for the Franklin monitoring station is 42 μg/m^3 based on 2011 through 2013 data, which exceeds the 24-hour standard of 35 μg/m^3 (EPA, 2014e). The annual average $PM_{2.5}$ design value for Franklin County based on 2011 through 2013 data was 8 μg/m^3, which is less than the annual standard of 12 μg/m^3.

Table 3-53. Cache Valley air quality monitoring data, 2013 (Source: EPA, 2014f).

Pollutant	Averaging Time	NAAQS	Monitoring Data	Monitor Location
Lead	Rolling 3 month average	0.15 μg/m^3	0.03 μg/m^3	West Magna UT
Nitrogen Dioxide	1-hour	100 ppb	58 ppb (98th percentile)	Logan UT
	annual	53 ppb	14 ppb	
Ozone	8-hour	0.075 ppm	0.066 ppm (4th max)	Logan UT
$PM_{2.5}$	Annual	12 μg/m^3	9.7 μg/m^3	Franklin ID
	24-hour	35 μg/m^3	54.9 μg/m^3(98th percentile)	
PM_{10}	24-hour	150 μg/m^3	100 μg/m^3	Logan UT

3.3.9.2 Environmental Effects

Section 176(c) of the Clean Air Act (42 U.S.C. §7506[c]) requires federal agencies that license, permit, or approve any activity to demonstrate that the action conforms to the applicable SIP before the action is approved. In this context, "conformity" requires that federal actions be consistent with the objective of SIPs to eliminate or reduce the severity and number of violations of the NAAQS, and achieve expeditious attainment of those standards. EPA's general conformity regulations at 40 CFR Part 93 Subpart B apply to

federal activities except those covered under transportation conformity (40 CFR Part 93 Subpart A). General conformity regulations apply to a federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the federal action equal or exceed certain *de minimis* rates. If the action would cause emissions above the *de minimis* rates and the action is not otherwise exempt, "presumed to conform," or included in the existing emissions budget of the SIP, the agency must conduct a conformity determination before it takes the action.

Temporary Construction Effects

Construction activities would result in emissions of criteria pollutants through vehicle exhaust and fugitive dust. We conducted a quantitative construction emissions analysis to compare predicted project-related emissions to the *de minimis* criteria that would trigger the need for general conformity determination.

For $PM_{2.5}$ (the only pollutant for which Franklin County is a nonattainment area), the applicable general conformity *de minimis* thresholds are as follows:

- Direct $PM_{2.5}$ 100 tons/year; or
- NO_x 100 tons/year (precursor); or
- SO_2 100 tons/year (precursor).

Our general conformity applicability analysis focuses on direct $PM_{2.5}$ and the $PM_{2.5}$ precursor, NO_x. We did not analyze the $PM_{2.5}$ precursor SO_2 because construction equipment and on-road vehicles are not a significant source of SO_2 emissions (EPA, 2013). Although not required for purposes of General Conformity, we also quantified predicted CO and PM_{10} emissions from construction, as these pollutants are relevant to construction effects of the proposed project.

Methodology

Off-Road Construction Equipment

We developed emission factors for construction equipment using EPA's NONROAD model, which is incorporated into the model MOVES2014. We developed expected peak year construction equipment use assumptions to estimate the total hours of operation for each type of equipment (appendix D, *Construction Equipment Use Estimates*). The total hours of operation was multiplied by the horsepower of each type of equipment and the appropriate emission factor to determine the total equipment-related emissions of CO, NO_x, $PM_{2.5}$ and PM_{10}. The NONROAD emission factors (grams/horsepower-hour) that we used in our analysis are summarized in table 3-54.

Table 3-54. NONROAD emission factors for off-road construction equipment (Source: staff).

Equipment Type	HP	NONROAD Equipment Type	Total Estimated Operating Hours	Emission factors (grams/HP-hour)			
				CO	NO_x	PM_{10}	$PM_{2.5}$
110 Ton Crawler Crane	350	Cranes	1,440	0.371	1.672	0.074	0.072
Air Compressor	250	Air Compressors	960	0.448	2.052	0.089	0.087
Bulldozer (D6 or similar)	254	Crawler Tractor/Dozers	5,600	0.420	1.278	0.076	0.074
Concrete Batch Plant (100cy/hour)	100	Generator Sets	720	2.189	3.974	0.383	0.371
Concrete Pump	325	Pumps	720	1.102	3.649	0.163	0.158
Conveyor	80	Crushing/Proc. Equipment	480	1.402	2.290	0.200	0.194
Drilling and Grouting Rig	260	Bore/Drill Rigs	640	0.926	3.664	0.188	0.182
Frontloader (~25 ton)	276	Tractors/Loaders/Backhoes	5,120	1.765	3.447	0.332	0.322
Generator (~30kVa)	40	Generator Sets	1,760	1.548	4.407	0.291	0.282
Grader	193	Graders	1,920	0.407	1.246	0.073	0.071
Grout Mixer	25	Cement & Mortar Mixers	320	3.055	5.392	0.493	0.478
Grout Pump	25	Pumps	320	2.535	4.744	0.374	0.363
Light Towers	14	Other Construction Equipment	8,960	4.559	4.321	0.365	0.354
Long Reach Excavator	680	Excavators	320	1.001	1.644	0.103	0.100

Equipment Type	HP	NONROAD Equipment Type	Total Estimated Operating Hours	Emission factors (grams/HP-hour)			
				CO	NO_x	PM_{10}	$PM_{2.5}$
Medium Hydraulic excavator (~30 ton)	207	Excavators	3,200	0.324	1.070	0.055	0.053
Mobile screen	200	Crushing/Proc. Equipment	960	0.388	1.743	0.078	0.075
Off-road dump truck (CAT 740 or similar)	489	Off-highway Trucks	8,160	0.372	1.060	0.054	0.052
RCC batch plant with generator	100	Generator Sets	960	2.189	3.974	0.383	0.371
Scraper	450	Scrapers	7,200	0.805	1.986	0.117	0.113
Slurry mixer	75	Cement and mortar mixers	320	2.200	4.191	0.375	0.364
Slurry pump	50	Pumps	320	1.322	4.232	0.249	0.241
Small bulldozer	92	Crawler tractor/dozers	960	1.666	1.683	0.212	0.206
Small hydraulic excavator (~10 ton)	74	Excavators	320	1.307	3.092	0.125	0.121
Small tampers, blowers	2	Tampers/ rammers	960	4.461	4.635	0.435	0.422
Soil compactor (~15 ton)	157	Rollers	4,800	0.738	1.735	0.174	0.168
Truck crane	400	Cranes	3,360	0.668	2.583	0.100	0.097
Vacuum truck	200	Off-highway trucks	1,920	0.163	0.633	0.020	0.019
Vibratory roller	102	Rollers	960	0.738	1.735	0.174	0.168

Equipment Type	HP	NONROAD Equipment Type	Total Estimated Operating Hours	Emission factors (grams/HP-hour)			
				CO	NO_x	PM_{10}	$PM_{2.5}$
Water pumps	8	Pumps	960	4.475	4.817	0.460	0.446
Water truck	489	Off-highway trucks	2,720	0.372	1.060	0.054	0.052

Worker Commute Emissions

We also estimated the number of employees that would be on-site by month. Emissions from workers commuting to the construction site were quantified based on the following assumptions:

- Workers would be staying in Preston, Idaho, and commuting about 10 miles one-way (20 miles roundtrip) to the project site.
- The primary type of vehicle used for worker commutes would be passenger pickup trucks.
- The average vehicle occupancy would be two workers.
- There would be an average of 20 working days per month for 12 months.
- Each vehicle would be started twice per day, once in the morning and once in the afternoon.

Pick-up truck emission factors were developed using the model MOVES2014, run using the national scale option. The national scale level of analysis is appropriate for an applicability analysis, the objective of which is to determine whether or not the potential emissions of a project could require a General Conformity determination.

- January morning (7 a.m.) meteorology was used to account for higher emissions at low temperatures (worst case scenario).
- Tire wear and break wear processes were included for PM_{10} and $PM_{2.5.}$
- Average speed of 55 miles per hour.
- Unrestricted access rural type roadway.

The resulting MOVES running emission factors are 3.03, 0.45, 0.01, and 0.03 grams per vehicle-mile for CO, NO_x, $PM_{2.5}$, and PM_{10}, respectively. The vehicle start emission factors are 37.95, 1.59, 0.15, and 0.17 grams per vehicle start for CO, NO_x, $PM_{2.5}$, and PM_{10}, respectively.

Concrete Batch Plant Emissions

A temporary concrete batch plant with a capacity of 100 cubic yards/hour would likely be used. Procedures for calculating dust emissions from concrete batch plants are provided in AP-42 Section 11.2 (EPA, 2006). EPA's AP-42, *Compilation of Air Pollutant Emission Factors* has been published since 1972 and is the primary compilation of EPA's emission factor information for more than 200 air pollution source categories (EPA, 2015). AP-42 notes the following inputs to one cubic yard of concrete: 1,865 pounds of course aggregate, 1,428 pounds of sand, 491 pounds of cement and 73 pounds of cement supplement. Table 3-55 summarizes the emission factors that we used and resulting hourly emissions for the various processes involved with the concrete batch plant. We assumed that emission controls were in place during cement and cement supplement unloading.

AP-42 provides concrete batch plant emissions in terms of PM_{10}. The $PM_{2.5}$ fraction was assumed to be 0.1 based on an EPA literature review identifying 0.1 as a consensus multiplier for construction dust (Pace, 2005).

Table 3-55. Concrete batch plant PM emission factors (Source: staff).

Process	**Emission Factor**	**Hourly PM_{10} Emissions at Max. Capacity (100 cubic yards/hour)**
Aggregate transfer	0.0017 lbs PM_{10}/ ton aggregate input	0.158525 lbs
Sand transfer	0.00051 lbs PM_{10}/ton sand input	0.036414 lbs
Cement unloading to silo (controlled)	0.00017 lbs PM_{10}/ton cement input	0.0041735 lbs
Cement supplement unloading (controlled)	0.0024 lbs PM_{10}/ton cement supplement input	0.01752 lbs
Weigh hopper loading	0.0013 lbs PM_{10}/ton total input	0.250705 lbs
Mixer loading (central mix)	0.0028 lbs PM_{10}/ton total input	0.53998 lbs
	Total PM_{10} (lbs)	0.9985575
	Total PM_{10} (grams/hour)	452.9376935
	Total $PM_{2.5}$ (grams/hour)	45.29376935

Fugitive Dust Emissions

Section 13.2.3 of AP-42 provides a conservative total suspended particulate (TSP) emission factor for heavy construction of 1.2 tons/acre/month or alternative methods addressing each component of the construction process separately (e.g. land clearing, bulldozing, scraping) (EPA, 1995). We used the overall emission factor as the basis for estimating fugitive dust emissions because the currently available information on the proposed construction process does not meet the data needs of the alternative methods.

We converted the TSP emission factor to a PM_{10} emission factor assuming 50 percent of the TSP consists of PM_{10} per AP-42 section 13.2.5.3. We assumed $PM_{2.5}$ consists of 10 percent of PM_{10} dust per Pace (2005). We assume that as construction is completed in each portion of the project site, stabilization measures would be implemented to control both dust and erosion/stormwater. Our analysis conservatively assumed the entire construction area of disturbance would consist of uncovered/open soil for the entire peak year of construction. We credited Twin Lakes with a 50 percent reduction in emissions because it committed to implement dust control measures (e.g., watering during dry weather and covering trucks). Table 3-56 summarizes the fugitive dust emissions factors that we used in our analysis.

Given the very conservative nature of the fugitive dust analysis, we assumed that our analysis also accounts for the road dust emissions associated with construction worker commutes.

Table 3-56. Fugitive dust emission factors (Source: staff).

	Total Acres	**Duration of construction**	**Uncontrolled PM_{10} Emissions (grams/hour)**	**Controlled PM_{10} Emissions (grams/hour)**	**Controlled $PM_{2.5}$ Emissions (grams/hour)**
Main dam site (bypass, intake, dam, penstock, and powerhouse)	6.9[a]	1,920 hours (240 workdays at 8 hours per day)	5,216.3	2,608.2	260.8
Summer home road	7.3[b]	320 hours (40 workdays at 8hours per day)	5,518.7	2,759.4	275.9

[a] Based on our 3-D analysis of river channel and channel side slope embankments.

[b] Assumes a 50-foot width for the road and shoulder grading, 1.2-miles long.

Our Analysis

Table 3-57 summarizes the results of our construction emissions analysis. The total emissions of NO_x and $PM_{2.5}$would be well below the *de minimis* threshold. Therefore, we conclude that a general conformity determination would not be required for proposed project construction. In terms of localized effects of ambient concentrations of criteria pollutants, we conclude that given the project location and surrounding land uses there are no sensitive receptors adjacent to the construction area that would be exposed to construction-related emissions for a prolonged period of time.

Air quality impacts during construction could be minimized through incorporation of the standard construction dust control BMPs. Although Twin Lakes commits to controlling fugitive dust during construction, including a fugitive dust control plan as an element of the erosion prevention and sediment control plan would ensure that contractors abide by BMPs. Elements of such a plan could include provisions to: (1) establish stabilized truck exit areas for washing off the wheels of all trucks that exit the construction site; (2) establish tracking pads at construction exits to prevent dirt from being tracked onto roadways; (3) water any truck routes within the construction site as needed or, in cases where such routes would remain in the same place for an extended duration, covering the routes with gravel to avoid re-suspension of dust; (4) water exposed soil areas (unpaved access roads, soil piles, staging areas) once per day during dry weather to control fugitive dust; (5) securely cover the loads of all trucks hauling loose material prior to leaving the construction site; (6) limit the speed of vehicles on-site to 10 miles per hour to minimize fugitive dust emissions; and (7) incorporate dust control measures (e.g., dust collectors and covers limiting pathways for dust) into the temporary concrete batch plant.

Table 3-57. Peak construction year emission summary in tons (Source: staff).

	CO	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Off-road equipment	13.31	33.89	2.14	2.08
Worker commutes (running and start emissions)	0.468	0.070	0.005	0.002
Concrete batch plant	--	--	0.359	0.036
Fugitive dust	--	--	6.49	0.65
Total Emissions	**13.78**	**33.96**	**9.00**	**2.77**
De minimis threshold	NA[a]	100	NA[a]	100
De minimis threshold exceeded?		No		No

[a] General conformity is not applicable to this pollutant because the project area is within an attainment area for this pollutant.

Long-Term Operation Effects

Negligible mobile source emissions would occur during routine maintenance. The proposed project would not involve new stationary sources of air emissions.

Dr. Michael L. Wolfe, in a letter filed on December 15, 2014, expressed concern that the proposed project would alter the timing and volume of water to downstream reaches of the Bear River in Cache and Box Elder Counties of Utah, and ultimately, the amount of water flowing into the Great Salt Lake. Dr. Wolfe noted that a potential decrease in the net flow of water into Great Salt Lake would likely have serious environmental consequences including increasing levels of dust in the atmosphere.

Our Analysis

We conclude that a detailed air quality analysis related to stationary or mobile sources is not necessary because project operation would entail minimal stationary or mobile sources of air pollution.

The proposed project would reduce emissions of criteria pollutants and greenhouse gasses to the extent that it displaces the emissions generated by other types of electricity generation (e.g., natural gas and coal). Given the dynamic nature of the electricity market, the extent to which the project would displace nonrenewable electricity generation is not reasonably foreseeable.

As discussed in section 3.3.2.2 of this EIS, the effect on downstream flows due to the proposed project would be a 0-3.4 percent loss of instream flows (average net loss of 10 to 25 cfs depending on month during October through April during periods when the proposed reservoir would be initially filling or refilling; no loss in May through September; see table 3-22). To calculate the change in fugitive dust generation, it would be necessary to quantify the change in exposed soil acreage at the Great Salt Lake as a result of this varying reduction in the water levels. There is no methodology available to predict the change in exposed soil due to the change in instream flows on the temporal and geographic scale involved for this project. This is considered "unavailable information" per 40 CFR 1502.22. The unavailable information is relevant to evaluating the reasonably foreseeable and potentially significant adverse effect of increased dust generation during periods of reduced stream flow. The scientific understanding of the relationship between drought events and dust generation is well established (Field et al., 2009), and it is assumed a similar relationship would exist with reduced streamflow as a driver of dust generation. Reduced water flow could directly expose soils to wind erosion. These effects could be exacerbated by changes in precipitation, water levels, and wildfires (Field et al., 2009).

The Bear River is the largest source of freshwater input to the Great Salt Lake (Bedford, 2009). With respect to specific impacts on Great Salt Lake, which is located on shallow playa, small changes in water elevation can substantially change the surface area of the lake (USGS, 2015b). However, we have no way of quantifying the potential

for increased fugitive dust resulting from decreased flows into Great Salt Lake and any additional exposure of the lake sediments.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Bear River Narrows Project would not be constructed. There would be no changes to the physical, biological, or cultural resources of the area, and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced from nonrenewable fuels, and supplemental irrigation water from the proposed project reservoir would not be available. Existing high-quality fish and wildlife habitat would be maintained, including 4.5 miles of mainstem Bear River fluvial BCT habitat, about 425 acres of wildlife habitat along the Bear River riparian corridor, 55 acres of designated RNA and ACEC land designed to protect sensitive plants and wildlife, and 249 acres of designated conservation land protected under the PacifiCorp settlement agreement. This would allow PacifiCorp to continue its BCT restoration efforts that may result in an increased population of BCT in the Bear River. No action would also preserve three formal recreational sites, numerous informal recreational sites along Oneida Narrows Road, and Oneida Narrows as a regionally unique recreational river-fishery and whitewater resource. The remarkable recreational, geologic, and wildlife values of the reach would be protected, and cultural resources sites within the project APE would not be adversely affected by the project.

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4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Bear River Narrows Project's use of the Bear River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[61] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using the likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EIS for the protection, mitigation, and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. 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 the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

Table 4-1 summarizes the assumptions and economic information we use in our analysis. This information was provided by Twin Lakes in its license application. We find that the values provided by Twin Lakes are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; estimated future capital investment required to maintain and extend the life of plant equipment and facilities; licensing costs; normal operation and maintenance cost; and Commission fees.

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[61]See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶61,027 (July 13, 1995). 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.

Table 4-1. Parameters for the economic analysis of Bear River Narrows Project (Source: Twin Lakes, 2013, as modified by staff).

Parameter	Value
Period of analysis (years)	30
Period of financing (years)	20
Federal income tax rate	35 percent
Insurance	$60,000
Construction cost, $[a]	$23,841,410
Licensing cost, $[b]	$2,785,500
Operation and maintenance, $/year[c]	$102,400
Commission fees, $/year[d]	$28,080
Energy value ($/MWh)	88.17
Interest rate	5 percent
Discount rate	5 percent

[a] Staff has increased the contingency allocation from 10 percent to 15 percent due to several geotechnical issues that would need to be addressed in the final design. Those issues are presented in table 4-3.

[b] Licensing costs include the administrative, legal/study, and other expenses to date.

[c] Existing plant operation and maintenance includes operation and maintenance.

[d] Commission fees are based on statements of annual charges received from the Commission for federal lands and administrative charges based on authorized capacity. The fees shown are estimated.

As currently proposed, the Bear River Narrows Project would have an installed capacity of 10 MW and generate an average of 48,531 MWh annually.

4.2 COMPARISON OF ALTERNATIVES

Table 4-2 compares the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the action alternatives considered in this draft EIS: Twin Lakes' proposal, the staff alternative, and the staff licensing alternative. There would be no cost associated with the no-action alternative.

Table 4-2. Summary of the annual cost of alternative power and annual project cost for the alternatives for the Bear River Narrows Project (Source: staff).

	Twin Lakes' Proposal	Staff Alternative (License Denial)	Staff Licensing Alternative	Staff Licensing Alternative with Mandatory Conditions
Installed capacity (MW)	10 MW	-	10 MW	10 MW
Annual generation (MWh)	48,531	-	48,531	48,531
Annual cost of alternative power ($/MWh)	$4,278,980 88.17	-	$4,278,980 88.17	$4,278,980 88.17
Annual project cost ($/MWh)	$3,170,770 65.33	-	$3,196,970 65.87	$3,227,180 66.50
Difference between the cost of alternative power and project cost ($/MWh)	$1,108,210 22.84	-	$1,082,010 22.30	$1,051,800 21.67

4.2.1 No-action Alternative

Under the no-action alternative, the project would not be constructed and would not produce any electricity or supplement Twin Lakes' irrigation water supply. None of the environmental measures would be implemented.

4.2.2 Applicant's Proposal

Twin Lakes proposes to construct the project as described in the license application.

Based on a total installed capacity of 10MW, and an average annual generation of 48,531 MWh, the cost of alternative power would be $4,278,980, or about $88.17/MWh. The average annual project cost would be $3,170,770, or about $65.33/MWh. Overall,

the project would produce power at a cost that is $1,108,210, or $22.84/MWh, less than the cost of alternative generation.

4.2.3 Staff Alternative

Based on the discussions in section 5.2, *Comprehensive Development and Recommended Alternative*, staff recommends that the project not be licensed. As such, the staff-recommended alternative would be the same as the no-action alternative discussed above.

4.2.4 Staff Licensing Alternative

If the Commission decides to issue a license for the project, staff has developed an alternative that includes appropriate recommended measures. This alternative is similar to the proposed alternative with modifications to some proposed measures and additional measures to mitigate for environmental effects.

This alternative would have a total installed capacity of 10 MW and an average annual generation of 48,531MWh, and an average annual cost of alternative power of $4,278,980, or about $88.17/MWh. The average annual project cost would be $3,196,970, or about $65.87/MWh. Overall, the project would produce power at a cost that is $1,082,010, or $22.30/MWh, less than the cost of alternative power. This alternative would cost $26,200 more than the project as proposed by Twin Lakes.

4.2.5 Staff Licensing Alternative with Mandatory Conditions

If the Commission decides to issue a license for the project, staff has developed an alternative that includes appropriate recommended measures plus any mandatory conditions that are not included in the staff license alternative. This alternative is similar to the proposed alternative with modifications to some proposed measures and additional measures to mitigate for environmental effects.

This alternative would have a total installed capacity of 10 MW and an average annual generation of 48,531MWh, and an average annual cost of alternative power of $4,278,980, or about $88.17/MWh. The average annual project cost would be $3,227,180, or about $66.50/MWh. Overall, the project would produce power at a cost that is $1,051,800, or $21.67/MWh, less than the cost of alternative power. This alternative would cost $56,410 more than the project as proposed by Twin Lakes.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-3gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4-3. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of operating the Bear River Narrows Project (Source: staff).

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
Geology and Soils				
1. Finalize the draft Erosion Control Plan filed on April 1, 2014, in consultation with resource agencies, based on the final project design, to minimize construction-related effects on vegetation and water quality.	Twin Lakes, staff	$0	$0	$0[c]
2. Consult with Idaho Fish and Game, Idaho DEQ, BLM, and FWS to develop the final Erosion Control Plan.	Idaho Fish and Game, staff	$0	$0	$0[d]
3. Include in the final Erosion Control Plan BMP-11 from Idaho DEQ (2005), vehicle/equipment washing and maintenance, where appropriate	Staff	$0	$0	$0[d]
4. Develop a spoil disposal plan that addresses waste rock and soil storage and disposal on BLM-managed land	BLM, staff	Included in any cost of item 2	Included in any cost of item 2	Included in any cost of item 2[d]
5. Address the following geotechnical issues in the final project design: the need for additional seepage control measures at the left abutment and along the penstock; the risk of canyon slope failures in general and specifically at the borrow areas based on detailed site-specific geotechnical investigation and analysis; and the need for training walls along the spillway and a stilling	Staff	$0	$0	$0[e]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
basin or other protective measures at the toe of the dam to prevent erosion.				
Aquatic Resources				
6. Consult with the owners of water right 13-969A regarding replacement of the existing diversion structure that would be inundated by the proposed reservoir.	Twin Lakes, staff	$0	$0	$0[d]
7. Develop a hazardous substances plan for oil and hazardous substance storage, spill prevention, and cleanup, for project planning and construction.	Twin Lakes, BLM, staff	$0	$0	$0[c]
8. Develop a hazardous substances plan for oil and hazardous substance storage, spill prevention, and cleanup, for project operation and maintenance.	BLM, staff	$10,000	$5,000	$3,730[f]
9. Form an SMBWC to aid in oversight of mitigation actions and to evaluate future project proposals in the project watershed using annual funding of $25,000, and establish a website and database for the watershed.	Twin Lakes	$5,120	$26,600	$16,890
10. Develop a construction flow monitoring plan, in consultation with state and federal agencies, to ensure that normal Oneida development minimum flow releases are maintained through the construction site, including reservoir filling.	Staff	$10,000	$840	$1,030[f]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
11. Operate the project with a normal maximum reservoir elevation of 4,734 feet and set a drawdown limit of 5,000 acre-feet in the proposed reservoir corresponding to a minimum water surface elevation of 4,718 feet.	Twin Lakes, staff	$0	$0	$0
12. Operate the project such that project releases in the Bear River downstream of its confluence with Mink Creek match releases from the upstream Oneida dam during routine periods (defined by us as periods when the proposed reservoir is not refilling), and provide a minimum flow in the Bear River downstream of its confluence with Mink Creek equal to the minimum flow of 251 cfs, or inflow to the reservoir, whichever is less, during construction, operation, and reservoir refilling.	Twin Lakes	$0	$0	$0
13. Pass Bear River flows through the construction site without interruption.	Twin Lakes, staff	$0	$0	$0

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
14. Provide outflows equal to inflow from the Oneida development as measured as the sum of flows downstream of the proposed Bear River pumping station and flows downstream of Twin Lakes' Mink Creek diversion dam, except when flows are adjusted during reservoir refill and Mink Creek water exchange periods.	Staff	$0	$0	$0[f]
15. Provide a 10-cfs minimum flow in Mink Creek downstream of the Twin Lakes diversion dam.	Twin Lakes	$0	$92,170	$59,910
16. Provide a minimum flow of 28 cfs from April through September and 14 cfs from October through March into Mink Creek downstream of Twin Lakes' diversion dam.	Idaho Fish and Game	$0	$193,600	$125,840[h]
17. Provide a minimum flow of 20 cfs from April through September and 15 cfs from October through March into Mink Creek downstream of Twin Lakes' diversion dam.	Staff	$0	$161,300	$104,850[h]
18. Install, operate, and maintain a stream flow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam.	Twin Lakes, staff	$0	$0	$0[i]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
19. Develop a project operation compliance monitoring plan which includes provisions for new stream flow gages located immediately downstream of the pumping station on the Bear River and immediately downstream of Twin Lakes' Mink Creek diversion dam.	Staff	$160,000	$10,000	$14,160[j]
20. Release water from Twin Lakes' diversion dam on Mink Creek to replace water lost due to evaporation in the proposed reservoir.	Twin Lakes	$0	$0	$0[g]
21. Release water from the proposed dam into the Bear River to replace water lost due to evaporation in the proposed reservoir.	Idaho Fish and Game, staff	$0	$5,000	$3,250[f]
22. Dedicate the Battle Creek water right associated with the Ben Johnson Family Farm site to instream flow for aquatic and wetland development and enhancement.	Twin Lakes	$0	$20,480	$13,310
23. Implement the proposed DO Management Plan filed with the license application to ensure that powerhouse discharges meet state of Idaho water quality criteria for DO at all times.	Twin Lakes	$0	$0	$0[c]
24. Revise the proposed DO Management Plan in consultation with state and federal resource agencies to provide details of proposed corrective actions.	Idaho Fish and Game, staff	$10,000	$10,000	$6,980[f]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
25. Cooperate with agencies to plan and eventually remove fish passage barriers in Mink Creek.	Twin Lakes	$0	$0	$0
26. Consult with agencies to develop a plan and remove fish passage barriers in Mink Creek.	Staff	$10,000	Implementation cost dependent on measures agreed upon	$480[f]
27. Cooperate with agencies in the planning and eventual installation of a fish screen to prevent fish entrainment at the Twin Lakes diversion on Mink Creek.	Twin Lakes	$0	$0	$0
28. Consult with agencies in development of a plan for the installation and maintenance of a fish screen to prevent fish entrainment at the Twin Lakes diversion on Mink Creek on a schedule discussed with the resource agencies and approved by the Commission.	Staff	$100,000	$2,000	$6,090[f]
29. Consult with FWS and Idaho Fish and Game to finalize the design of the proposed fish screen at the proposed Bear River pumping station intake (cost included in the overall construction and operation and maintenance costs) and file the final design with the Commission for approval.	Idaho Fish and Game, staff	$0	$0	$0
30. Cooperate with agencies to control non-native species in Mink Creek.	Twin Lakes	$0	$0	$0[g]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
31. Develop and implement a non-native species control plan for Mink Creek, in consultation with Idaho Fish and Game, the Forest Service, and FWS.	Staff	$10,000	$22,790	$15,290[f]
Terrestrial Resources				
32. Develop a terrestrial mitigation plan to address wetland and riparian habitat that includes the following provisions and file the plan with the Commission for approval: (1) provide a schedule for mitigation actions; (2) provide detailed planting plans with site contours, existing vegetation, planting species, planting densities, planting locations, and success criteria for specific planting locations; (3) monitor for natural reproduction of planted riparian trees and incorporate additional plantings, if necessary, over the term of a license to mitigate for lack of natural regeneration; and (4) include riparian plantings along the reservoir perimeter to facilitate generation of wetland habitats in the 15 acres where Twin Lakes expects suitable habitat to develop.	Staff	$40,000	$5,690	$5,610[k]
33. Develop, in consultation with FWS, BLM, and Idaho Fish and Game, a terrestrial mitigation plan to address fencing design and placement and number and location of nesting platforms and boxes	Staff	$10,000	-	$480[f]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
34. Implement the following measures related to wildlife habitat enhancement described in the Conceptual Mitigation Plan filed with the license application: (1) creation of at least 16 acres of emergent, 20 acres of forested, 12 acres of scrub/shrub wetlands, and 38 acres of riparian habitat at the Ben Johnson Family Farm site through changes in land management, hydrology, and active planting with a goal to develop as many self-sustaining wetland and riparian areas as possible without the need for irrigation; (2) enhancement of 115 acres of existing wetlands at the Ben Johnson Family Farm site; (3) enhancement of 49 acres of fringe wetlands and riparian habitat off-site at Condie and Winder reservoirs; (4) creation of 15.4 acres of wetland around the proposed reservoir; (5) evaluation of the feasibility of developing a 10-acre parcel of land at the mouth of Battle Creek on the Ben Johnson Family Farm site into a treatment wetland to enhance water quality in Battle Creek and Bear River; (6) creation of islands (as part of the 201 acres of wetland and riparian habitat enhancements) within the Ben Johnson Family Farm site to increase shoreline habitat and mitigate for the loss of waterfowl/water bird habitat; (7) management of 538 acres of habitat	Twin Lakes	$705,580	$30,720	$53,760

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
(including 201 acres of wetlands and riparian habitat) at the Ben Johnson Family Farm site for big game by discontinuing agricultural production and increasing riparian vegetation; and (8) installation of a raptor nesting platform adjacent to the proposed reservoir, near the Ben Johnson Family Farm site, and at a location between the two sites, and installation of nesting boxes at the Deep Creek drainage to enhance wildlife habitat.				
35. Implement the proposed Noxious Weed Prevention and Revegetation Plan dated August 2013 that was included with the license application.	Twin Lakes	$0	$0	$0 [c]
36. Revise the proposed Noxious Weed Prevention and Revegetation Plan to include the following provisions and file the revised plan with the Commission for approval: (1) identify proposed photo points for monitoring upland revegetation activities; (2) base criteria for revegetation success on existing vegetation community structure in areas of proposed disturbance or at reference with similar structure; and (3) ensure criteria for successful revegetation of upland areas are met for two successive growing seasons.	Staff	$10,000	$0	$480[f]
37. Establish goals and criteria by which to judge the success of revegetation efforts, including a	Idaho Fish and Game, staff	$10,000	$6,310	$4,580[d]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
discussion of any irrigation needed to expedite plant growth, documentation of existing water rights and those necessary for ensuring survival of plantings, a description of any measures to be used to enhance existing wildlife habitat, and provisions for a site steward to oversee management of the sites.				
38. As mitigation for the net loss of important bald eagle nesting, roosting, and foraging habitat, acquire a parcel that provides similar habitat of equal or greater quantity and quality. The land should include at least 5 miles of riverine habitat along the Bear River that includes at least 70 acres of currently established cottonwood riparian habitat.	Idaho Fish and Game	$300,000	$0	$14,370[l]
39. Employ industry-standard avian protection measures on the new transmission line.	Twin Lakes, staff	$0	$0	$0[g]
40. Use the most recent APLIC guidelines (APLIC, 2006, 2012) to minimize collisions and electrocution hazards for birds.	Idaho Fish and Game, staff	$0	$0	$0[d]
41. As mitigation for effects of the proposed project on land birds, provide at least 132 acres of wetland and riparian habitat as well as grassland habitat.	Idaho Fish and Game	-	-	-[m]
42. Provide suitable habitat for all lifestages of water birds of equal or greater quantity and quality including at least 200 acres of nesting	Idaho Fish and Game	-	-	-[n]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
and brood-rearing habitat that provides ice-free winter foraging and nesting areas equivalent to 5 miles of riverine habitat.				
43. Conduct an assessment of potential trumpeter swan habitat provided by the Ben Johnson Family Farm site to determine if the proposed acquisition would adequately mitigate for project effects on trumpeter swans, and provide habitat of equal or greater quantity and quality including protection of the ice-free winter foraging and resting area that is equivalent to 5 river miles.	Idaho Fish and Game	-	-	-[n]
44. As mitigation for the loss of 60 acres of suitable bat roosting and foraging habitat due to inundation, provide mitigation acreage of equal or greater quantity and quality.	Idaho Fish and Game	-	-	-[m]
45. As mitigation for the loss of 435 acres of habitat to support wild turkey populations and for the loss of access for public hunting opportunity, provide mitigation acreage of equal or greater quantity and quality.	Idaho Fish and Game	-	-	-[m]
46. Install fencing adjacent to the proposed reservoir that would direct big game to relatively safe places to cross the reservoir and exclude cattle from the buffer zone.	Twin Lakes, staff (but with consultation regarding fencing)	$0	$0	$0[g]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
47. Mitigate effects on deer and elk by providing a ratio of 5 acres of riparian habitat for every acre of riparian habitat impacted by the proposed project.	Interior, FCFGA, GYC, TU	$417,770	$0	$20,010[f]
48. As mitigation for the effects of the proposed project on mule deer, provide at least 435 acres of mule deer fawning and wintering habitat of equal or greater quantity and quality.	Idaho Fish and Game	-	-	- [m]
49. As mitigation for the loss of nearly 265 acres of northern leopard frog habitat, provide wetland and riparian habitat with equal or greater quantity and quality.	Idaho Fish and Game	$150,000	$0	$7,180 [o]
50. Perform a survey of affected areas to evaluate if there is adequate upland habitat to support rock squirrels, and if not, provide at least 237.8 acres of suitable habitat for rock squirrel, including at least 19 acres of burrowing habitat of equal or greater quantity and quality to that being lost due to inundation.	Idaho Fish and Game	-	-	- [m]
51. Provide a shoreline buffer of 300 feet.	Staff	$1,110,000	$0	$53,160[f]
52. Develop a final construction schedule based on final project design in consultation with Idaho Fish and Game to minimize disturbance to key wildlife activities.	Twin Lakes, staff	$0	$0	$0[g]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
53. As part of wildlife habitat mitigation program, increase acreage being held either: (1) in trust by the United States on behalf of the tribes, and/or (2) in fee title by the tribes for the benefit of fish and wildlife habitat in perpetuity.	Shoshone-Bannock Tribes	$0	$0	$0[p]
Recreation Resources				
54. Develop a recreation plan in consultation with agencies and stakeholders.	Idaho Parks and Recreation, staff	$40,000	$2,000	$3,220[f]
55. Construct a new, 4.1-acre, multi-use recreation facility including a campground, boat ramp, and hiking trail on the proposed reservoir to replace the campground that would be lost due to inundation by the new reservoir.	Twin Lakes, staff	$327,700	$7,170	$20,350
56. Revegetate the new campground by significantly increasing the numbers and diversity of planted woody vegetation with an emphasis on cottonwoods and other local riparian tree and shrub species.	Idaho Fish and Game, staff	$10,000	$0	$480[f]
57. Construct a new river access and boat launch with park and portable toilets immediately below the proposed dam to replace the boating access points that would be lost due to inundation by the proposed reservoir.	Twin Lakes, staff	$30,720	$1,540	$2,470

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
58. Construct a new boat ramp on the Bear River within the Ben Johnson Family Farm site with parking and portable toilets pending completion of onsite assessment of the suitability of this site (also part of the Conceptual Mitigation Plan).	Twin Lakes	$10,240	$1,540	$1,490
59. Construct a parking area and interpretive and informative signage at the Ben Johnson Family Farm site (also part of the Conceptual Mitigation Plan).	Twin Lakes	$7,680	$0	$370
60. Provide parking for boater put-in and take-out comparable to the amount lost due to inundation.	Idaho Fish and Game, staff	$0	$0	$0[q]
61. Consult with a stakeholder group to review and revise the recreation mitigation strategy included in the license application.	Idaho Parks and Recreation, staff	$0	$0	$0[d]
Land Use and Aesthetics				
62. Develop a land management plan, in consultation with agencies and stakeholders, to develop and coordinate land management measures and consistency with relevant land management plans.	Staff	$40,000	$2,000	$3,220[f]
63. Manage and maintain any new project roads that would be constructed for the project.	BLM, FCFGA, Yellowstone to Uintas Connection, TU, staff	$0	$50,000	$32,500[f]

Enhancement/Mitigation Measures	Entities	Capital Cost (2015$)[a]	Annual Cost(2015$)[a]	Levelized Annual Cost (2015$)[b]
64. Develop an LEESP that includes provision for coordination and funding of law enforcement and emergency services personnel with jurisdiction within the project area.	BLM	$20,000	$45,000	$30,210[f]
65. Acquire the Ben Johnson Family Farm site on the Bear River.	Twin Lakes	$1,280,080	$0	$61,310
66. Select the powerhouse color to blend with the local environment.	Twin Lakes, staff	$0	$0	$0[g]
Cultural Resources				
67. Implement the 2013 HPMP and 2014 Addendum 1.	Twin Lakes	$550,000	$0	$26,340[r]
68. Revise the HPMP and Addendum 1 to address the Commission's comments and other comments received by the parties to the Commission's Restricted Services List.	BLM, SHPO, staff	$0	$0	$0[f]
69. Protect Native American burial sites.	Interior, Shoshone-Bannock Tribes, TU, staff	$0	$0	$0
Air Quality				
70. During construction, use dust abatement methods as needed to prevent excessive impacts on air quality.	Twin Lakes, staff	$0	$0	$0[c]

[a] All capital and annual costs were provided and were escalated to 2015 dollars for a purpose of this analysis. Annual costs typically include operational and maintenance costs and any other costs that occur on a yearly basis. All costs were provided by Twin Lakes in its license application unless otherwise noted.

[b] All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing costs.

[c] Twin Lakes stated that the cost of this measure is included in the overall construction cost.

[d] Staff assumes that this cost would be included in the overall construction cost for the project.

[e] The applicant's construction cost estimate does not explicitly include costs for these geotechnical items; therefore, Twin Lakes' estimated cost may be understated. Twin Lakes did provide a contingency allowance of 10 percent in the license application. However, given that the design is at a very conceptual level and several costly issues need to be addressed, we have increased the contingency allowance to 15 percent.

[f] Cost estimate provided by staff.

[g] Twin Lakes did not provide a cost for this measure, and therefore we interpret that to mean that it does not anticipate any additional cost would be required to implement the measure.

[h] We based our cost of the measure on the cost of Twin Lakes' proposal for the 10-cfs minimum flow.

[i] Twin Lakes did not provide a cost for the gage, so we assume that the cost is included in the overall construction cost of the project.

[j] The capital cost includes $10,000 for development of the plan and $150,000 for installation of a stream flow gage on the Bear River downstream of the pumping station. The annual cost includes maintenance and calibration of the gage. The cost of the stream flow gage on Mink Creek is covered by a separate measure.

[k] Staff estimates the cost of this measure would include $15,000 every 10 years, starting in year 10 to monitor planted riparian trees and $80,000 in year 3 for new riparian plantings along the reservoir perimeter.

[l] The cost of this measure would include the acquisition of acreage with appropriate bald eagle habitat.

[m] Some of the acreage needed could be provided by the proposed Conceptual Mitigation Plan and the staff-recommended 300-foot conservation buffer. Staff is unable to estimate a cost for this measure.

[n] Some of the acreage needed could be provided by the proposed Conceptual Mitigation Plan. Staff is unable to estimate a cost for this measure.

[o] Some of the acreage needed would be provided by the staff-recommended 300-foot conservation buffer and we have shown a cost of $150,000 for grading to create some of the necessary habitat along the reservoir banks.

[p] There may be some legal costs associated with this measure.

[q] We have assumed that the costs estimated by Twin Lakes for recreation facilities would cover this cost.

[r] We have estimated a minimal cost for implementation of the HPMP ($350,000 for additional studies of the Ben Johnson Family Farm site and $200,000 for data recovery) given unknowns in what would actually be required. The cost could require up to at least an additional $5,000,000 in capital costs and $200,000 in annual costs.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of Twin Lakes' proposal, Twin Lakes' proposal as modified by staff in its licensing alternative (which would essentially be the same as the staff alternative with mandatory conditions), and the no-action alternative. We estimate the annual generation of the project under the two action alternatives identified would be 48,531 MWh. We summarize the environmental effects of the different alternatives in table 5-1.

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection of, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for licensing the Bear River Narrows Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Twin Lakes' proposal, issuance of an original hydropower license by the Commission, would allow Twin Lakes to meet its revenue goals for funding improvements to its irrigation system, provide up to 5,000 acre-feet of supplemental water to meet irrigation demands during dry years, and also help meet a need for power in the project area in both the short and long term as additional coal-fired facilities are retired. The proposed project would also provide low-cost power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

However, based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we select the no-action alternative as the preferred alternative. The overall public benefits of the no-action alternative would exceed those of Twin Lakes' proposal, because of the unavoidable adverse environmental effects. These unavoidable adverse effects would include:

1. loss of a 4.5-mile section of the Bear River with outstandingly remarkable recreational values, as designated by BLM in its wild and scenic eligibility report (BLM, 1995), including a regionally significant recreational river-fishery and whitewater resource in an undeveloped canyon with easy and open accessibility to the public;

Table 5-1. Comparison of alternatives for the Bear River Narrows Project (Source: staff).

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
Developmental Resources			
Generation	Not applicable	10-MW (48,531 MWh/year)	Same as applicant's proposal
Annual cost	Not applicable	$3,170,770 ($65.33/MWh)	$3,196,970 ($65.87/MWh)
Geology and Soils			
Slope stability	Occasional slope failures or landslides from natural forces	Same as no-action with the potential for additional instability at the proposed borrow areas and canyon walls.	Slope stability hazards minimized.
Dam stability	No effect	Potential seepage control issues in the penstock and left abutment.	Potential dam stability issues minimized.
Shoreline erosion	Erosion along Bear River shoreline, especially during high-flow events	Some erosion and associated increased sedimentation in adjacent project waters during project construction.	Same as applicant's proposal.
Water Quality			
DO in Bear River downstream of Oneida reservoir	Meets state standard of 6 mg/L	May fall below state standards periodically due to intake at bottom of the reservoir. Proposed aeration measures would minimize this effect.	Same as applicant's proposal.
Water temperature in Bear	Exceeds state standard	Decreases (up to 2ºC) due to	Same as applicant's

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
River downstream of Oneida reservoir	during the summer	intake at bottom of reservoir, benefitting downstream water quality.	proposal.
Fisheries			
7 miles of BCT fluvial habitat in Bear River downstream of Oneida dam	No change	Loss of 4.5 miles of the BCT fluvial habitat, which reduces available adult habitat by 77%, juvenile habitat by 86%, fry habitat by 75%, and spawning habitat by 18%.[62]	Same as applicant's proposal.
10 miles of salmonid[63] fluvial habitat in Bear River	No change	Loss of 4.5 miles of the salmonid fluvial habitat that would be converted to reservoir habitat, which would likely be dominated by non-native warmwater fishery	Same as applicant's proposal.
BCT habitat in Mink Creek below Twin Lakes' diversion dam(2.3 acres of adult habitat, 12.7 acres of juvenile habitat, 14.5 acres	No change	Increase BCT habitat below Twin Lakes' diversion dam (6.3 acres for adults, 29 acres for juveniles, 29.5 acres for fry, and 23.2 acres for	Greater increase in BCT habitat below Twin Lakes' diversion dam (8.3 acres for adults, 33.7 acres for juveniles, 26.5 acres for fry,

[62] Percentages represent average loss across seasons.

[63] Salmonids would include, at a minimum: BCT, brown trout, rainbow trout, brook trout, and mountain whitefish.

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
of fry habitat, 10.2 acres of spawning habitat) and approximately 12 miles of BCT habitat upstream of Twin Lakes' diversion dam		spawning)	and 27.2 acres for spawning) and improved access to about 12 miles of habitat upstream of Twin Lakes' diversion dam.
Non-native fish outcompete and prey upon native salmonids, including BCT	No change	No change	Using conventional methods, (e.g., backpack electrofishing), control non-native fish in Mink Creek to improve native salmonid populations.
Entrainment and out-of-basin transfers of native salmonids, including BCT, at Twin Lakes' diversion dam	No change	No change	No entrainment or out-of-basin transfers of native salmonids, including BCT, would occur at Twin Lakes' diversion dam due to Twin Lakes' irrigation withdrawals from Mink Creek.
Terrestrial Resources			
Riparian vegetation	No change	Loss of 59.3 acres and temporary disturbance of 2.4 acres of broadleaf riparian forest, due to reservoir inundation, resulting in reduction of mature cover along Bear River. The loss of habitat value	Unavoidable loss of at least 26 acres of riparian vegetation. Protection and management of additional lands as needed, not to include lands at the Ben Johnson Family Farm, to offset acreage of lost habitat. Plantings in suitable areas

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
		would be partially[64] offset through the proposed creation of 20 acres of forested wetland and 38 acres of upland riparian habitat at Ben Johnson Family Farm, development of 5 acres of forested wetland around proposed reservoir, and enhancement of riparian habitat in Mink Creek as well as in Condie and Winder reservoirs.	around the reservoir would facilitate development of 15 acres of forested wetlands. Enhancement at the applicant's Condie and Winder reservoirs would create 49 acres of broadleaf forested fringe wetland riparian habitat. 30-50 years needed to replace lost riparian function.
Bald eagle habitat	No change	Loss of 59.3 acres of nesting, perching, and roosting habitat along Bear River, including 5 miles of ice-free winter habitat.	Loss of 59.3 acres of nesting, perching, and roosting habitat along Bear River, including 5 miles of ice-free winter habitat.
		The loss of habitat value would be partially mitigated through development of 58 acres of nesting, perching,	We have not identified suitable mitigation sites to offset these effects.

[64] Terrestrial habitat mitigation under the applicant's proposal would only partially offset reductions in habitat value because of the uncertainty with the feasibility of habitat creation at the Ben Johnson Family Farm, the time it would take for habitat features to develop, the current value of any additional mitigation lands that would be protected and managed, and difficulty in mitigating certain habitat features.

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
		and roosting habitat at the Ben Johnson Family Farm, as well as construction of three nesting platforms.	
Northern leopard frog habitat	No change	Loss of 264.8 acres of habitat along Bear River including three known breeding sites. The loss of habitat value would be partially mitigated through development of 76 acres of potential habitat at the Ben Johnson Family Farm, 10 acres of wetlands and a 100-foot conservation buffer at the proposed reservoir, and enhancement of habitat in Mink Creek.	Similar to applicant's proposal, with protection and management of additional lands, not to include lands at the Ben Johnson Family Farm, to offset acreage of lost habitat, including a greater amount of conservation lands around the proposed reservoir (313 acres).
Bat habitat	No change	Loss of 59.3 acres of riparian forest habitat, 1 acre of exposed rock/cliff habitat, and temporary disturbance of 1 acre of exposed rock habitat. The loss of habitat value would be partially mitigated through the protection of 3 acres of riparian forest habitat and 7 acres of	Similar to applicant's proposal, with protection and management of additional lands to offset acreage of lost habitat, including a greater amount of habitat protected around the proposed reservoir (4 acres of riparian forest, 25.3 acres of exposed rock). 30-50 years needed to develop riparian forest

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
		exposed rock habitat around the proposed reservoir.	habitat; exposed rock habitat could not be recreated.
Rock squirrel habitat	No change	Loss of 237.8 acres and temporary disturbance of 67.9 acres of potential habitat, including 19 acres of burrowing habitat. The loss of habitat value would be partially mitigated through conservation lands around the proposed reservoir (124 acres) and development of about 85 acres of habitat at the Ben Johnson Family Farm.	Similar to applicant's proposal, with protection and management of additional lands to offset acreage of lost habitat, not to include lands at the Ben Johnson Family Farm, including a greater amount of conservation land around the proposed reservoir (313 acres).
Mule deer habitat	No change	Loss of 435 acres of habitat, including 173 acres of good to excellent fawning habitat, 330 acres of good to excellent summer habitat, and 325 acres of good to excellent winter habitat. Potential fragmentation of habitat due to new reservoir being a barrier to migration. The loss of habitat value would be partially mitigated through development of 351	Similar to applicant's proposal, with protection and management of additional lands, not to include lands at the Ben Johnson Family Farm, to offset acreage of lost habitat, including a greater amount of conservation lands around the proposed reservoir (313 acres). Long-term reduction in fawning habitat because replacement habitat would

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
		acres of habitat at the Ben Johnson Family Farm and 124 acres of conservation land around the reservoir.	take 30-50 years to develop and riparian habitats around the reservoir are not expected to match acreage of existing riparian habitat that would be inundated.
Wild turkey habitat		Loss of 435 acres of habitat, including 174 acres of excellent-quality and 160 acres of good-quality habitat	Similar to applicant's proposal, with protection and management of additional lands to offset acreage of lost habitat. Benefit provided by riparian woodland habitat around the reservoir would not be realized until it develops (30-50 years) and would not replace lost acreages.
Migratory bird habitat	No change	Loss of 200 acres of nesting and brood-rearing habitat and 4.5 miles of riverine, ice-free, winter foraging and resting habitat. The loss of habitat value would be partially mitigated through installation of nest boxes.	Similar to applicant's proposal, with protection and management of additional lands to offset acreage of lost habitat. Benefit provided by riparian woodland habitat around the reservoir would not be realized until it develops (30-50 years) and would not replace lost acreages. The lost ice-free riverine habitat is likely

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
			irreplaceable.
Recreation Resources			
4.5 miles of whitewater boating and tubing in Oneida Narrows	No change	Loss of 4.5 miles whitewater boating and tubing area, including numerous formal and informal boater put-in/takeout areas (nearest similar experience in region is about 120 miles away on the Snake River). Partial offset of loss through development of two boat access facilities below the proposed dam and downstream at the Ben Johnson Family Farm.	Similar to applicant's proposal except boat access would not be provided at the Ben Johnson Family Farm.
4.5 miles of coldwater riverine trout fishery on the Bear River	No change	Loss of 4.5 miles of coldwater trout fishery with public access due to creation of proposed reservoir, which would support a warmwater fishery. Potential partial offset of loss through enhancement of trout habitat in Mink Creek; however, little public access exists.	Same as applicant's proposal.

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
Three formal recreation facilities, numerous informal facilities, and Bear River access	No change	Replacement of formal and informal recreation facilities with 4.1-acre reservoir and associated reservoir recreation sites, including a campground, picnic area, and boat launch.	Same as applicant's proposal.
Land Use			
441 acres of conservation land in Oneida Narrows	PacifiCorp would continue to add conservation land as condition of Bear River Project settlement agreement.	Loss of about 305 acres of conservation land and temporary disturbance of 48 acres. Partially offset loss with 100-foot buffer around proposed reservoir, which equates to 124 acres of conservation land, 88 acres of which is land currently managed by BLM and PacifiCorp for conservation purposes.	Similar to applicant's proposal, with additional offset of loss with a 300-foot buffer around reservoir, which equates to 376 acres of conservation land, equivalent to the amount lost and temporarily disturbed by project construction. Additional coordination with BLM, PacifiCorp, and other stakeholders to mitigate project effects on conservation land use.
Air Quality			
Air pollution	No change	Minor, short-term increase in air pollutants during project construction. Overall reduction in air pollution due	Same as applicant's proposal.

Resource	No-action Alternative	Applicant's Proposal	Staff Licensing Alternative
		to displacement of fossil fuel generation.	
Cultural Resources			
Bear River Massacre Site National Historic Landmark located at the Ben Johnson Family Farm	No change	Potentially no change, based on implementation of HPMP; however, also potential for adverse effects due to proposed conservation efforts at the Ben Johnson Family Farm. If components of the landmark site cannot be disturbed, large areas of the Ben Johnson Family Farm would be off-limits for proposed recreation and wildlife mitigation.	Same as no-action alternative.
Socioeconomics			
Local economy	No change	Short-term modest benefits due to project construction; long-term minor benefits due to project operation.	Same as applicant's proposal with some potential additional contribution to economy based on recommended mitigation.
Revenue for Twin Lakes' shareholders	No change	Minor, long-term increase in revenue from availability of 5,000 acre-feet of water to meet irrigation demands.	Same as applicant's proposal.

2. substantial reduction in the size of the cutthroat trout fishery, a fishery of recreational significance, because of the permanent loss of 4.5 miles of mainstem Bear River fluvial BCT habitat;
3. substantial reduction in the diversity or population of up to 48 state-designated sensitive wildlife species because of the permanent loss of about 425 acres of wildlife habitat along the Bear River riparian corridor from inundation and proposed project facilities; habitat that is seldom replicated along the 80-mile-long reach between the Soda development and Great Salt Lake;
4. permanent loss of 249 acres of designated PacifiCorp-owned conservation land that is a critical component of the Bear River Project licensing settlement agreement,[65] 202 acres of which are within the existing Bear River Project's project boundary;
5. permanent loss of 55 acres of designated Research Natural Area/Area of Critical Environmental Concern land managed by BLM and designed to protect sensitive plants (e.g., bigtooth maple, box-elder riparian, Rocky Mountain juniper, and bunchgrass) and wildlife (e.g., bald eagle and rock squirrel habitats); and
6. degradation of aesthetics via the conversion of the scenic Oneida Narrows into a hydroelectric project with a large dam, powerhouse, transmission facilities, and roads.

Although Twin Lakes proposes measures to mitigate some of the adverse effects described above and staff recommends additional measures to provide additional mitigation for adverse effects, those measures would not adequately offset the adverse effects of constructing and operating a new major hydroelectric project on a currently scenic river reach in an undeveloped canyon with remarkable recreational, geological, and wildlife values and public access, unlike other reaches within a 2 to 3 hour drive (reaches of the Snake River are the nearest comparable river reaches). Consequently, we conclude that issuing a license for the proposed project would not be in the public interest. However, if the Commission were to issue a license for the proposed Bear River Narrows Project, we make recommendations as to which environmental measures proposed by Twin Lakes or recommended by agencies, other entities, and staff should be included in any license issued for the project. In addition to Twin Lakes' proposed environmental measures, we recommend additional staff-recommended environmental

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[65] This comprehensive Settlement Agreement was filed by PacifiCorp on September 26, 2002, and approved by the Commission in the Order Approving Settlement Agreement and Issuing New License Issued on December 22, 2003; 105 FERC ¶62,207.

measures to be included in any license issued for the project. We also discuss which measures we do not recommend including in the license.

5.2.1 Measures Proposed by Twin Lakes

Based on our environmental analysis of Twin Lakes' proposal discussed in section 3 and the costs discussed in section 4, we recommend including the following environmental measures proposed by Twin Lakes in any license issued for the project. Our recommended modifications to Twin Lakes' proposed measures are shown in *italics*.

Project Construction

Geology and Soil Resources

- Finalize the draft Erosion Control Plan filed on April 1, 2014, in consultation with Idaho Fish and Game, Idaho DEQ, BLM, and FWS, based on the final project design, *and incorporate spoil storage and disposal measures and Idaho DEQ BMP-11 (which pertains to vehicle/equipment washing and maintenance), into the plan where appropriate*, to minimize construction-related effects on vegetation and water quality.

Aquatic Resources

- Consult with the owners of water right 13-969A regarding replacement of the existing diversion structure that would be inundated by the proposed reservoir with a new diversion *capable of delivering up to 3.46 cfs at all water levels*.
- Maintain Bear River flows through the construction site without interruption.
- Install a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam.

Terrestrial Resources

- *Revise the proposed* Revegetation and Noxious Weed Control Plan filed with the license application *as discussed in section 5.2.2.*
- Employ industry-standard avian protection measures on the transmission line *including the most recent APLIC guidelines (APLIC, 2006; 2012)* to minimize electrocution hazards.
- Develop a final construction schedule based on final project design, in consultation with Idaho Fish and Game, to minimize disturbance to bald eagle, migratory birds, elk, and mule deer during nesting and migration periods.

Recreation Resources

- Construct a new, multi-use recreation facility that would include a campground, boat ramp, and hiking trail on the proposed reservoir to replace the campground that would be lost due to inundation, *and include detailed site plans in the staff-recommended recreation plan discussed in section 5.2.2*.
- Construct a new river access and boat launch with parking and portable toilets immediately below the new dam to replace boating access points that would be lost due to inundation, *and include detailed site plans in the staff-recommended recreation plan discussed in section 5.2.2*.

Aesthetics

- Use a powerhouse color that blends with the surroundings to reduce the visual effect of the project.

<u>Project Operation/Maintenance</u>

Aquatic Resources

- Implement the DO Management Plan filed with the license application, which includes provisions to monitor and report DO and water temperature and implement corrective actions if necessary, to ensure that powerhouse discharges meet state of Idaho water quality criteria for DO at all times *after revising it as discussed in section 5.2.2*.
- Operate the project with a normal maximum reservoir elevation of 4,734 feet and a reservoir drawdown limit of 5,000 acre-feet that corresponds to a minimum reservoir elevation of 4,718 feet, to protect aquatic and recreational resources by maintaining a minimum pool level within the proposed reservoir.
- Operate the project such that project releases downstream of the confluence of Mink Creek match releases from the upstream Oneida dam during routine operation (defined by staff as periods when the proposed reservoir is not refilling), and release a minimum flow of 251 cfs from the proposed dam, or inflow, whichever is less, during operation and reservoir refilling.
- Operate and maintain a streamflow gage on Mink Creek immediately downstream of Twin Lakes' Mink Creek diversion dam to aid in monitoring compliance with all flow release requirements.
- Develop a plan to control non-native fish species in Mink Creek, after consulting with agencies as discussed in section 5.2.2.
- *Develop a plan* to remove fish passage barriers in Mink Creek, *after consultation with agencies as discussed in section 5.2.2.*

- *Develop a plan* to install a fish screen to prevent entrainment of fish into the irrigation canal at the Twin Lakes diversion on Mink Creek and the proposed pumping station*, after consultation with the agencies, as discussed in section 5.2.2.*

Terrestrial Resources

- Implement the proposed Conceptual Mitigation Plan with the following components:
    - Install fencing adjacent to the proposed reservoir that would direct big game to relatively safe places to cross the reservoir and exclude cattle from the buffer zone. *Agreed-upon fence design and installation should be filed with the Commission as part of the staff-recommended terrestrial mitigation plan discussed in section 5.2.2.*
    - Enhance 49 acres of fringe wetland and riparian habitat at Twin Lakes' Condie and Winder reservoirs, and provide 15.4 acres of adequate habitat along the edge of the proposed Bear River Narrows reservoir based on the capability of existing and expected habitat conditions to support these habitats *(including riparian plantings). Include provisions for site-specific planting plans and monitoring provisions in recommended terrestrial mitigation plan discussed in section 5.2.2.*
    - Install raptor nesting platforms adjacent to the proposed reservoir, near the Ben Johnson Family Farm site, and at a location between the two sites, and install nesting boxes in the Deep Creek drainage to mitigate loss of nesting opportunities *and include specific information regarding placement of nesting platforms and nesting boxes in the staff-recommended terrestrial mitigation plan discussed in section 5.2.2.*
- Provide a 100-foot conservation buffer extending upland from the normal high water mark (at elevation 4,734 feet) of the proposed reservoir. *Increase buffer to 300 feet to provide suitable area around the reservoir to promote continued use as a wildlife movement corridor and protect remaining scenic resources associated with Oneida Narrows.*

Cultural Resources

- *Revise* and finalize *the* 2013 HPMP and 2014 Addendum 1 *to address* prior staff *comments and comments received by the parties to the Commission's Restricted Services List* to ensure protection of archaeological and historic resources at the project.

5.2.2 Additional Measures Recommended by Staff

In addition to Twin Lakes' proposed measures and the staff modifications listed above, we recommend including the following staff-recommended measures in any license issued for the Bear River Narrows Project:

Project Construction

Geology and Soil Resources

- Address geotechnical issues that pertain to dam stability in the final project design by including additional seismic analysis, further analysis of seepage control measures at the left abutment and along the penstock, and the need for training walls along the left abutment and a stilling well at the toe of the dam. The final project design submitted to the Commission for approval would include the updated seismic hazard analysis and the additional analysis of measures to control seepage along the penstock and erosion during overflow spillway operation and dam overtopping during high flow events.
- Assess the need to provide additional protective measures in the final project design based on detailed onsite geotechnical surveys in the vicinity of the proposed dam, powerhouse, and borrow areas to prevent the risk of canyon slope failures.

Aquatic Resources

- Develop a construction flow monitoring plan to ensure that Oneida development flow releases continue to be passed to the Bear River downstream of the project site during construction and initial reservoir filling.

Project Operation/Maintenance

Aquatic Resources

- Develop a hazardous substances management plan to protect water quality during project operation and maintenance.
- Provide a 20 cfs minimum flow from the Twin Lakes' Mink Creek diversion dam from April through September and 15 cfs from October through March to provide greater BCT habitat in Mink Creek than proposed by Twin Lakes, as mitigation for the loss of BCT habitat in the Bear River once the reservoir is filled.
- Develop an operation compliance monitoring plan to document compliance with requirements to (1) maintain flow releases in the Bear River downstream of its confluence with Mink Creek that are equivalent to flow releases from the Oneida development, except when refilling the proposed reservoir;
  (2) maintain minimum flows in the Bear River downstream of the Bear River

Narrows dam that are at or above 251 cfs, or inflow whichever is less, when the reservoir is refilling; (3) maintain Bear River and Mink Creek minimum flows to protect BCT; and (4) maintain project reservoir refill rates and drawdowns so as to protect aquatic and recreational resources in the proposed reservoir.

Recreation Resources

- Develop a recreation plan in consultation with stakeholders, to outline the design, construction, operation and maintenance, and long-term management policies of the proposed recreation facilities and recreation use at the project to provide a process for meeting recreation needs as they change over time.

Land Use Resources

- Develop a land management plan that includes site-specific plans for any ground-disturbing activities at the project, a discussion of ongoing project effects on lands associated with the project and management measures to protect those lands, provisions for monitoring land use, and periodic consultation with agencies and stakeholders over the term of a new license.

Below, we discuss the rationale for the staff-recommended modifications to proposed measures and the additional staff-recommended measures.

Geotechnical Factors to Be Incorporated into the Final Project Design of the Dam

Twin Lakes' preliminary design is to construct the project as a zoned embankment dam using local materials that would be compacted during construction. The downstream face of the dam would be covered with RCC to prevent erosion during floods exceeding the capacity of the service spillway. Twin Lakes is considering several measures to prevent excessive seepage at the dam and penstock.

As part of the licensing process, the Commission reviews the adequacy of proposed project facilities. After reviewing the geotechnical aspects of the preliminary design report, we conclude that, in general, the project is appropriately designed for the site. However, during final design, we recommend the additional study of the effect of potential earthquakes on the proposed dam; the further evaluation of the need for additional seepage control, both along the left abutment and along the penstock; the need for training walls along the service spillway; and the need for a stilling basin at the toe of the dam.

Canyon Slope Stability Assessment

During project construction and operation, slope failures or landslides could occur along the reservoir's canyon walls because of removal of material from the borrow sites, increased pore pressure from the reservoir, hillside runoff, heavy or frequent precipitation, roadway construction along the toe of the slope, or a seismic event. The

preliminary design report identified landslide deposits or colluvial soils, which are soils that have been deposited at the base of a slope from slope failure, along the river valley near the proposed dam site.

Additional information is needed to assess whether construction and operation of the project would be likely to result in slope failures or landslides. Therefore, we recommend that during final design Twin Lakes conduct a detailed, site-specific geotechnical investigation of the canyon and both proposed borrow sites to identify any potential slope failure sites and proposed treatment at the sites.

Protection of Water from Contaminants during Project Operation

Construction of proposed project facilities and operation and maintenance of the proposed project, including public use at project recreational facilities, could affect water quality if pollutants (e.g., fuels, lubricants, herbicides, pesticides, and other hazardous materials) and other contaminants (e.g., human waste) are discharged into project waterways.

In its draft Erosion Control Plan, discussed in section 3.3.1.2, *Geology and Soils Resources*, and filed on April 1, 2014, Twin Lakes proposes to implement BMPs included in Idaho DEQ (2005) that would protect water quality from contaminants during the construction of specific project facilities. BMPs specified in Twin Lakes draft plan that do not directly pertain to erosion control include: BMP-10, spill prevention and control, which focuses on containing potential spills by using contaminant diking, curbing, and drip pans; BMP-12, waste management, which focuses on methods to handle and store hazardous materials on-site in a clean and orderly manner; BMP-13, which focuses on reducing and preventing discharges of pollutants from concrete waste by conducting offsite washout, performing onsite washout in a designated area, and training employees and subcontractors; and BMP-14, sanitary/septic waste management, which focuses on providing convenient, well-maintained facilities and arranging for regular service and disposal.

In condition1(G), BLM requires that Twin Lakes file a hazardous substances plan for oil and hazardous substance storage, spill prevention, and clean-up with the Commission prior to planning, construction, or maintenance that may affect BLM-administered land. At a minimum, the plan would include procedures for reporting and responding to releases of hazardous substances and provisions for maintaining a cache of spill clean-up equipment sufficient to contain any spill from the project.

Twin Lakes does not propose any measures pertaining to prevention of contaminants entering surface waters during routine and non-routine project operation and maintenance. Operation and maintenance of project facilities, including recreation facilities, would entail the use of hazardous materials associated with vehicles, equipment, and maintenance (e.g., cleaning, human waste handling, lubrication, and hydraulic fluids). Many of the BMPs that Twin Lakes proposes for construction activities would also be applicable for post-construction operation and maintenance.

Specifically, implementation of BMP-10, spill prevention and control, would likely address the portions of BLM condition 1(G) that pertain to project maintenance. Developing a separate hazardous substances plan, as BLM specifies, that proactively addresses post-construction management, including storage, spill prevention, and clean-up of contaminants, as needed, for the term of a license, if one were to be issued, would protect adjacent water quality. This measure would not only benefit BLM-managed lands, but the water resources of Bear River and Mink Creek in all areas that may be affected by the project. Consequently, we recommend that Twin Lakes develop a project operation and maintenance hazardous substances management plan in consultation with BLM and Idaho DEQ that would apply to all land and project facilities within the project boundary. We estimate that the levelized annual cost of this measure would be $3,730, but the associated protection of groundwater, surface water, and public health would be well worth the cost.

DO Management Plan

Twin Lakes proposes to implement a DO Management Plan to ensure that powerhouse discharges meet state of Idaho water quality criteria for DO at all times. If DO measured downstream of the proposed dam should fall below state standards at a proposed downstream monitoring station, Twin Lakes would first open aspiration tubes that would inject air into the turbines. If aspiration does not increase DO levels to above state standards, a bypass valve in the penstock upstream of the powerhouse would be opened to release jetted water at 100 percent oxygen saturation. The amount of jetted water would be adjusted until the state standard is met. However, our analysis in section 3.3.2.2 reveals aspects of the proposed plan that are not clear, including how long air aspiration would occur before jetting water at 100 percent saturation would be implemented, how Twin Lakes would guarantee that the jetted water is at 100 percent saturation, and what additional options would be assessed if these two actions still do not result in downstream water meeting water quality standards. We therefore recommend that Twin Lakes revise its proposed DO Management Plan in consultation with Idaho DEQ, Idaho Fish and Game, BLM, and FWS to provide details of proposed corrective actions because the plan filed by Twin Lakes does not provide that detail. Options to be considered for assessment if aspirating the turbines and jetting DO saturated water to the tailwaters still do not enable water quality standards to be met could be: (1) redesigning the intake to allow selective withdrawal of water from different strata of the reservoir, and (2) installing an air or oxygen diffusion system immediately upstream of the intake structure. Conceptual costs for implementing any measures considered for future implementation should be included in the revised plan. Although our recommended revisions to the DO Management Plan would result in an estimated annual levelized cost of $6,980, the benefit of ensuring that water quality standards would be met downstream of the project would be worth this cost.

Construction Flow Monitoring Plan

As discussed in section 5.2.1, Twin Lakes proposes to release a continuous minimum flow downstream of the proposed project site equal to the minimum flow release from the Oneida development (250 cfs plus 1 cfs from leakage) during construction, reservoir fill, and operation of the proposed project. Project construction and reservoir filling activities that would affect Bear River flows would occur over about 3.5 years. Thus, aquatic resources in the immediate project vicinity would be exposed to construction-related flow effects over about a 3.5-year period, which would include a minimum of three spawning/early-rearing periods for fishes residing in this reach. Idaho Fish and Game has agreed with Twin Lakes' proposal to maintain the same minimum flow as now occurs from the Oneida development, and we also recommend that minimum flow. However, because proposed project construction would occur within Oneida Narrows Canyon, a deep, narrow canyon with limited area for construction activities, unanticipated construction events (such as rock slides or temporary blockages in flow) may interrupt river flows through the site. Although some of these events would be beyond Twin Lakes' control, measures should be taken to ensure that normal Oneida development flow releases are maintained through the construction site, including during the reservoir filling period. Therefore, we recommend preparation of a construction flow monitoring plan, developed in consultation with state and federal agencies that includes, at a minimum, the following: (1) identification of the downstream monitoring location; (2) a description of the proposed flow monitoring equipment; and (3) provisions for reporting any flow interruptions to the agencies and the Commission, a description of measures that would be taken to restore flows, and procedures that would be implemented to prevent future flow interruptions during the construction and reservoir filling period. This plan should be filed with the Commission for approval prior to the beginning of construction. We estimate that developing and implementing this plan would have a levelized annual cost of $1,030 and would be worth the cost for protecting aquatic resources in the Bear River during the project's 2-year construction period.

Mink Creek Minimum Flow

Twin Lakes proposes to institute a year-round minimum flow of 10 cfs from its Mink Creek diversion dam to establish a baseline flow for enhancement of fish, wildlife, and recreational resources in lower Mink Creek and to maintain quality BCT habitat in Mink Creek as mitigation for inundation of Bear River BCT habitat. Twin Lakes' proposed 10-cfs continuous minimum flow at its Mink Creek diversion dam would also include flow equivalent to the evaporative losses at the proposed project reservoir. Idaho Fish and Game, however, recommends establishing a higher minimum flow in Mink Creek to support "good" aquatic habitat, which would be a minimum flow release of 28 cfs at Twin Lakes' diversion dam from April to September, and 14 cfs during October through March. Idaho Fish and Game bases its flow recommendation on the Tennant Method (Tennant, 1976), which uses the hydrologic record to determine seasonally adjusted instream flow recommendations. We reviewed the results of Twin Lakes

instream flow study (Ecosystem Sciences, 2013), and calculated the percent of maximum WUA provided at the flows modeled. Our analysis indicates that peak WUA occurs at 20 to 30 cfs for adult, spawning, and juvenile lifestages, and at 10 cfs for fry. However, a relatively high percentage of maximum WUA also occurs at a flow of 10 cfs for spawning (75 percent) and juvenile (82 percent) lifestages, and a relatively high percentage (71 percent) occurs at 15 cfs for the adult lifestage. Ecosystem Sciences (2013) states that Mink Creek actually gains flow downstream of Twin Lakes' diversion dam as a result of springs and other local inflow, as did Interior and Idaho Fish and Game, and that even during the summer months when no flow is released at Twin Lakes' diversion dam, lower Mink Creek typically has a flow of 3 to 5 cfs. Thus, if Twin Lakes releases a minimum flow of 10 cfs at its diversion dam, typical flows in the lower creek would be more in the range of 13 to 15 cfs, resulting in greater habitat value than indicated by a minimum flow of 10 cfs.

Based on our analysis, a minimum flow release of 10 cfs at Twin Lakes' Mink Creek diversion dam would provide enhancement of BCT habitat compared to existing conditions in the creek. However, a flow of 10 cfs would only provide 54 percent of the maximum WUA for adult BCT, which even with some additional inflow and habitat enhancement in the lower creek may not provide sufficient habitat for adult BCT displaced from the inundated reach of the Bear River. A minimum flow of 20 cfs would provide 84 percent of the maximum WUA for adult BCT, and 100 percent of the maximum WUA for spawning and juvenile lifestages, while still providing 80 percent of maximum WUA for the fry lifestage. This would be a substantial habitat enhancement over existing conditions in the creek, offsetting some of the lost Bear River BCT habitat. Idaho Fish and Game also recommends a seasonal minimum flow, with a lower flow (14 cfs) in the over-winter period of October to March. An over-winter minimum flow of 15 cfs would provide good habitat for over-wintering juveniles (98 percent of maximum WUA) and any fry (91 percent of maximum WUA). Over-winter adult BCT habitat would be reduced at a flow of 15 cfs (to 71 percent of maximum WUA), but Twin Lakes' radiotelemetry study found fewer adult BCT over-wintering in Mink Creek compared to the mainstem of Bear River. Idaho Fish and Game's recommended April through September minimum flow of 28 cfs (close to the modeled flow of 30 cfs) would provide near-maximum WUA for adult BCT, but would result in a decrease in WUA for spawning, juvenile, and fry lifestages, compared to the 20-cfs flow. Therefore, we recommend a seasonal minimum flow in Mink Creek of 20 cfs from April through September and 15 cfs from October through March, to be released and monitored at Twin Lakes' Mink Creek diversion dam, for enhancement of BCT habitat in the creek to

partially offset the loss of BCT habitat in the Bear River.[66] We estimate that these flows would have a levelized annual cost of $104,850, but would be worth the cost for enhancing the habitat of this important species. The estimated levelized annual cost of the Idaho Fish and Game recommendation is $125,840, and the estimated levelized annual cost of the Twin Lakes' proposal is $59,910.

Operation Compliance Monitoring Plan

Outflow from the upstream Oneida development currently includes minimum flow and ramping rate requirements for protection of aquatic habitat in the Bear River, releases to meet downstream water rights, and recreational flow releases. Under Twin Lakes' proposal, as well as the staff licensing alternative, these flows would continue to be passed downstream, with the project operating such that project outflow would match reservoir inflow, with a minimum flow of 251 cfs, or inflow, except as described in the following discussion.

Although Twin Lakes does not propose to install a downstream flow measurement gage on the Bear River, its proposal suggests that it would measure flows on the Bear River downstream of its confluence with Mink Creek to demonstrate that downstream project releases are equal to inflows to the proposed reservoir, as measured at the existing gage immediately downstream of Oneida dam. Twin Lakes proposes flow monitoring for its minimum flow releases in Mink Creek immediately downstream of its Mink Creek diversion dam. Because Mink Creek has accretion flows downstream of the diversion dam (and the proposed gage site), measurement of Bear River flows downstream of its confluence with Mink Creek would include those accretion flows and, therefore, would not provide an accurate measurement of flows released by Twin Lakes at the proposed dam. If Bear River flow is gaged downstream of the pumping station but upstream of the confluence with Mink Creek, the sum of flows measured at that gage and the gage on Mink Creek would provide an accurate measurement of flows released by Twin Lakes, to ensure compliance with a minimum downstream flow release of 251 cfs, as well as matching outflow from the project relative to inflow to the project reservoir as measured at the existing gage immediately downstream of Oneida dam. Locating the Bear River gage downstream of the pumping station would also ensure that measurements do not reflect any irrigation releases from the proposed reservoir, which are immediately withdrawn at the pumping station.

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[66] A requirement to release and maintain a Mink Creek minimum flow from the Mink Creek diversion dam identifies the Mink Creek diversion dam as a project facility necessary for project operations. To ensure the Commission has the jurisdiction and authority to require the recommended minimum flows are released and maintained from Twin Lakes' Mink Creek diversion dam, the Mink Creek diversion dam would be incorporated into the project boundary.

The normal maximum reservoir water surface elevation would be 4,734 feet. During severe dry weather conditions, Twin Lakes would set a reservoir drawdown limit of 5,000 acre-feet, which corresponds to a water surface elevation of 4,718 feet. Twin Lakes estimates the 5,000-acre-foot drawdown would occur in 11 out of 20 years, and a partial drawdown (from 3,200 to 4,000 acre-feet) would occur in 2 out of 20 years. Partial drawdown elevations of 3,200 to 4,000 acre-feet would correspond to elevations of about 4,722 to 4,725 feet. The reservoir would be refilled during the winter months only after all downstream water rights are met. Although no specific recommendations pertaining to reservoir levels or drawdowns were made by any resource agency or other stakeholders, typical concerns that may arise about the effects of proposed reservoir drawdowns include fish stranding, dewatering of spawning areas or wetlands, or effects on boating. Idaho Fish and Game agrees with Twin Lakes that setting a maximum drawdown limit for reservoirs provides some benefits to fishery, wildlife, and recreation uses compared to complete drawdown. Setting a drawdown limit would provide some protection to fish and wildlife resources that would develop within the reservoir and maintain a certain level of boating and other recreational uses. Monitoring reservoir water surface elevations would maintain a record of reservoir levels and fluctuations, which would be useful to Twin Lakes in managing reservoir storage, and hydropower and irrigation operations. Such monitoring also would allow Idaho Fish and Game and other stakeholders to monitor reservoir levels in relation to environmental resources in the reservoir, including fishery and recreational resources, and whether variations in reservoir water levels may be affecting such resources. For example, fishing and boating may be feasible or desirable only within a specific range of elevations, and knowing when those elevations would occur would be beneficial to those recreating at the reservoir.

In consideration of both required streamflow and reservoir level management, we recommend development of an operation compliance monitoring plan, in consultation with the resource agencies, that would include, but not be limited to: (1) streamflow monitoring at a gage located on the Bear River immediately downstream of the pumping station, and at a location on Mink Creek immediately downstream of the Mink Creek diversion dam; (2) reservoir level monitoring; (3) determining the timing, magnitude, and rates of drawdown and refill; (4) protocols for modifying drawdown or refill schedules based on operational or environmental considerations; and (5) provisions for reporting streamflows and reservoir levels and comparing those parameters to inflow to the project as measured at the streamflow gage downstream of Oneida dam. The cost of the plan would include development of the plan and the cost of installation, operation, and maintenance of a new streamflow gage located immediately downstream of the pumping station. We estimate that the overall cost of this plan, including the new Bear River streamflow gage, would have a levelized annual cost of $14,160, but would be worth the cost for monitoring streamflows and reservoir levels for the benefit of both power generation and environmental resources.

Non-Native Fish Control Plan for Mink Creek

BCT is an important salmonid sport species that is the focus of restoration efforts by several agencies and by PacifiCorp in the project area. BCT occur in both the Bear River and in Mink Creek, and Mink Creek is believed to be one of the most important spawning tributaries for BCT. Twin Lakes' fish surveys of Mink Creek conducted in 2008 and 2009, however, show the fish community includes both native and non-native species. Most of the non-native species are brook trout (25 percent of the total catch), brown trout (16 percent of the total catch), and rainbow trout (1 percent of the total catch). The only native salmonid in Mink Creek is BCT (9 percent of the total catch), which along with brook trout was collected at all surveyed sites. The proposed project would eliminate about 4.5 miles of mainstem Bear River BCT rearing habitat, and Twin Lakes' primary mitigation for the loss of Bear River BCT habitat would be to improve BCT habitat within Mink Creek by providing a continuous minimum flow of 10 cfs, as well as other potential but not currently proposed measures such as the control of non-native species, and removing barriers to fish movement within the creek (see below). Because Mink Creek would be the primary mitigation for the loss of Bear River habitat, it is important to consider the need for controlling non-native fish populations there so that the proposed habitat enhancement would benefit BCT to the maximum extent possible. Habitat enhancement would also benefit the non-native salmonids, and if these non-native species are not controlled, they would continue to adversely affect the native BCT.

Non-native fish may hybridize, compete for habitat and food resources, or prey directly upon BCT. BCT do hybridize with rainbow trout; however, no hybridization has been documented in Mink Creek or its tributaries, as all rainbow trout stocked in the Bear River by Idaho Fish and Game are sterile. Threats to BCT within Mink Creek are more likely from competition with and predation by brook trout and brown trout, and to a lesser extent smallmouth bass and walleye. Twin Lakes' proposal to cooperate with the agencies on the future control of non-native fish species in Mink Creek would likely be consistent with Idaho's Fish and Game's management plan for BCT, but Twin Lakes provides few details of what the measures would entail, what entity would be responsible for the non-native species control, or the implementation schedule for related control measures.[67] Developing a non-native species control plan, in consultation with the resource agencies, that includes an implementation schedule for the duration of the license term, would require Twin Lakes to take specific actions to control non-native species in Mink Creek and ultimately benefit native species such as BCT. Controlling non-native species would allow the proposed habitat enhancements to provide maximum benefit to BCT, and in turn benefit the Bear River fluvial population of BCT, which is

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[67] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to implement non-native species control in Mink Creek.

known to spawn and rear in Mink Creek and would be adversely affected by the proposed project. Assuming control efforts would use backpack electrofishing, and would be conducted during years 1-10 and every third year thereafter for the duration of the license, we estimate that Twin Lakes' implementation of this plan would have a levelized annual cost of $15,290, but this would be worth the benefit of enhancing the BCT population in Mink Creek and the Bear River.

Fish Barrier Removal Plan for Mink Creek

As previously described, the proposed project would eliminate about 4.5 miles of the remaining 10 miles of mainstem Bear River BCT rearing habitat downstream of Oneida dam,[68] and Twin Lakes' primary mitigation for the loss of Bear River BCT habitat would be to improve BCT habitat within Mink Creek by providing a continuous minimum flow of 10 cfs, along with other potential measures such as the control of non-native species (see above) and removing barriers to fish movement within the creek. Removing instream barriers to fish migration would allow BCT to use more of the Mink Creek habitat and would benefit the Mink Creek and Bear River BCT population by partially offsetting the loss of BCT habitat due to project construction. In response to Twin Lakes' proposal to cooperate in the planning and eventual removal of upstream passage barriers in Mink Creek,[69] Idaho Fish and Game comments that Twin Lakes does not provide a plan for the time period, funding responsibility, or water user agreements needed for removal of any fish passage barriers in Mink Creek. Removal of fish passage barriers would help facilitate migrations and dispersal of fish, and would rejoin previously fragmented habitats. The eventual removal of fish passage barriers in Mink Creek would provide improved passage for all fish species, but could also result in the introduction and establishment of non-native species in areas upstream of any current barriers to non-native species. If greater numbers of non-native species (primarily brook trout and brown trout) gain access to a greater length of Mink Creek, they may compete with and prey upon BCT, and negate the benefits of increased habitat for BCT.

Under current conditions, not all fish passage barriers in Mink Creek are year-round barriers. For example, Twin Lakes' habitat surveys in Mink Creek identified one barrier, a natural waterfall, 1.33 miles upstream of the confluence with the Bear River. Radiotelemetry data of tagged BCT indicate that this barrier was successfully passed during the spring spawning season, which suggests upstream passage for BCT at this barrier is flow dependent and likely limited primarily during the summer, low-flow

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[68] Additional Bear River habitat is available downstream of Oneida dam that may occasionally be used by BCT, but the approximately 10 miles of the Bear River immediately downstream of Oneida dam has the better salmonid habitat value.

[69] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to remove fish passage barriers in Mink Creek.

season because of insufficient water depth. In addition, there are potential benefits of maintaining some fish passage barriers, with a common fishery management approach to protect native salmonids in streams where they are competing with and being preyed upon by non-native salmonids (e.g., smallmouth bass) is to isolate the native salmonids above impassable barriers.

Although improvement of fish passage within Mink Creek would likely have some benefits, we do not have enough information on how Twin Lakes' proposal would actually be implemented, and how improved passage may affect the existing fishery to be able to analyze the benefits of this proposed measure. Development of a fish barrier removal plan in consultation with the resource agencies that surveys, identifies barriers for target species, prioritizes removal, outlines removal timing, and addresses water user agreements would be needed prior to actual removal efforts. If a recommendation to remove or modify existing upstream fish passage barriers should be included in such a plan, Twin Lakes would be responsible for implementing any such measure upon Commission approval of the plan. Removing or modifying fish passage barriers in Mink Creek would allow BCT to use more of the habitat in Mink Creek, and combined with an enhanced flow regime and control of non-native species, would benefit the Bear River fluvial population of BCT by partially offsetting the loss of BCT habitat in Bear River due to the proposed project. We estimate that the levelized cost for developing a fish barrier removal plan for Mink Creek would be $480, and would be worth the cost as it could serve as partial compensation for loss of mainstem BCT habitat from reservoir inundation. However, because the specific details of the plan (which barriers and how many) are not available at this time, we are unable to estimate a cost for implementing the plan.

Fish Screening

Fisheries surveys and radiotelemetry studies conducted by Twin Lakes in Bear River and Mink Creek found that the current fish community in the Bear River in the reach downstream of the proposed project consists of native and non-native cold- and warmwater species. Telemetry studies also documented that BCT are entrained at Twin Lakes' Mink Creek diversion structure and are then transported to Twin Lakes' irrigation reservoirs.[70] Twin Lakes proposes to cooperate with the agencies in the planning and eventual installation of a fish screen to prevent entrainment of fish at the Twin Lakes' diversion structure on Mink Creek.[71] However, Twin Lakes does not identify what entity would be responsible for the design or installation and maintenance of the fish screen or

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[70] One of 16 adult BCT (6.3 percent) tagged in 2009 and 2010 was documented in a Twin Lakes' reservoir, and was later confirmed as a mortality.

[71] Twin Lakes clarified in its letter filed with the Commission on January 23, 2015, that it is not currently proposing to install a fish screen at its Mink Creek diversion.

when the measure would be implemented. Idaho Fish and Game recommends that Twin Lakes be required to fund, design, and construct fish screens at the Twin Lakes' Mink Creek canal intake and the proposed pumping station intake (see below) within a specified period of time, in consultation with Idaho Fish and Game, to prevent the entrainment of BCT and nuisance species into Twin Lakes' canal system.

Installing a fish screen at Twin Lakes' Mink Creek diversion would reduce fish entrainment under existing operations in Mink Creek, and would prevent fish (including BCT) from entering the Twin Lakes irrigation system and the out-of-basin transfer and distribution of these fishes to other water bodies. A fish screen at Twin Lakes' Mink Creek diversion would also increase the likelihood of the return of BCT to the higher quality rearing habitat in the Bear River. Upstream habitat improvement structures installed downstream of the Mink Creek Hydroelectric Project have been successful in increasing the production of BCT in upper Mink Creek. Improvements in upstream fish passage and non-native species control if implemented by Twin Lakes should also improve the BCT production in Mink Creek, which is already considered one of the primary BCT spawning tributaries of the Bear River. If downstream-migrating BCT move during lower flow periods of the year when Twin Lakes would be withdrawing most of the Mink Creek flow for irrigation, this would substantially increase the potential for fish entrainment and the loss of these fish from the Bear River population. A fish screen at Twin Lakes' Mink Creek diversion would mitigate this potential effect. As we previously described, because Mink Creek is Twin Lakes' primary mitigation location for the loss of BCT fluvial habitat in the Bear River, protecting BCT from entrainment at Twin Lakes' Mink Creek diversion would allow the benefits of the proposed mitigation to be fully realized.

Twin Lakes proposes to install 1.75-millimeter wedge wire screening on the proposed Bear River pumping station, to prevent entrainment of both native and non-native fish species into Twin Lakes' irrigation system. Idaho Fish and Game agrees with this proposal but recommends that Twin Lakes be required to fund, design, construct, and install fish screens at Twin Lakes' proposed Bear River pumping station in consultation with Idaho Fish and Game, to prevent the entrainment of BCT and nuisance species into Twin Lakes' canal system. Twin Lakes' conceptual fish screen plan to install wedge wire screening at the proposed pumping station should be effective in minimizing entrainment of both BCT and nuisance fish from the Bear River and their introduction into Twin Lakes' storage reservoirs, which are populated primarily by game fish. However, few details of this plan have been provided by Twin Lakes, and the final plan for pumping station screening would benefit from input from Idaho Fish and Game and other resource agencies with fish screen design experience.

Therefore, we recommend that Twin Lakes design, install, and maintain the Mink Creek diversion fish screen and finalize the design of the pumping station fish screen

after consultation with the resource agencies.[72] We estimate a levelized annual cost of $6,090 for designing, constructing and maintaining the Mink Creek diversion screen (cost of the pumping station screen is included by Twin Lakes in the overall construction cost). This would be worth the cost for further protection of the Bear River Basin BCT and native fish populations.

Revegetation and Noxious Weed Control Plan

Project construction would have unavoidable effects on upland vegetation. Twin Lakes proposes to implement its Noxious Weed Prevention and Revegetation Plan to speed the revegetation of disturbed areas and minimize the spread of invasive plant species. Revegetation measures and details proposed for inclusion in the detailed revegetation plan include site treatments to restore soil and drainage conditions and consultation to determine appropriate plant species and planting densities. Twin Lakes' proposed plan also includes measures for monitoring revegetated sites using photo surveys and a minimum monitoring period of 3 years, followed by additional monitoring, if necessary. However, the current plan does not provide any detail about number of photo points, what specific vegetation data would be collected, or what criteria would determine success or failure.

Idaho Fish and Game recommends that Twin Lakes establish goals and criteria by which to judge the success of revegetation efforts. In addition to general species composition and abundance information collected during photo point surveys, Idaho Fish and Game recommends that Twin Lakes document the success of the plantings relative to the goals and criteria established by the technical working group. Additionally, Idaho Fish and Game recommends that the final revegetation plan include a discussion of any irrigation needed to expedite plant growth, including documentation of existing water rights and those necessary for ensuring survival of plantings. Idaho Fish and Game further recommends that the plan include a description of any provisions for a site steward to oversee management of the sites.

The degree to which a photo provides valuable information depends on the cover type in question and the size of the restoration site. Small areas of disturbance in open cover types may only require one photo point, with 360 degree coverage. On the other hand, disturbance areas several acres in size within forested cover would require multiple photo points to provide adequate coverage. Typically, revegetation success criteria include metrics such as percent survivorship for planted vegetation, cover percentages by

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[72] The required installation and maintenance of the Mink Creek diversion fish screen would render the fish screen a project facility necessary for project operations. To ensure the Commission has the jurisdiction and authority to require the installation and maintenance of the fish screen, the screen and its supporting structure would be incorporated into the project boundary.

species in seeded areas, and/or vegetation cover in multiple vertical zones. Criteria developed based on existing vegetation community structure in areas of proposed disturbance, or based on reference sites with similar vegetation structure are preferred because they are more likely to reproduce existing stand structure. Ensuring criteria are met for two successive growing seasons after initial success criteria are met would help ensure revegetation efforts are sustainable and not temporary results of an abnormally wet growing season.

Although upland vegetation in the project vicinity is generally tolerant of semi-arid conditions, newly transplanted plants and sewn seed do better when water is readily available during the weeks after planting. Twin Lakes' draft Erosion Control Plan proposes hydromulching in some locations, but it does not address irrigation of plantings in its proposed Noxious Weed Prevention and Revegetation Plan. We expect irrigation would be an integral component of revegetation success; however, the availability of water for irrigation is unclear. Including a discussion of the need for water supplements and documentation of existing water rights that would be used for any proposed watering of plantings in the final plan would ensure that water is available.

The proposed plan for revegetation activities includes varied time schedules for activities at different sites, plantings over a variety of cover types, and a significant monitoring effort. The final Noxious Weed Prevention and Revegetation Plan should include designation of a site steward to help ensure successful development of replacement habitat. These elements of the final plan would ensure that revegetation efforts are successful and corrective actions (e.g., adjustment of irrigation amounts, modification of barriers or signage to ensure revegetation sites remain undisturbed), if needed, are implemented in a timely manner.

Therefore, we recommend Twin Lakes revise the proposed Noxious Weed Prevention and Revegetation Plan to include the following provisions and file the revised plan with the Commission for approval: (1) identify proposed photo points for monitoring upland revegetation activities; (2) base criteria for revegetation success on existing vegetation community structure in areas of proposed disturbance or at reference with similar structure; (3) ensure criteria for successful revegetation of upland areas are met for two successive growing seasons; (4) discuss any irrigation needed to expedite plant growth; (5) document existing water rights and those necessary for ensuring survival of plantings; (6) describe any measures to be used to enhance existing wildlife habitat; and (7) provide for a site steward to oversee management of the sites. Although the estimated levelized annual cost for this measure would be $5,060, it would increase the potential for revegetation efforts and noxious weed management to be successful and would benefit local wildlife populations, and we conclude that this benefit would be worth the cost.

Riparian Habitat Mitigation

Project construction and operation would result in the permanent loss or conversion of 90 acres of riparian habitat. Construction activities would temporarily disturb an additional 2 acres. As discussed in section 3.3.3.2, *Terrestrial Resources*, Twin Lakes proposes a Conceptual Mitigation Plan for enhancing and restoring riparian habitat. The plan includes provisions for a 10-cfs minimum flow release into Mink Creek; riparian plantings at the Condie and Winder reservoirs to enhance up to 23 acres of emergent wetland and 26 acres of woody riparian habitats; restoration and enhancement of riparian and wetland habitat at the Ben Johnson Family Farm site; and a study to determine the feasibility of constructing a water treatment wetland on a 10-acre site near the confluence of Battle Creek and Bear River to enhance water quality in Battle Creek and the Bear River. Additionally, Twin Lakes expects about 15 acres of wetlands to develop around the proposed Bear River Narrows reservoir through natural colonization. As discussed below in section 5.2.3, *Other Measures Not Recommended by Staff*, we do not believe that development of the Ben Johnson Family Farm site or at Battle Creek for mitigation of impacts to terrestrial resources is viable and thus we do not evaluate it further in this section.

Interior comments that the shoreline areas proposed as sites where Twin Lakes would establish new riparian habitat are not likely to provide in-kind replacement for the river floodplain riparian habitats that would be inundated by the new reservoir. Interior notes large cottonwood trees and galleries like those currently adjacent to the Bear River rely on periodic flooding to regenerate. These trees would likely not grow well on the steeper and drier soils upslope of the new reservoir shoreline. Interior also notes that any planting of riparian forest vegetation would require at least 50 years to function in the same manner as the mature riparian forest that would be lost.

Riparian habitats provide a variety of beneficial ecological functions in the landscape. Riparian vegetation helps prevent erosion, improves water quality, and moderates water temperature. The dynamic nature of riverine systems, including variable flows over the course of the year, and variable patterns of sediment erosion and deposition, creates a high complexity of microsite conditions within the riparian zone. This results in spatially diverse vegetation structure and increased species diversity of both vegetation and wildlife species. As such, while these areas may constitute a small percentage of total landscape area, they provide disproportionate values for habitat and ecologic function relative to the adjacent uplands. Specifically along the Bear River, where land use has limited the extent of native riparian communities downstream of the Soda development, Oneida Narrows provides habitat values not readily found elsewhere along the lower Bear River. The proposed project would inundate 20 percent of broadleaf riparian and 72 percent of grass/forb riparian area within the project study area, including 47 acres of palustrine wetland, and 41 acres are upland riparian habitat. Therefore, we find riparian mitigation is needed to offset project effects.

Twin Lakes' proposed measures, excluding measures at the Ben Johnson Family Farm site, would result in some restoration or enhancement of riparian communities outside of the project boundary. Planting riparian trees at Winder and Condie reservoirs would increase riparian cover in these areas. It would take up to 50 years, however, before this vegetation plantings mature and resemble existing conditions along the Bear River and replace the structure and wildlife value of the lost habitat. Increasing flows in Mink Creek during summer periods would reduce potential for drought stress and benefit existing vegetation but would provide little increase in functional value of the habitat since the flows would unlikely increase recruitment of native riparian species. In addition, some riparian vegetation would be expected to develop along the reservoir Bear River narrows reservoir shoreline. In terms of natural development of habitat along the proposed reservoir, there would be a time delay between the flooding of existing wetlands and development of soil characteristics and seed banks needed for natural regeneration of wetlands communities in areas currently supporting upland vegetation. Plantings along the new reservoir shoreline, as recommended by staff, would facilitate the reestablishment of wetlands along the shoreline. Development of woody species would take longer than herbaceous species. Reservoir fluctuations may limit the extent of the riparian zone, particularly in areas with steep slopes. Overall, long-term impacts to riparian habitat would result.

Because much of the Twin Lakes' proposed measures lack specifics, final habitat development measures are needed. Therefore, we recommend Twin Lakes, in consultation with FWS, BLM, and Idaho Fish and Game, develop a terrestrial mitigation plan that includes, at a minimum, the following: (1) a schedule for mitigation actions; (2) provisions to monitor for natural reproduction of planted riparian trees and incorporate additional plantings, if necessary, over the term of a license to mitigate for lack of natural regeneration; (3) provisions to include riparian plantings along the entire reservoir perimeter to facilitate generation of wetland habitats in the 15 acres where Twin Lakes expects suitable habitat to develop; (4) success criteria for riparian enhancements and restoration sites, based on desired conditions to replace functional values of inundated areas; (5) provisions to enhance 49 acres of broadleaf forested fringe wetland riparian habitat at the applicant's Condie and Winder reservoirs, including irrigation methods; (6) provisions to monitor plantings to ensure success criteria are met; and (7) provisions for annual reporting of monitoring and planting activities.

Development of a terrestrial mitigation plan would ensure proposed riparian restoration and enhancement measures would partially mitigate for the effects of project construction and operation on these resources. Our recommended provisions would provide for reduced time lags between project effects and restored habitat function in riparian areas by requiring planting of wetland species around the new reservoir after suitable soil conditions develop and not wait for natural colonization of wetland species and provide for conservation of existing resources in the project vicinity. For these reasons, we conclude that the benefits of implementing a terrestrial mitigation plan

addressing riparian habitat mitigation with our recommended components would be worth the estimated levelized annual cost of $5,610.

Although we believe that Twin Lakes' proposed measures would substantially fall short of mitigating impacts to riparian habitat, particularly given the infeasibility of measures at the Ben Johnson Family Farm, we have been unable to identify sites that could be acquired and managed to provide riparian and associated wildlife habitat. No stakeholder has provided any options for habitat development. It is unlikely that replacement habitat can be found within the general project area. Further, absent site-specific information on site conditions, availability of water, existing and potential wildlife use, conflicts with other land uses, and location in reference to the projects, it is not possible to develop measures to offset project effects to this valuable and scarce resource. Therefore, the project would result in the unavoidable loss of at least 26 acres of riparian vegetation assuming that 49 acres would develop along Condie and Winder reservoirs and 15 acres along the Bear River Narrows reservoir. Unavoidable impacts would be greater if habitat development is not 100 percent successful and factoring in the lag time for the habitat to develop to match existing habitats that would be lost.

Shoreline Buffer

The proposed project would affect about 658 acres of land from a combination of inundation for the reservoir and new dam and powerhouse, new roads, and other project infrastructure. The proposed dam and reservoir would affect land held for conservation and wildlife protection by BLM land management plan direction, the Bear River Project license, and the Bear River settlement agreement.

Twin Lakes proposes to create a 100-foot shoreline buffer around the reservoir that would total 124 acres, 88 acres of which BLM and PacifiCorp currently manage for conservation purposes.

The purpose of the existing conservation land is to protect wildlife habitat and connectivity in the river corridor and surrounding land, the scenic values of Oneida Narrows from further development, and to preserve recreational values along the river. The proposed reservoir would inundate existing conservation land and bisect the remaining currently contiguous conservation land. The proposed project would have adverse effects on plants and wildlife by permanently separating habitat areas, limiting connectivity across the Bear River, removing riparian vegetation that provides habitat corridors parallel to the river, and changing the habitat characteristics from riparian riverine plant community to upland reservoir ecosystem.

The remaining conservation land in the Bear River Project would be fragmented by the new reservoir. It would no longer serve to protect the riverine resources, scenic values, and wildlife values for which the conservation land was originally established in the license and settlement agreement for the Bear River Projects, which would prevent PacifiCorp from complying with the current requirements of its license and settlement agreement. PacifiCorp could try to amend its license and remove the remaining

conservation land if it no longer serves project purposes. However, inundating 222 acres of PacifiCorp land within the proposed project boundary and removing an additional 28 acres of PacifiCorp land from conservation status would create an opportunity for PacifiCorp to no longer make the effort to conserve these adjacent lands but to seek economic benefits from these lands by allowing private or commercial development on its land near the proposed reservoir. Private or commercial development, especially on the north end of the reservoir, would further diminish scenic resources, may contribute to shoreline erosion from development on steep slopes, and would further eliminate wildlife habitat.

In general, project shoreline buffers include open space necessary to encourage riparian regrowth, stabilize the shoreline, connect habitats, provide setbacks for large mammals and nesting birds, protect natural landscapes, establish wetlands, and allow recreation shoreline use. Buffers also contribute to maintaining a natural setting, limiting changes caused by the project or development on the visual resources, discouraging private and commercial development near the shoreline, and directing public use away from cultural sites. We find that the proposed 100-foot shoreline buffer would provide some benefits, but at a disproportionately smaller scale as compared to the adverse effects from the proposed project. While the 124-acre buffer zone would protect existing wildlife habitat representing about 20 percent of the 658 acres lost as a result of the project, without extensive management the buffer zone would maintain but not enhance the value of the existing habitat.

Large mammals common in the project area, including mule deer and elk, would benefit from larger setbacks than the proposed 100 feet, especially in open sage meadows lacking visual barriers to human activity. To minimize project effects, the reservoir banks could function as wildlife corridors, similar to existing conditions. Appropriate corridor widths to support this function for deer and elk range from 330 feet to 1.5 mile (Bentrup, 2008). As discussed in section 3.3.3.2, *Terrestrial Resources,* we expect the riparian vegetation around the reservoir to develop slowly and initially provide limited cover for large mammals. Additionally, the project would remove habitat for a variety of special status wildlife species including bald eagle, rock squirrel, mule deer, Townsend's big-eared bat, California myotis, and northern leopard frog.

A 100-foot-wide conservation buffer around the reservoir would provide relatively little onsite mitigation for losses to these habitats. As we discuss in section 3.3.3.2, increasing the conservation buffer from 100 feet to 300 feet would provide protection for an additional 0.7 acre of broadleaf riparian forest, 1.3 acres of Douglas-fir/limber pine (none of which would be included in the 100-foot-wide buffer), 18.9 acres of exposed rock, 83.5 acres of foothills grassland, 93.5 acres of maple forest, and 32 acres of Utah juniper. Increasing onsite conservation efforts, as opposed to relying on potential offsite restoration or enhancement, would provide protection for individuals forced to vacate inundated habitat and benefit local populations that are unlikely to migrate to the other proposed conservation areas.

If the project is constructed, the views of Oneida Narrows would be from the north, looking down the reservoir toward the canyon. For scenic resources, a shoreline setback of about 300 feet in this area would result in development occurring outside of the primary viewing corridors near the upstream end of the reservoir. The setback would help ensure that visitors arriving on the proposed new access road would have unimpaired views down the canyon, preserving as much of the existing visual resources as possible.

The conservation values of land inundated would be permanently lost. The value of the conservation land not inundated by the project may diminish to the point of having little value. Based on this uncertainty, the benefits that larger buffers provide wildlife for traveling around the proposed reservoir, the need to establish slow-growing riparian vegetation along the new reservoir shoreline, and the desire to protect the remaining visual resources, we recommend an increase in the shoreline buffer from the proposed 100 feet to 300 feet. Twin Lakes' proposed buffer would encompass 124 acres, of which about 88 acres are currently managed for conservation along the river corridor. As such, the project would result in a net loss of 269 acres of conservation land currently protected within the proposed project boundary. The staff-recommended 300-foot shoreline buffer would encompass about 380 acres, which is about half the land area that would be disturbed by the proposed project. The staff-recommended shoreline buffer would not offset all of the project-related loss of conservation values, because much of the existing value relies on characteristics of the lands proposed for inundation; however, it would establish protections for the remaining natural landscape, ecosystem functions, and conservation values, consistent with current conservation efforts, through the term of any license. We estimate the levelized annual cost of this increased buffer around the proposed reservoir would be $53,160, but the increased protection of remaining wildlife habitat from future development and the preservation of the remaining aesthetic attributes of Oneida Narrows would be worth the cost.

Special Status Wildlife Habitat Mitigation

Twin Lakes proposes to inundate a 4.5-mile section of the Bear River and the associated riparian corridor. This riparian area provides a travel corridor through the landscape and provides habitat for a variety of special status wildlife and game species (see table 3-37) including northern leopard frog, bats, mule deer, elk, wild turkey, bald eagle, rock squirrel, and trumpeter swan. Twin Lakes proposes, as part of its Conceptual Mitigation Plan, habitat enhancement and restoration at Mink Creek, Condie and Winder reservoirs, and the Ben Johnson Family Farm site to mitigate for losses in habitat for all species mentioned except for bats and wild turkey. As discussed in section 5.2.3, *Other Measures Not Recommended by Staff*, we do not believe that the use of the Ben Johnson Family Farm site for habitat mitigation would be feasible and do not recommend its implementation. Idaho Fish and Game provided recommendations for all species, including bats and wild turkey, with stated acreages needed to mitigate for proposed effects.

Idaho Fish and Game notes that the mitigation acres could be protected through conservation easements or by purchase of property that is then transferred to a management agency for appropriate protection and management. The Shoshone-Bannock Tribes recommend that mitigation lands be held in trust by the United States on behalf of the tribes, or increasing acres held in fee by the tribes, to benefit fish and wildlife. The project area provides a relatively natural corridor along a river dominated by agriculture, water storage, and hydroelectric energy production for the majority of its length. As such, the Oneida Narrows section of the Bear River is a landscape component of high value for wildlife and provides habitat functions not easily found elsewhere along the river. These functions include high quality fawning habitat for mule deer; roosting, nesting, and foraging habitat for bald eagle; breeding sites for northern leopard frog; winter habitat for wild turkey and trumpeter swan; roosting sites for bats; and burrowing and foraging habitat for rock squirrel. We discuss each resource below.

Bald eagle. Based on Twin Lakes' study, the proposed project would inundate broadleaf riparian habitat consisting of mature cottonwood stands, eliminating one active bald eagle nest site (the only active site in the study area) and 59 acres of nesting habitat and about one third of the observed winter roost sites in the study area, which extends from the southern end of the proposed project to the confluence of Cottonwood Creek and the Bear River about 10 miles to the north. Because existing vegetation along the proposed reservoir elevation is devoid of the tall, supercanopy trees bald eagles prefer, all existing eagle nesting habitat in the reach would be removed. Creation of the reservoir would increase water depth, allowing fish to swim below the reach of foraging eagles. The project would turn the river stretch that provides winter fishing opportunities for eagles into a slack-water reservoir that would be covered with ice during the winter months, thus eliminating winter foraging opportunities for eagles. Outside the study area, there is little bald eagle habitat in the 80 miles between Great Salt Lake and Soda reservoir. Therefore, the project would have substantial adverse effects on bald eagles on the lower Bear River.

Twin Lakes' proposed measures would provide for three nesting platforms for eagles. Twin Lakes proposes to plant riparian species to mitigate for losses to broadleaf riparian cover types, but these plantings would require multiple decades to provide any benefit to bald eagles. Idaho Fish and Game recommends that Twin Lakes acquire a mitigation parcel that provides similar habitat, in equal or greater quality and quantity to that lost, to mitigate for the net loss of important bald eagle nesting, roosting, and foraging habitat. Idaho Fish and Game recommends the land include at least 5 miles of free-flowing riverine habitat along the Bear River and at least 70 acres of currently established cottonwood riparian habitat. Idaho Fish and Game's recommendation for conservation of existing cottonwood forest would be an effective method for partially offsetting project effects on bald eagles. Based on our review of aerial imagery along the Bear River upstream and downstream of the proposed project, it is not clear that a 5-mile stretch of river with 70 acres of cottonwood woodland exists outside of the proposed project area. However, unless Twin Lakes develops measures to conserve and enhance

existing mature cottonwood stands in proximity to suitable bald eagle foraging habitat, and creates additional habitat through planting of native riparian trees, the project would have adverse effects on this species.

Migratory birds. The proposed project would inundate up to 200 acres of nesting and brood-rearing habitat (about 95 percent of the existing habitat in the study area) and impound 4.5 miles of riverine, ice-free, winter foraging and resting habitat for migratory birds. Twin Lakes would install nest boxes in the Deep Creek drainage to enhance landbird habitat. As mitigation for effects on birds, Idaho Fish and Game recommends that Twin Lakes provide additional suitable habitat for all lifestages of water birds of equal or greater quantity and quality including at least 200 acres of nesting and brood-rearing habitat that provides ice-free winter foraging and nesting areas equivalent to about 5 miles of riverine habitat. In addition, Idaho Fish and Game recommends that at least 132 acres of wetland and riparian habitat as well as grassland habitat should be provided for landbirds. Nesting box installation is an acceptable mitigation measure used to provide beneficial habitat enhancement to affected avian species. However, Twin Lakes does not provide details in its Conceptual Mitigation Plan of what species would be targeted with the nest box installation, nor does it identify the total number of nest boxes it would install. Without this information, we cannot determine whether these boxes would be used by targeted species with any success unless they are placed in association with other suitable habitat features for that specific species. Additionally, nest boxes alone do not provide foraging or rearing habitat and would not offset the inundation of these habitats. As such, development of 132 acres of wetland and riparian habitat as well as grassland habitat for land birds and provisions to acquire at least 200 acres of nesting and brood-rearing habitat for waterfowl, water birds, and trumpeter swan along with 4.5 miles of ice-free winter foraging and resting areas, would be needed to offset project effects.

Wild turkey. Based on Twin Lakes' study, the proposed project would inundate or otherwise remove 435 acres of wild turkey habitat, including 174 acres of excellent quality and 160 acres of good quality habitat. Wild turkey is an Idaho upland game species. Twin Lakes states the existing overall low turkey population density implies that roosting turkeys could easily relocate to other areas without crowding other birds. Twin Lakes does not propose any species-specific mitigation. The Idaho Fish and Game Upland Game Management Plan includes management directives to: (1) maintain or improve available habitat; and (2) emphasize recreational hunting, but promote non-consumptive uses as well. Idaho Fish and Game, therefore, recommends that Twin Lakes provide at least 435 mitigation acres of equal or greater quantity and quality to mitigate for the loss of habitat to support wild turkey populations and for the loss of access for public hunting opportunities. Inundation of wild turkey habitat, without mitigation, would be inconsistent with the Idaho Fish and Game Upland Game Management Plan. Although additional suitable habitat for wild turkey is available in the project vicinity, outside of the project area, the proposed project would remove large sections of contiguous habitat that functions as a travel corridor through the local area. As such, the

project would affect the local wild turkey population. At least 435 mitigation acres of equal or greater quality would be needed to mitigate the loss of habitat to support wild turkey populations. The 300-foot-wide conservation buffer around the reservoir included in the staff licensing alternative, and discussed further below, would contain habitat to meet some of these requirements. However, the conservation of existing habitat would not offset the effects of 435 acres of habitat lost to inundation.

Bats. Based on Twin Lakes' analysis, the proposed project would eliminate about 59 acres of broadleaf riparian and 1 acre of exposed rock that provides bat foraging and roosting habitat. Idaho Game and Fish notes that all bats found in Idaho are state-protected non-game species. Twin Lakes' bat surveys recorded more than 4,000 echolocation sequences and captured 38 bats, indicating existing habitat is occupied by at least six bat species. Twin Lakes does not propose any mitigation measures specific to bats. Idaho Game and Fish recommends Twin Lakes provide suitable roosting and foraging habitat in quantity and quality equal to or greater than that lost to inundation. While some measures in the Conceptual Mitigation Plan, including proposed riparian tree plantings, could provide long-term benefits for bats, it would take decades for these trees to develop suitable size for roosting bats. Therefore, the proposed Conceptual Mitigation Plan does not provide mitigation for effects on bats. To mitigate for the effects of habitat inundation, Twin Lakes would need to protect or create 60 acres of bat foraging and roosting habitat. This measure would mitigate the long-term loss of bat habitat caused by project construction. The 300-foot-wide conservation buffer around the reservoir included in the staff licensing alternative, and discussed further below, would provide an additional 18.9 acres of mitigation for project inundation of exposed rock that would contribute to this acreage. Protection and enhancement of existing mature cottonwood stands, as recommended in the previous bald eagle discussion, would also contribute to our recommended mitigation acreage for bats.

Northern leopard frog. Based on Twin Lakes' analysis, the proposed project would eliminate 264.8 acres of northern leopard frog habitat, a BLM watch species and Idaho protected non-game species. This loss equates to about 58 percent of the predicted northern leopard frog habitat in the study area. Twin Lakes' Conceptual Mitigation Plan states that an estimated 29 acres of new potentially suitable northern leopard frog habitat would be developed along the shores of the new reservoir and Mink Creek. The Conceptual Mitigation Plan also suggests the possibility of creating additional acres of wetland associated with Battle Creek. Twin Lakes does not propose specific mitigation for the loss of northern leopard frog habitat that would be inundated by the proposed reservoir, including three breeding sites documented along the river near Redpoint Campground.

Idaho Game and Fish recommends Twin Lakes protect or create about 264.8 acres of northern leopard frog habitat. This level of protection would be needed to offset project effects on northern leopard frog habitat. Distribution of these acres should emphasize proximity to projected affected northern leopard frog populations, or existing populations in the project vicinity. Transport of individuals from project-affected habitat

to enhanced or restored habitat should also be considered. Although this measure would mitigate for effects on northern leopard frog, it would not offset the overall net loss of northern leopard frog habitat. The 300-foot-wide conservation buffer around the reservoir included in the staff licensing alternative, and discussed further later in this section, could contribute to this acreage if suitable conditions are promoted.

Rock squirrel. Twin Lakes' rock squirrel habitat assessment (Ecosystem Sciences, 2009c) indicates the proposed project would inundate 19 acres of rock squirrel burrowing habitat. However, Twin Lakes' model for rock squirrel habitat only evaluates burrowing habitat not foraging habitat. In total, Twin Lakes estimates 237.8 acres of permanent and 64.9 acres of temporary loss/change to upland vegetation used by the rock squirrel (foothill grassland, maple, agriculture, Utah juniper, and disturbed low cover classes). Idaho Fish and Game recommends that Twin Lakes use the rock squirrel model to reevaluate potential losses to rock squirrel habitat, recognizing the value of all rock squirrel habitat and not limiting the model to burrowing habitat. To mitigate for effects on this species, Idaho Fish and Game recommends Twin Lakes provide adequate upland habitat to support rock squirrels. Therefore, to offset project effects, Twin Lakes would need to protect or create 237.8 acres of rock squirrel habitat, including 19 acres of burrowing habitat in proximity to existing rock squirrel populations. The 300-foot-wide conservation buffer around the reservoir included in the staff licensing alternative, and discussed further below, would provide 3.6 acres of broadleaf riparian, 148.5 acres of maple, 38.3 acres of Utah juniper, 123.1 acres of foothills grassland, and 26.3 acres of exposed rock cover types to partially fulfill the recommended mitigation.

Mule deer. According to Twin Lakes' study, the proposed project would inundate or otherwise remove 435 acres of mule deer habitat, most of which is considered to be good to excellent quality habitat. A large amount (>8,000 acres) of equivalent quality summer and winter mule deer habitat is available within 1 mile of the inundation area. Although most of the upland habitat currently existing at elevations above the proposed reservoir would remain unchanged by the project, about 72 percent of this available fawning habitat would be lost with proposed project construction. As such, net loss of high quality fawning habitat would constitute the most significant potential adverse effect on mule deer from the project. Deer would be displaced to lower quality habitat on agricultural land and grasslands downstream of the new reservoir or in upland areas adjacent to the new reservoir.

In addition to habitat loss, the proposed inundation may inhibit or create a barrier to movement of big game between habitats on either side of the river. Although Twin Lakes provides marginal predictions of project effects on game populations, it is evident that the proposed project could affect wildlife migration corridors for species other than deer and elk, such as moose or wild turkey, because they would not likely be able to freely and efficiently move through the project area during migratory periods. Although Twin Lakes' proposed fencing plan would serve to reduce Bear River crossing related stress by directing big game to narrower river crossing sites, further consultation with

Idaho Fish and Game to develop the fencing placement and timing would help to ensure safe wildlife passage and reduce potential adverse effects on wildlife migration.

Twin Lakes concludes that the availability of significant amounts of equivalent habitat throughout the larger regional area makes it unlikely that overall mule deer production would decline. Idaho Fish and Game argues that, for any species, a net loss of excellent habitat limits productivity and, therefore, the net loss of excellent fawning and rearing habitat would adversely affect the productivity of mule deer in the project area. The Idaho Fish and Game Mule Deer Management Plan for the Bannock deer PMU includes management directives to: (1) improve key winter, summer, and transitional habitats for mule deer populations that meet or exceed statewide objectives, and (2) maintain, improve, and manage access to hunting areas. Idaho Fish and Game recommends Twin Lakes provide at least 435 acres of mule deer fawning and wintering habitat. We expect that mule deer productivity would decrease in the project area because of the loss of quality fawning and rearing habitat. Consequently, we find the proposed project is inconsistent with the Idaho Fish and Game Mule Deer Management Plan. Twin Lakes would need to protect or create 435 acres of mule deer fawning and wintering habitat to offset project effects. Although providing a 300-foot-wide reservoir buffer would contribute to this acreage, further analysis is needed to determine whether these areas would constitute suitable wintering or fawning habitat. However the conservation of existing habitat would not offset the effects of 435 acres of habitat lost to inundation.

Based on the above discussion, we conclude that to mitigate project effects, Twin Lakes would have to include provisions to acquire, protect, and enhance: (1) at least 5 miles of free-flowing riverine habitat along the Bear River that includes at least 70 acres of currently established cottonwood riparian habitat; (2) 132 acres of wetland and riparian habitat as well as grassland habitat for land birds; (3) at least 200 acres of nesting and brood-rearing habitat for waterfowl, water birds, and trumpeter swan that provides ice-free winter foraging and nesting areas equivalent to 5 miles of riverine habitat; (4) 59 acres of bat roosting habitat; (5) 435 acres of wild turkey habitat with public hunting access, including 180 acres of wintering habitat; (6) 435 acres of mule deer fawning and wintering habitat of equal or greater quantity and quality to that in the project area; (7) 265 acres of wetland and riparian habitat with equal or greater quality for northern leopard frog; and (8) at least 237.8 acres of suitable habitat for rock squirrel, including at least 19 acres of burrowing habitat.

Twin Lakes' proposed measures, along with a 300-foot-wide shoreline, would mitigate a limited extent of the total project effects on special status wildlife species and habitat. Extensive additional lands would need to acquire to mitigate for lost habitats.

We have been unable to identify sites that could be acquired and managed to mitigate the loss of wildlife habitat. No stakeholder has provided any options for habitat development. It is unlikely that replacement habitat can be found within the general project area. Not only would habitat have to be identified as providing potential habitat

for these species, but there has to be some degree of certainty that this habitat could be managed or improved to increase the habitat value of those lands to offset the value of the lost habitat. Further, absent site-specific information on site conditions, availability of water, existing and potential wildlife use, conflicts with other land uses, and location in reference to the project and detailed protection and management plans, it is not possible to develop and evaluate measures to offset project effects to important wildlife habitats. Without this information, we are unable to determine the feasibility, potential benefits, or cost of any mitigation. Therefore, lacking specific details of a habitat mitigation plan, we must conclude that the project would result in the unavoidable loss of habitat for bald eagles, migratory land and waterbirds, wild turkey, bats, northern leopard frog, rock squirrel, and mule deer. The loss of 4.5 miles of ice-free riverine habitat would also be unavoidable.

We do recommend that Twin Lakes develop a terrestrial mitigation plan that includes the following: (1) a description of the number and locations for raptor and landbird nesting platforms and boxes, including the existing habitat in the vicinity of the nesting boxes so that an assessment can be made whether the boxes would be an enhancement of the existing conditions; and (2) details of fencing design and placement on lands adjacent to the proposed reservoir that would exclude cattle from the buffer zone while allowing safe passage for wildlife. This would ensure that proposed wildlife protection measures would be successfully implemented. We conclude that development of the plan with our recommended components would be worth the estimated levelized annual cost of $480 to develop the plan.

Recreation Plan

The proposed project would result in the loss of all riverine recreational opportunities in Oneida Narrows, including the loss of a heavily used recreational trout fishery (Twin Lakes estimates about 9,500 anglers per year) and a the only whitewater boating and tubing resource within 120 miles of the project. Twin Lakes proposes to develop new recreational facilities at the new reservoir and at the Ben Johnson Family Farm site, which include a new multi-use recreation facility and campground on the new reservoir, a river access site below the new dam, and a new boat ramp, parking area, and hiking trail at the Ben Johnson Family Farm site downstream of the project. However, Twin Lakes' proposed recreational measures do not provide the specific details of how the sites will be designed, operated, or maintained to meet future recreational demand over the term of a new license. Idaho Parks and Recreation recommends development of a recreation plan in consultation with stakeholders to identify additional measures to address adverse effects of the proposed project. Idaho Parks and Recreation recommends that Twin Lakes identify additional recreational measures, both onsite and offsite, to better mitigate project effects of the loss of the coldwater fishery and the loss of whitewater boating and tubing opportunities.

While the proposed recreational measures would provide some recreational benefit, the new facilities would add to an already regionally abundant area with reservoir

recreation and warmwater fishing opportunities while permanently removing scarce whitewater boating and tubing, and coldwater fishing opportunities. Further, because the Ben Johnson Family Farm overlaps a national historic land mark, the Bear River Massacre Site, we do not recommend implementation of Twin Lakes proposed recreation measures at this site.

We have been unable to identify sites that could be acquired and managed to mitigate the loss of 4.5 miles of public access to the recreational coldwater trout fishery and whitewater boating and tubing resource on the Bear River. No stakeholder has provided any options for developing a similar recreational whitewater boating and/or coldwater fishery. It is unlikely that these types of riverine recreational opportunities can be found within the general project area. Therefore, lacking specific details of a feasible riverine recreation site and a detailed implementation plan, we must conclude that the project would result in the unavoidable loss of 4.5 miles of public access to the recreational coldwater trout fishery and whitewater boating and tubing resource on the Bear River.

However, we agree with Idaho Parks and Recreation that development of a recreation plan for implementation and operation of recreation facilities at the project is needed, in consultation with relevant stakeholders, to outline the design, construction, and operation and maintenance of proposed recreation facilities and to develop long-term management policies, including recreation use monitoring and coordination with other land use and resource plans at the project, to manage recreation use and future demand at the project.

Development and implementation of a recreation plan in consultation with stakeholders would allow professional land managers to provide input on the site design, operation and maintenance of recreation facilities at the project. Additionally, input from agencies and stakeholders would ensure the recreation plan is consistent with management objectives of relevant local and federal land use plans, including the upstream Oneida development. Although Idaho Parks and Recreation recommends the plan include additional measures to better mitigate the loss of the coldwater fishery and whitewater boating and tubing opportunities, these effects are unavoidable and cannot be replaced.

Therefore, we recommend that Twin Lakes develop a recreation plan that includes, at a minimum:

1. A comprehensive description of all proposed recreation developments at the project, including the new, multi-use recreation facility on the new reservoir and the new river access and boat launch with parking and portable toilets immediately below the new dam.
2. Detailed site plans and construction schedules.
3. Provisions for operation and management of project recreation facilities.

4. Provisions for monitoring recreational use recreation-related impacts on environmental resources
5. A description of how the need for any new measures to support recreational use and/or protect environmental resources and/or construct new project facilities will be identified based on recreation use over the term of a new license.
6. A schedule for consultation with agencies and stakeholders on a periodic basis to identify updates to the plan, if a needed based on the monitoring of recreational use at the project, and a process for review of the updated plan before submitting it to the Commission for final approval.
7. A description of how flow-related information will be made available to the public to ensure that the public is aware of flow-related recreational opportunities that exist downstream of the project.

We estimate that the levelized annual cost to develop and implement this plan, including providing the proposed recreational facilities, would be $26,520. The benefits of providing public access over the term of a new license to both recreational facilities on the new reservoir and downstream of the project to mitigate for those opportunities that would be lost due to project construction would be worth this cost.

Land Management Plan

The proposed change in land use would permanently alter and adversely affect visual and recreational resources, bisecting and degrading lands managed for conservation by BLM and PacifiCorp. Twin Lakes proposes measures to address the changes in land use, including creating a shoreline buffer around the reservoir and working with private landowners to offset project effects on agricultural land.

BLM preliminary 4(e) condition 1(D) specifies that Twin Lakes prepare site-specific plans for any ground-disturbing activities on BLM-administered lands, including activities outlined in BLM resource management plans. BLM preliminary 4(e) condition 2 would require that Twin Lakes document, in consultation with BLM, project effects on federal lands, and management measures to protect those lands. Finally, BLM's preliminary 4(e) condition 3 would require that Twin Lakes develop an integrated travel and access management plan for land administered by BLM that would be affected by the proposed project. BLM further specifies that the travel plan would be incorporated into or coordinated with other project-related plans (e.g., comprehensive recreation management plan, integrated wildlife habitat program, wildlife mitigation and management plan); however, these plans are not provided in BLM's draft conditions.

As proposed, Twin Lakes' land use measures do not describe specific land management measures in sufficient detail to provide a basis for understanding how project land would be managed for the term of a new license. Because of this lack of detail, it is also unclear how or if Twin Lakes' proposed measures would be consistent

with existing land management plans. BLM's specified land use conditions to develop an integrated travel and access management plan, prepare site-specific plans for ground-disturbing activities, and document project effects on federal lands and management measures to protect those lands would provide measures to ensure land use on federal lands is managed consistently with existing BLM land use management plans. However, a land management plan that would include BLM's specified conditions in addition transportation access and safety measures, land use monitoring, and periodic consultation for all project lands, not just federal lands, would ensure public access is provided and all lands within the project boundary are managed appropriately over the term of a new license.

Therefore, we recommend that a land management plan that applies to all project land, not just BLM land, be developed and include, at a minimum, the following elements:

1. an identification and description of land use in the proposed project boundary, including a map identifying the locations of land use types;
2. measures to protect the visual and scenic resources from development;
3. road and public access measures at the project to ensure access to the public, nearby landowners, and to PacifiCorp to access the Oneida development ;
4. measures to monitor and document changes in land use for the term of a license;
5. provisions for consultation with agencies, PacifiCorp, and other stakeholders during implementation of the plan and measures to periodically review and update the plan; and
6. provisions for coordination with other project resource plans, including but not limited to erosion control, spill prevention, wetland, wildlife, recreation, and cultural plans.

We conclude that development of a land management plan with our recommended components would be worth the estimated levelized annual cost of $3,220.

5.2.3 Other Measures Not Recommended by Staff

In addition to those measures discussed in the previous section for which staff recommended alternatives or modifications, staff finds that some of the measures recommended by Twin Lakes or other interested parties would not contribute to the best comprehensive use of the Bear River water resources, do not exhibit sufficient nexus to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Ben Johnson Family Farm Site

Twin Lakes proposes to acquire the 538-acre Ben Johnson Family Farm site, which is located about 12.7 miles downstream of the proposed project, to mitigate for project effects on aquatic, wetland, riparian, and wildlife resources. Specifically, Twin Lakes proposes to restore herbaceous and woody wetlands and upland riparian habitat focusing on changes in land management, hydrology, and vegetative plantings. Additionally, Twin Lakes proposes to develop a recreation area at the Ben Johnson Family Farm site that would include a boat ramp, parking, portable toilets, and a hiking trail that would provide access to about 4.4 miles of the Bear River shoreline.

Twin Lakes' proposed measures at the Ben Johnson Family Farm site would face several significant hurdles prior to implementation, as discussed in sections 3.3.2.2, *Aquatic Resources, Environmental Effects, Water Quantity*, and 3.3.3.2, *Terrestrial Resources, Environmental Effects*. Substantial excavation and allocation of water would be necessary to create aquatic/wetland habitat. However, it is not clear where the 20 cfs of water Twin Lakes proposes to use for restoration purposes would come from and whether existing rights could be legally transferred for such purposes. Further, without detailed plans and site-specific data, it is not possible to evaluate how much water or excavation would be required to create the habitat, or if Twin Lakes would have suitable water rights to irrigate these areas, or to quantify the potential benefits to wildlife habitat and associated wildlife populations. Therefore, the feasibility of the restoration efforts at the Ben Johnson Family Farm and resulting benefits are uncertain.

The proposed boat launch facility at the Ben Johnson Family Farm site would be located 12.7 miles downstream from the proposed dam. As discussed in section 3.3.5.2, *Recreation Resources, Environmental Effects*, the river downstream from the proposed dam is very different than what currently exists in Oneida Narrows. Further, the distance of 12.7 miles from the dam to the proposed river access would likely be too far for most tubers to comfortably float, and the general lack of current, even with regular releases from the proposed dam, would make the reach unattractive to whitewater boaters. Although Twin Lakes asserts abundant new recreation opportunities would be created along the river below the proposed project, it may not be appropriate to provide a shoreline trail along the entire reach because it would reduce riparian habitat or encourage visitor disturbances to wildlife and, possibly, cultural resources. There may be fewer recreation benefits created at the parcel than what is described by Twin Lakes in its application because of the high potential for resource conflicts.

As discussed in section 3.3.7.2, *Cultural Resources, Environmental Effects*, the proposed mitigation site has high value for cultural resources, which could preclude any excavation or construction activity associated with mitigation efforts. For this reason alone, we believe this site is infeasible and do not recommend the Ben Johnson Family Farm site for mitigation of impacts on aquatic, wetland, riparian, and wildlife resources.

We estimate that the acquisition of the Ben Johnson Family Farm site would have a levelized annual cost of $61,310, but because we believe this site is infeasible to

mitigate project effects, we do not recommend this measure as a requirement of any license that may be issued.

Formation of Southern Middle Bear Watershed Commission

Twin Lakes proposes to form the SMBWC, which would be comprised of personnel from Twin Lakes, resource agencies, non-governmental organizations, and other stakeholders. The main purpose of the SMBWC would be to implement, monitor, and make management decisions to achieve mitigation plan goals, such as those associated with wetland restoration and aquatic habitat enhancement. All aspects of mitigation implementation, monitoring, and adaptive management would be overseen by a scientific advisory board formed by the SMBWC. In addition, Twin Lakes proposes to commit $25,000 in annual funding for the conservation projects overseen by the SMBWC, and establish a website to inform the public about mitigation goals, progress, new projects, recreation access, and monitoring results. The website would also provide access to a database that would provide all project-related data. In determining what projects to fund and prioritize, the SMBWC would apply a watershed-based approach. No agency or other stakeholder made recommendations regarding the formation of the SMBWC; however, Idaho Fish and Game and FWS comment that an annual contribution of $25,000 to the SMBWC would be insufficient to fund anticipated mitigation efforts.

Projects implemented and funded by the proposed SMBWC could benefit aquatic and other resources in the project vicinity and in the watershed; however, the proposed measure does not identify specific mitigation projects that would be funded by the $25,000 contribution. Although the SMBWC appears to be a reasonable approach to managing mitigative measures, we cannot determine whether any funded measure would have a direct nexus to the project. We estimate that the SMBWC programs would have a levelized annual cost of $16,890, but because we cannot see any direct nexus to the project, we do not recommend this measure as a requirement of any license that may be issued. Instead, we recommend specific aquatic and terrestrial protection, mitigation, and enhancement measures that have a direct link to the proposed project and, when applicable, we designate the entities to be consulted in reviewing plans and associated reports.

Evaporative Compensation Flows in Mink Creek

Twin Lakes' proposal for evaporative loss compensation is to provide the compensatory releases at its Mink Creek diversion dam as part of its proposed 10-cfs minimum flow in Mink Creek. Twin Lakes proposes to essentially reimburse itself for the Mink Creek minimum flows through the proposed water exchange, but they would not include the portion of the minimum flow that would represent evaporative loss compensation. In this way, the reduction in outflows from the proposed reservoir as a result of evaporation would be made up downstream of the confluence of Mink Creek. Idaho Fish and Game recommended that the evaporation compensation be released from the proposed dam instead of into Mink Creek, so that flows would not be reduced in the

1.2-mile-long reach of the Bear River from the dam to the confluence with Mink Creek. The staff licensing recommendation for project outflow, as calculated by the sum of flows at the Mink Creek gage and the staff-recommended gage downstream of the pumping station but upstream of the confluence of Mink Creek, to equal inflow at the proposed project would result in no reductions in flows at the dam as a result of evaporation, consistent with the intent of the Idaho Fish and Game recommendation. Evaporative compensation flows would not be released into Mink Creek, although Twin Lakes would be required to meet any instream flows that may be included in a license for the project. There would be no cost associated with the staff recommendation, although Twin Lakes would be required to use some reservoir storage to meet the outflow equals inflow mode of operation.

Development of a Law Enforcement and Emergency Services Plan

BLM's preliminary 4(e) condition 4 specifying the development of an LEESP would help quantify the effects of project operations on law enforcement, emergency services, and fire suppression on BLM-managed land. The county sheriff, state police, and federal rangers are obligated to provide law enforcement in the project area. Emergency services are provided by Franklin County, with an ambulance and search and rescue equipment stationed in Preston, Idaho. Fire suppression is provided by the Franklin County Fire District for private land and federal agencies for federal land. Some coordination of delivery of these services within the project area could increase the overall efficacy and efficiency of these services.

However, Twin Lakes and the Commission would have no authority over how any funding provided to law enforcement, emergency service, and fire suppression agencies would be spent and if such spending has a direct relationship to the project. Also, if the project is constructed, Twin Lakes would provide funding for these services through public land use fees and county taxes. Consequently, we do not recommend that Twin Lakes develop an LEESP that coordinates and possibly provides additional funding for these agencies because it would not be an appropriate condition of a license. We estimate that the levelized annual cost of an LEESP would be about $30,312, but the benefits associated with this cost are not readily apparent.

5.3 UNAVOIDABLE ADVERSE EFFECTS

There would be benefits associated with Twin Lakes' proposed project and staff's licensing alternative in that the project would generate an estimated 48,531 MWh of electricity per year from a clean source of energy that may displace some fossil fueled power sources. The project would also provide up to 5,000 acre-feet of water for irrigation purposes during dry water years, which would benefit local farmers. However, if the Commission issues a license for this project, there would be unavoidable adverse effects associated with construction and operation, even with the staff-recommended protection, mitigation, and enhancement measures. We discuss those unavoidable effects in the following section.

Construction of the proposed project would result in some short-term, minor increase in turbidity and total suspended solids as a result of erosion even with implementation of protective measures.

Construction of the proposed project would inundate 4.5 miles of riverine aquatic habitat in the Bear River, which represents nearly half of the available mainstem BCT habitat downstream of Oneida dam in the Bear River Basin. Although the staff-recommended alternative would improve the amount and quality of BCT adult, juvenile, fry, and spawning habitats in Mink Creek, this alternative would still result in a substantial reduction of adult and juvenile BCT habitat in the Bear River Basin downstream of Oneida dam (see table 3-28). While the remaining habitat may be sufficient to support some level of BCT population, likely at a depressed level, future planned BCT population enhancements are dependent on the availability of this Bear River fluvial habitat. Therefore the proposed project would have a long-term adverse effect on the BCT population potential of the Bear River downstream of Oneida dam.

Construction of the proposed project would result in a permanent loss or change to about 425 acres of wildlife habitat along the Bear River riparian corridor, including long-term loss of 121 acres of existing wetlands. The proposed reservoir would result in increased habitat fragmentation and disrupt wildlife movement along the Bear River. The existing riparian corridor provides suitable habitat for a wide variety of species, including fawning habitat for mule deer, bat roosting habitat, burrow and foraging habitat for rock squirrel, and bald eagle nesting, perching, and foraging habitat. Development of the reservoir would inundate the broad floodplain topography that supports the existing riparian vegetation. Banks of the proposed reservoir would be steep and vegetation development would be minimal, similar to that along the banks of Oneida reservoir upstream. The result would be a very narrow band of vegetation interspersed between large areas of foothills grassland, providing very limited cover for wildlife movement. Twin Lakes' proposed buffer would encompass 124 acres, of which about 88 acres are currently managed for conservation along the river corridor. As such, the project would result in a net loss of 269 acres of conservation land currently protected within the proposed project boundary. The staff-recommended 300-foot shoreline buffer would encompass about 380 acres, which is about half the land area that would be disturbed by the proposed project. Our recommended shoreline buffer of the reservoir would reduce potential for future changes in land use to further constrict wildlife movement, but would not offset the habitat fragmentation along the Bear River. Therefore, the removal of the existing floodplain and associated riparian vegetation would represent a major, unavoidable, long term effect.

Construction of the proposed dam, powerhouse, switchyard, access roads, and recreational facilities would include use of heavy machinery, possibly blasting, and increased human presence. These activities would result in noise-related disturbance and habitat removal, resulting in decreased habitat value for wildlife. Local wildlife would likely relocate to other habitats away from construction activities, which would cause increased stress and potentially result in reduced reproductive success if nests or dens are

abandoned. This disturbance would constitute unavoidable short-term adverse effects on wildlife.

Three formal recreational sites would be inundated along with numerous informal recreational sites along Oneida Narrows Road. Permanent conversion of Oneida Narrows as a recreational coldwater river-fishery and whitewater resource to a reservoir would also result from the proposed project. We consider these losses of recreational opportunities to be major, long-term effects because of the transformation of Oneida Narrows from a regionally unique riverine setting to a lake-like setting with recreational opportunities similar to many lakes and reservoirs in the region. We conclude that the proposed project would degrade Oneida Narrows' visual and aesthetic character because new permanent human-made features would contrast with existing visual elements, another major, long-term effect.

The proposed reservoir would permanently inundate about 222 acres of PacifiCorp conservation land, about 152 acres of BLM grazing land, about 62 acres of private agricultural land, and about 55 acres of designated RNA/ACEC land; major, long-term effects. Project facilities, including the dam, powerhouse, and road, would permanently remove an additional 28 acres from conservation uses (a major, long-term effect), and about 46 acres would be temporarily lost due to project construction (a minor, short-term effect).

Construction and operation of the proposed project would adversely affect cultural resource sites within the project APE that are eligible for or included on the National Register. Revising and implementing the HPMP and Addendum 1 could potentially mitigate for such unavoidable effects.

Construction of the project also would cause sporadic emissions of criteria pollutants through vehicle exhaust and fugitive dust that would adversely affect air quality in the immediate project area for short periods of time during the expected 2-year construction period. However, our analysis shows such emissions would be well below the *de minimis* criteria and therefore minor.

5.4 SUMMARY OF SECTION 10(J) RECOMMENDATIONS AND 4(E) CONDITIONS

5.4.1 Fish and Wildlife Agency Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations,

expertise, and statutory responsibilities of such agency. In response to our REA notice, the following fish and wildlife agency submitted recommendations for the project: Idaho Fish and Game (letter filed December 16, 2014).

Table 5-2 lists the state recommendations filed subject to section 10(j), and whether the recommendations are adopted if the Commission were to issue a license for the project. Environmental recommendations that we consider outside the scope of section 10(j) are considered under section 10(a) of the FPA and addressed in the specific resource sections of this document and section 5.2.3.

Of the 16 recommendations that we consider to be within the scope of section 10(j), we wholly include 6 and do not include 10. We discuss the reasons for not including that recommendation in section 5.2, *Comprehensive Development and Recommended Alternative*. Table 5-2 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j).

Table 5-2. Idaho Fish and Game recommendations for the Bear River Narrows Project (Source: staff).

Recommendation	**Within the Scope of Section 10(j)**	**Levelized Annual Cost**	**Adopted?**
1. Fund and install a fish screen at the Mink Creek diversion to prevent entrainment of BCT within a specified period of time; the screen should be designed in consultation with Idaho Fish and Game.	Yes	$6,090	Yes

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
2. Fund and install a fish screen at the Bear River pumping station intake to prevent introduction of nuisance fish to Winder, Condie, and Twin Lakes reservoirs.	Yes	Part of construction cost; no additional cost	Yes; to prevent the entrainment and out-of-basin transfer of native bear river fishes (e.g., Bonneville cutthroat trout)
3. Consult with Idaho DEQ regarding the proposed DO Management Plan as part of the WQC process.	No; not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$6,980	No; the WQC would be issued prior to license issuance
4. Release storage water at the proposed dam to compensate for evaporative losses in the reservoir.	Yes	No additional cost	Yes
5. Release a minimum flow below the new dam equal to the minimum flow released from Oneida dam during all phases of the project including bypass construction, initial reservoir fill, and long-term reservoir operations.	Yes	No additional cost	Yes

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
6. Establish a minimum flow in Mink Creek of 28 cfs from April – September and 14 cfs from October – March.	Yes	$125,840	No; 28 cfs flow would reduce habitat for BCT spawning, juveniles, and fry; our similar flow regime of 20 cfs from April – September and 15 cfs from October – March would maximize habitat for spawning and juvenile BCT lifestages, and provide greater than 80% of available habitat for adult and fry lifestages
7. Develop a detailed erosion control plan that employs industry standard erosion control measures in consultation with a technical working group that at a minimum includes Idaho DEQ, Idaho Fish and Game, BLM, and FWS.	No; not a specific measure to protect, mitigate, or enhance fish and wildlife resources	No additional cost	Yes

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
8. Modify the proposed Revegetation and Noxious Weed Control Plan to include criteria by which to judge success, discussion of irrigation needed to expedite plan growth including water rights, discussion of how revegetation would enhance wildlife habitat, and provisions for a site steward to oversee management of revegetation sites.	Yes	$480	Yes
9. Protect or create at least 264.8 acres of northern leopard frog habitat to replace that which would be inundated. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for northern leopard frogs and other amphibians and reptiles.	Yes	$7,180 (cost for grading of the reservoir banks to create some suitable habitat)	No; we have been unable to identify sites that would be able to provide the full 264.8 acres of northern leopard frog habitat.

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
10. Provide bat habitat at equivalent locations that include an area with cliff and rock formation surface area and cave features similar to that that would be inundated and in association with riparian foraging habitat. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for bats.	Yes	No basis to estimate cost	No; we have been unable to identify sites that would be able to provide the full equivalent amount of lost bat habitat.
11. Establish the total area of rock squirrel habitat that would be lost, not just burrowing habitat, and protect a similar area known to be inhabited by this species. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for winter rock squirrels.	Yes	No basis to estimate cost	No we have been unable to identify sites that would be able to provide the total amount of lost rock squirrel habitat.

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
12. Provide at least 435 acres of mule deer fawning and wintering habitat to replace that which would be inundated. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for deer.	Yes	No basis to estimate cost	No we have been unable to identify sites that would be able to provide the full 435 acres of mule deer fawning and wintering habitat.
13. Ensure property protected for mule deer habitat is managed to provide hunting opportunities for sportsmen.	No; not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$0	No; we have been unable to identify if property for mule deer management exists.
14. Provide at least 435 acres of turkey habitat to replace that which would be inundated. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for turkeys.	Yes	No basis for estimating cost	No; we have been unable to identify sites that would be able to provide the full 435 acres of turkey habitat.

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
15. Ensure property protected for turkey habitat is managed to provide hunting opportunities for sportsmen.	No; not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$0	No; we have been unable to identify if property for turkey management exists
16. Provide at least 132 acres of wetland, riparian, and grassland habitat to replace landbird habitat that would be inundated. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for landbirds.	Yes	No basis for estimating cost	No; we have been unable to identify sites that would be able to provide the full 132 acres of landbird habitat

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
17. Acquire a mitigation parcel that provides similar habitat, in equal or greater quality and quantity to that lost, to mitigate for the loss of bald eagle nesting, roosting, and foraging habitat. The parcel should include at least 5.0 miles of free-flowing riverine habitat along the Bear River that includes at least 70 acres of currently established cottonwood riparian habitat. Establish provisions that would ensure the parcel would continue to provide quality bald eagle nesting, roosting, and foraging habitat.	Yes	$14,370	No; we have been unable to identify sites that would be able to provide the full amount of lost bald eagle

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
18. Protect a mitigation parcel that provides similar trumpeter swan habitat, in equal or greater quality and quantity to the 5 miles of ice-free winter foraging and resting riverine habitat that would be lost. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for winter trumpeter swans.	Yes	No basis for estimating cost	No; we have been unable to identify sites that would be able to provide the full amount of lost trumpeter swan habitat

Recommendation	Within the Scope of Section 10(j)	Levelized Annual Cost	Adopted?
19. Provide a mitigation parcel that provides similar waterfowl and waterbird habitat, in equal or greater quality and quantity to that lost. The parcel should include at least 200 acres of nesting and brood-rearing habitat and 5.0 miles of riverine ice-free winter foraging and resting habitat. Establish provisions that would ensure the parcel is managed and maintained to provide benefits for waterfowl and waterbirds.	Yes	No basis for estimating cost	No; we have been unable to identify sites that would be able to provide the full amount of lost waterfowl and waterbird habitat
20. Use the most recent Avian Power Line Interaction Committee guidelines (APLIC, 2008, 2012) to minimize collision and electrocution hazards for birds.	Yes	No additional cost	Yes

5.4.2 Land Management Agencies' Section 4(e) Conditions

In section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*, we list the preliminary 4(e) conditions submitted by BLM, and note that section 4(e) of the FPA provides that any license issued by the Commission "for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation." Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our staff alternative.

Of BLM's 16 preliminary conditions, we consider nine of the conditions (conditions 1A, 1B, 1C, 1E, 1H, 1I, 1J, 1K, and 3 [those aspects that pertain to unrestricted BLM access to project roads and designing signage to BLM standards]) to be administrative or legal in nature and not specific environmental measures. We, therefore, do not analyze these conditions in this EIS. Table 5-3 summarizes our conclusions with respect to the seven preliminary 4(e) conditions that we consider to be environmental measures. We include in the staff alternative six conditions as specified by the agency and do not recommend one condition; the measure not adopted in total is discussed in more detail in section 5.2, *Comprehensive Development and Recommended Alternative.*

Table 5-3. BLM section 4(e) conditions for the Bear River Narrows Project (Source: staff).

Condition	Annualized Cost	Adopted?
No. 1D, site-specific plans for ground-disturbing activities	$3,220 (cost for overall land management plan)	Yes
No. 1F, spoils disposal plan	Included in construction costs	Yes
No. 1G, hazardous substances plan	$3,730 (for plan during operation; cost for construction included in construction costs)	Yes
No. 2, annual report to BLM regarding protection of BLM-managed land	Included in the cost of 1D	Yes
No. 3, travel and access management plan	Included in the cost of 1D	Yes

Condition	Annualized Cost	Adopted?
No. 4, law enforcement and emergency services plan	$30,210	No, law enforcement and emergency services are under the authority of state and local governmental entities
No. 5, HPMP	Minimum of $26,340	Yes

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C.§803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 14 comprehensive plans that are applicable to the Bear River Narrows Project, located in Idaho:

Idaho Department of Fish and Game. 2013. Fisheries management plan, 2013-2018. Boise, Idaho. 2013.

Idaho Department of Fish and Game. 2007. Management plan for the conservation of Bonneville cutthroat trout in Idaho. Boise, Idaho. November 2007.

Idaho Department of Fish and Game. Bonneville Power Administration. 1986. Pacific Northwest rivers study. Final report: Idaho. Boise, Idaho.

Idaho Department of Fish and Game. 2005. Idaho comprehensive wildlife conservation strategy. Boise, Idaho. September 2005.

Idaho Department of Fish and Game. 2014. Idaho elk management plan: 2014-2024. Boise, Idaho. June 2014.

Idaho Department of Fish and Game. 2008. Idaho mule deer management plan: 2008-2017. Boise, Idaho. March 2008.

Idaho Department of Fish and Game. 2010. Mule deer initiative action plan. Boise, Idaho. 2010.

Idaho Department of Health and Welfare. 1992. Idaho water quality standards and wastewater treatment requirements. Boise, Idaho. January 1992.

Idaho Department of Parks and Recreation. Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORTP): 2006–2010. Boise, Idaho.

Idaho Water Resource Board. 2012. Idaho State water plan. Boise, Idaho. November 2012.

National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.

Northwest Power and Conservation Council. 2010. The Sixth Northwest conservation and electric power plan. Portland, Oregon. Council Document 2010-09. February 2010.

Northwest Power and Conservation Council. 1988. Protected areas amendments and response to comments. Portland, Oregon. Council Document 88-22. September 14, 1988.

U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

We have determined that the staff licensing alternative would be consistent with six of the reviewed plans but inconsistent with the goals and objectives of the remaining eight comprehensive plans. The plans considered inconsistent with the staff licensing alternative are discussed below.

The *Idaho Fisheries Management Plan* (2013) identifies two goals for the state of Idaho fisheries management that pertain to the proposed project:

- Sustain Idaho's fish and wildlife and the habitats upon which they depend.
- Meet the demand for fish and wildlife recreation.

The document discusses the impacts of irrigation withdrawals and hydroelectric project operations on flows and fish habitat of the Bear River. The document also states that maintaining high-quality habitat is critical to ensuring the persistence of native trout populations, such as BCT. Under the goals listed above, the document lists several objectives and desired outcomes. Applicable objectives under the first goal aim to maintain and improve game fish populations, ensure long-term survival of native fish, and increase the capacity of habitat to support fish and wildlife. Maintaining a diversity of fishing, hunting, and trapping opportunities and sustaining fish and wildlife recreation on public lands are two objectives listed under the second goal above.

The staff licensing alternative would be inconsistent with these objectives because inundation of Oneida Narrows would result in a net loss of high-value fluvial habitat, which would affect the long-term survival and enhancement of game fish populations, such as BCT. In addition, recreational fishing opportunities would be lost in Oneida Narrows, which is one of two areas on the Bear River that receives the highest fishing pressure. The lost opportunities would be replaced by an impoundment fishery likely dominated by introduced, non-native fish such as carp. Furthermore, we conclude that it is unlikely that other aspects of the staff licensing alternative, such as establishing 20 cfs from April through September and 15 cfs from October through March minimum flow downstream of the Mink Creek diversion, as mitigation for the loss of fluvial habitat, would adequately provide equivalent benefits for fish habitat and recreational fishing opportunities as Oneida Narrows (see table 5-1).

The *Idaho Comprehensive Wildlife Conservation Strategy* (2005) identifies a goal of sustaining Idaho's fish and wildlife and habitat upon which they depend. The document also identifies two objectives of Idaho Fish and Wildlife's 2005 Idaho Strategic Plan (The Compass) that are relevant to the strategy:

- Ensure the long-term survival of native fish, wildlife, and plants.
- Increase the capacity of habitat to support fish and wildlife.

The staff licensing alternative would be inconsistent with the first objective because habitat loss associated with constructing and inundating Oneida Narrows would likely jeopardize long-term survival and persistence of BCT populations in the mainstem of the Bear River. In addition, effects associated with habitat loss would decrease the capacity of the Bear River to support BCT and other salmonids. The staff licensing alternative would also likely result in reduced habitat for northern leopard frog, Townsend's big-eared bat, California myotis, rock squirrel, trumpeter swan, wild turkey, and bald eagle. We consider it unlikely that staff licensing alternative mitigation actions would adequately resolve the effects associated with the degree of habitat loss that would make the staff licensing alternative consistent with the above comprehensive strategy (see table 5-1).

The *Pacific Northwest Rivers Study* (1986) was conducted to assess the significance of river segments for a variety of values for fisheries, wildlife, cultural, natural features (aesthetics), and recreation. For the area of the proposed project, the river segment from the Mink Creek confluence to Oneida dam is ranked "substantial" for fisheries and recreation, "outstanding" for wildlife and natural features, and "unknown" for cultural resources. The staff licensing alternative would be inconsistent with this study because construction of the proposed project would reduce the value of the resource, especially for fisheries, natural features, and recreation. We conclude that it is unlikely that the staff licensing alternative would adequately resolve or mitigate the loss of fisheries habitat and natural features (Oneida Narrows Canyon).

The *Management Plan for the Conservation of Bonneville Cutthroat Trout in Idaho* (2007) identifies the single goal of ensuring the long-term viability and persistence of BCT within its historical range in Idaho at levels capable of providing angling opportunities, and includes seven objectives:

- Preserve genetic integrity of existing populations.
- Conserve genetic diversity and provide for genetic exchange.
- Improve degraded habitats.
- Reduce impacts of non-native fish species.
- Develop recreational fishing opportunities.

- Restore and maintain habitat for all life history stages and strategies.
- Maintain current distribution and restore distribution in previously occupied areas, if warranted.

This plan states that the primary focus of conserving BCT within the management unit that encompasses the proposed project area should be protecting existing populations from habitat degradation and reconnecting tributary spawning habitats with mainstem fluvial populations. Due to degradation of BCT fluvial habitat as a consequence of inundation, we conclude that the staff licensing alternative would be inconsistent with the third, sixth, and seventh objectives of the plan. Furthermore, we conclude that loss of habitat would likely result in the loss of genetic diversity and reduce recreation fishing opportunities through mortality and emigration of individuals; therefore, inconsistent with the first, second, and fifth objectives of the plan. We find that it is unlikely that staff licensing alternative mitigation actions would adequately resolve the effects associated with the degree of habitat loss that would make the staff licensing alternative inconsistent with the objectives of the above management plan.

The *Protected Areas Amendments and Response to Comments* (1988) is an adopted amendment by the Northwest Power Planning Council (Council) to designate and protect critical fish and wildlife habitat. This is a formal amendment to the Council's Columbia River Basin Fish and Wildlife Program,[73] which covers the Columbia River Basin, and the Northwest Power Plan, which covers the entire states of Idaho, Oregon, Washington, and western Montana. The authority of the Council to designate protected areas in the Columbia River Basin and other parts of the region originates from section 4(h) and section 4(e) of the Northwest Power Act, respectively. Designated protected areas are those areas afforded the single standard of protection from no new hydroelectric development. According to the most recent list of protected areas, the area of the proposed project from the Mink Creek confluence with the Bear River to Oneida reservoir is protected for wildlife (Northwest Power Planning Council, undated). Therefore, we find that the staff licensing alternative would be inconsistent with the protected areas amendment, and by extension, the Northwest Power Act. Because the staff licensing alternative would be within a designated protected area, we conclude that there would be no mitigative measure that would adequately resolve this inconsistency.

The Sixth Northwest Conservation and Electric Power Plan (2010) primarily focuses on means to make generation and transmission more efficient. However the plan emphasizes that, in doing so, the plan needs to ensure fulfillment of the obligations of the

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[73]The Columbia River Basin Fish and Wildlife Program is incorporated into the Northwest Power Conservation Council's Northwest Power Plan by authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980, also known as the Northwest Power Act.

Columbia River Basin Fish and Wildlife Program. As noted above, the project would be in a designated protected area and therefore would not be consistent with the Columbia River Basin Fish and Wildlife Program, and therefore also not consistent with the Conservation and Electric Power Plan.

The *Idaho Mule Deer Management Plan: 2008-2017*(2008) includes the following directives for the Bannock mule deer Population Management Unit: (1) improve key winter, summer, and transitional habitats for mule deer populations that meet or exceed statewide objectives; and (2) maintain, improve, and manage access to hunting areas. The staff licensing alternative would inundate or otherwise remove 435 acres of mule deer habitat and about 72 percent of excellent quality mule deer fawning habitat in Twin Lakes' mule deer study area. Although Twin Lakes and staff propose some measures to mitigate for effects on mule deer, including conserving lands associated with the Ben Johnson Family Farm, the proposed and staff recommended measures would not prevent a net loss in habitat. Additionally, the staff licensing alternative would increase habitat fragmentation and create barriers to movement between summer and winter ranges. Staff recommended measures would increase conservation of mule deer habitat around the reservoir, within the staff-recommended 300-foot reservoir buffer. However, because vegetation in the buffer area is not expected to provide similar habitat value as the existing Bear River floodplain and associated riparian vegetation, there would still be net losses to mule deer fawning habitat. Because the proposed project, with staff recommended mitigation measures would not result in net improvements to mule deer habitat and would not maintain existing hunting access, we find that the project would not be consistent with this management plan.

Idaho Elk Management Plan 2014 – 2024 (2014) includes management direction for the Bear River Zone to maintain elk populations at their current levels. Within this zone, there are winter range limitations and agricultural crop and property damage concerns, which must be balanced with elk population goals and hunter opportunity. The staff licensing alternative would inundate or otherwise remove 435 acres of elk habitat, including about 59 acres of low-elevation riparian wintering habitat, and reduce existing hunting access to Oneida Narrows. Additionally, the staff licensing alternative would increase habitat fragmentation and create barriers to movement between summer and winter ranges. Staff-recommended measures would increase conservation of elk habitat around the reservoir, within the staff-recommended 300-foot reservoir buffer. However, because vegetation in the buffer area is not expected to provide similar habitat value as the existing Bear River floodplain and associated riparian vegetation, there would still be net losses to elk wintering habitat. Because the proposed project with staff-recommended mitigation measures would have potential to reduce elk populations, we find that the project would not be consistent with this management plan.

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APPENDIX A

INDIVIDUAL LETTERS

(A.1, Scoping, A.2, REA Notice)

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APPENDIX A.1

Comments Filed by Individuals in Response to Issuance of the Commission's Scoping Document 1 Issued on February 13, 2007

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Comments Filed By Individuals in Response to Public Scoping

Individual Letter	Date Filed	Supports/Opposes Project
Anderson, Robert J 20070108-0099	1/5/2007	Opposes
Lown, Jean M 20070423-0192	4/172007	Opposes
Gleason, Warren Jay 20070424-0208	4/172007	Opposes
Yoder, G Ramsey 20070424-0014	4/19/2007	Opposes
Christensen, Ann L 20070424-0015	4/19/2007	Opposes
Swanson, John R 20070426-0268	4/24/2007	Opposes
Cokinos, Chris 20070501-0192	4/25/2007	Opposes
Youngfield, Rebecca 20070712-0074	7/9/2007	Opposes
Smith, Sam 20070306-0048	2/27/2007	Opposes
McGregor, Craig 20070307-5018	3/7/2007	Opposes
Olson, Dana 20070406-0018	4/2/2007	Opposes
Liddell, William 20070409-5081	4/10/2007	Opposes
Webb, Douglas 20070411-5001	4/11/2007	Opposes
Henderson, Curtis 20070411-5002	4/11/2007	Opposes
Shurtliff, Erica 20070412-5059	4/12/2007	Supports
Shurtliff, Brad 20070412-5062	4/12/2007	Supports
Naylor, Joe 20070412-5067	4/13/2007	Supports
Naylor, Jim 20070412-5067	4/13/2007	Supports
Weeks, Guy 20070412-5067	4/13/2007	Supports
Checketts, Ty 20070412-5072	4/13/2007	Supports
Checketts, Brice 20070412-5072	4/13/2007	Supports
Checketts, Marlene 20070412-5072	4/13/2007	Supports
Naylor, Karen 20070412-5073	4/13/2007	Supports
Spackman, Reed 20070412-5074	4/13/2007	Supports
Spackman, Virginia 20070412-5075	4/13/2007	Supports
Dursteler, Mary T 20070413-5088	4/16/2007	Opposes
Dursteler, Michael 20070413-5089	4/16/2007	Opposes
Mainini, Steve and Terry 20070414-5002	4/16/2007	Opposes
Boyack, Olivia 20070414-5004	4/16/2007	Opposes
Checketts, Chrystal 20070415-5001	4/16/2007	Supports
Roberts, Russel and Charlene 20070415-5001	4/16/2007	Supports
Checketts, Logan 20070416-5001	4/16/2007	Supports
Checketts, Colton 20070416-5030	4/16/2007	Supports
Checketts, Carson 20070416-5030	4/16/2007	Supports

Individual Letter	Date Filed	Supports/Opposes Project
Dustin, Al 20070416-5036	4/16/2007	Supports
Skinner, Richard A 20070418-0128	4/16/2007	Opposes
Vasquez, Anita 20070418-0129	4/16/2007	Opposes
Serrano, Karen 20070418-0132	4/16/2007	Opposes
Gantz, Kathy Snyder 20070419-0037	4/16/2007	Opposes
Graham, Jim 20070419-0040	4/16/2007	Opposes
McDonald, J 20070419-0053	4/16/2007	Opposes
Barzee, Spencer 20070416-5154	4/17/2007	Supports
Berndt, John 20070419-0282	4/17/2007	Opposes
Nelson, Victor 20070419-0283	4/17/2007	Opposes
Malouf, Jim 20070419-0294	4/17/2007	Opposes
Cole, Gail 20070419-0295	4/17/2007	Opposes
Bosworth, Ken W 20070424-0210	4/19/2007	Opposes
Hilborn, Doug 20070424-0211	4/19/2007	Opposes
Booter, Beth 20070425-0304	4/23/2007	Opposes

APPENDIX A.2

Comments Filed by Individuals in Response to the Commission's October 17, 2014, Ready for Environmental Analysis Notice

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Comments Filed by Individuals in Response to the Commission's REA Notice

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Flatt Individual_20150109-5192	1/13/2015	Opposes
Flatt Individual_20150112-5007	1/13/2015	Opposes
Packer Individual_20141230-5080	1/5/2015	Opposes
Maughan Individual_20141223-5158	12/24/2014	Opposes
Anonymous Individual_20141223-5006	12/24/2014	Opposes
Smith Individual_20141218-0051	12/22/2014	Opposes
Hansen Individual_20141219-0008	12/22/2014	Opposes
Heiniger Individual_20141219-0009	12/22/2014	Opposes
Hansen Individual_20141219-0010	12/22/2014	Opposes
Davis Individual_20141218-5002	12/18/2014	Opposes
Sullivan Individual_20141218-5006	12/18/2014	Opposes
Pemberton Individual_20141218-5010	12/18/2014	Opposes
Costley Individual_20141218-5017	12/18/2014	Opposes
Ochi Individual_20141217-5115	12/17/2014	Opposes
Robertson Individual_20141217-5112	12/17/2014	Opposes
Boyack Individual_20141217-5128	12/17/2014	Opposes
Martin Individual_20141217-5137	12/17/2014	Opposes
Moon Individual_20141217-5060	12/17/2014	Opposes
Senter Individual_20141215-5110	12/17/2014	Opposes
Barker Michell Individual_20141217-5005	12/17/2014	Opposes
Card Individual_20141217-5006	12/17/2014	Opposes
Lucia Individual_20141217-5008	12/17/2014	Opposes
Thornley Individual_20141217-5013	12/17/2014	Opposes
Beck Individual_20141217-5014	12/17/2014	Opposes
Williams Individual_20141216-5304	12/16/2014	Opposes
Lindenberg Individual_20141216-5276	12/16/2014	Opposes
Smith Hansen Individual_20141215-0036	12/16/2014	Opposes
Dunkley Individual_20141215-0037	12/16/2014	Opposes
Bebo Individual_20141215-5246	12/16/2014	Opposes
Westerberg Individual_20141215-5222	12/16/2014	Opposes
Pond Individual_20141216-5273	12/16/2014	Opposes
Smith Individual_20141216-5003	12/16/2014	Opposes
Gneiting Individual_20141216-5005	12/16/2014	Opposes
Janecke Individual_20141216-5006	12/16/2014	Opposes

Individual Letter	Date Filed	Supports/Opposes Project
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Dahlman Individual_20141216-5013	12/16/2014	Opposes
Role Individual_20141216-5020	12/16/2014	Opposes
Seamons Individual_20141216-5017	12/16/2014	Opposes
Richardson Individual_20141216-5271	12/16/2014	Opposes
Barker Individual_20141216-5021	12/16/2014	Opposes
Seamons Individual_20141216-5016	12/16/2014	Opposes
Seamons Individual_20141216-5015	12/16/2014	Opposes
Seamons Individual_20141216-5019	12/16/2014	Opposes
Callaway Kellner Individual_20141216-5222	12/16/2014	Opposes
Wood Individual_20141216-5236	12/16/2014	Opposes
Seamons Individual_20141216-5018	12/16/2014	Opposes
Coburn Individual_20141216-5023	12/16/2014	Opposes
Sedivy Individual_20141216-5022	12/16/2014	Opposes
Ball Individual_20141216-5024	12/16/2014	Opposes
Cline Individual_20141216-5025	12/16/2014	Opposes
Jensen Individual_20141216-5026	12/16/2014	Opposes
Hansen Individual_20141216-5181	12/16/2014	Opposes
Maginn Individual_20141215-5097	12/15/2014	Opposes
Henderson Individual_20141215-5018	12/15/2014	Opposes
Smith Individual_20141215-5024	12/15/2014	Opposes
Tippetts Individual_20141215-5027	12/15/2014	Opposes
Levitch Individual_20141215-5023	12/15/2014	Opposes
Phillips Individual_20141215-5031	12/15/2014	Opposes
Chamberlain Individual_20141215-5086	12/15/2014	Opposes
Anderson Individual_20141215-5037	12/15/2014	Opposes
Sheen Individual_20141215-5036	12/15/2014	Opposes
Pratt Individual_20141215-5039	12/15/2014	Opposes
Springer Individual_20141215-5042	12/15/2014	Opposes
Eiman Individual_20141215-5057	12/15/2014	Opposes
Wolfe Individual_20141215-5066	12/15/2014	Opposes
Butterfield Individual_20141215-5069	12/15/2014	Opposes
Laumann Individual_20141215-5016	12/15/2014	Opposes
Durso Individual_20141215-5012	12/15/2014	Opposes
Cheal Individual_20141215-5004	12/15/2014	Opposes

Individual Letter	Date Filed	Supports/Opposes Project
Ross Individual_20141212-5135	12/15/2014	Opposes
Williams Individual_20141212-5060	12/15/2014	Opposes
Bunzow Individual_20141212-5037	12/15/2014	Opposes
Duren Individual_20141212-5049	12/15/2014	Opposes
Wilkinson Individual_20141212-5005	12/15/2014	Opposes
Hopkins Individual_20141212-5002	12/15/2014	Opposes
Pearce Individual_20141211-5174	12/15/2014	Opposes
S Andersen Individual_20141211-5171	12/11/2014	Opposes
B Smith Individual_20141211-5101	12/11/2014	Opposes
Redding Individual_20141211-5103	12/11/2014	Opposes
Reynolds Individual_20141211-5102	12/11/2014	Opposes
Young Individual_20141211-5049	12/11/2014	Opposes
Rasmussen Individual_20141210-5159	12/11/2014	Opposes
D Anderson Individual_20141211-5003	12/11/2014	Opposes
Mcdanel Individual_20141211-5006	12/11/2014	Opposes
Benavides Individual_20141211-5007	12/11/2014	Opposes
Hendricks Individual_20141211-5009	12/11/2014	Opposes
Kimber Individual_20141211-5012	12/11/2014	Opposes
Dixon Individual_20141210-5156	12/10/2014	Opposes
A Smith Individual_20141208-5321	12/10/2014	Opposes
Haycock Individual_20141208-5327	12/10/2014	Opposes
J Andersen Individual_20141208-5343	12/10/2014	Opposes
Powell Individual_20141209-5000	12/10/2014	Opposes
B Smith Individual_20141209-5001	12/10/2014	Opposes
Jukes Individual_20141209-5075	12/10/2014	Opposes
B Smith Individual_20141210-5002	12/10/2014	Opposes
W Palmer Individual_20141210-5001	12/10/2014	Opposes
A Taylor Individual_20141210-5080	12/10/2014	Opposes
Taylor Individual_20141210-5075	12/10/2014	Opposes
Gioffre_Harrington Individual_20141210-5063	12/10/2014	Opposes
Fuller Individual_20141210-5015	12/10/2014	Opposes
Graham Individual_20141210-5012	12/10/2014	Opposes
Swensen Individual_20141210-5011	12/10/2014	Opposes
Schnitzius Individual_20141210-5023	12/10/2014	Opposes
Lundgreen Individual_20141209-5090	12/9/2014	Opposes

Individual Letter	Date Filed	Supports/Opposes Project
Olson Individual_20141209-5093	12/9/2014	Opposes
Purser Individual_20141209-5122	12/9/2014	Opposes
Webb Individual_20141209-5125	12/9/2014	Opposes
Kelby Individual_20141209-5155	12/9/2014	Opposes
Gardner Individual_20141209-5002	12/9/2014	Opposes
Adamson Individual_20141209-5009	12/9/2014	Opposes
Hobbs Individual_20141209-5011	12/9/2014	Opposes
Lewis Individual_20141209-5010	12/9/2014	Opposes
McKay Individual_20141209-5008	12/9/2014	Opposes
Linderman Individual_20141208-5234	12/8/2014	Opposes
Ryder Individual_20141208-5232	12/8/2014	Opposes
S Keller Individual_20141208-5229	12/8/2014	Opposes
Theis Individual_20141208-5264	12/8/2014	Opposes
Beavers Individual_20141208-5206	12/8/2014	Opposes
Owen Individual_20141208-5199	12/8/2014	Opposes
Phillips Individual_20141208-5207	12/8/2014	Opposes
Suryan Individual_20141208-5228	12/8/2014	Opposes
Westerberg Individual_20141208-5140	12/8/2014	Opposes
Higley Individual_20141208-5136	12/8/2014	Opposes
Maddock Individual_20141208-5131	12/8/2014	Opposes
CL Smith Individual_20141208-5125	12/8/2014	Opposes
Allen Individual_20141208-5079	12/8/2014	Opposes
Belnap Individual_20141208-5078	12/8/2014	Opposes
Cole Individual_20141208-5075	12/8/2014	Opposes
Kelley Individual_20141208-5080	12/8/2014	Opposes
Anderson Individual_20141208-5038	12/7/2014	Opposes
Byers Individual_20141208-5035	12/7/2014	Opposes
Christensen Individual_20141208-5041	12/7/2014	Opposes
Hobbie Individual_20141208-5036	12/7/2014	Opposes
Wheeler Individual_20141208-5042	12/7/2014	Opposes
B Durrant Individual_20141208-5021	12/7/2014	Opposes
Durant Individual_20141208-5023	12/7/2014	Opposes
Hillyard Individual_20141208-5003	12/7/2014	Opposes
K Smith Individual_20141208-5032	12/7/2014	Opposes
King Individual+20141205-5311	12/7/2014	Opposes

Individual Letter	Date Filed	Supports/Opposes Project
Seamons Individual_20141208-5016	12/7/2014	Opposes
Miner Individual_20141208-5074	12/7/2014	Opposes
Porter Individual_20141208-5073	12/7/2014	Opposes
David Individual_20141208-5067	12/7/2014	Opposes
Israelsen Individual_20141208-5061	12/7/2014	Opposes
Ostler Individual_20141208-5071	12/7/2014	Opposes
Rawlings Individual_20141208-5070	12/7/2014	Opposes
Toelken Individual_20141208-5066	12/7/2014	Opposes
Burwell Individual_20141208-5055(29958751)	12/7/2014	Opposes
Dodge Individual_20141208-5060	12/7/2014	Opposes
Hall Individual_20141208-5058	12/7/2014	Opposes
Keller Individual_20141208-5057	12/7/2014	Opposes
Palmer Individual_20141208-5059	12/7/2014	Opposes
T Keller Indivdual_20141208-5056	12/7/2014	Opposes
Daniels Individual_20141208-5048	12/7/2014	Opposes
Graham Individual_20141208-5054	12/7/2014	Opposes
Hansen Individual_20141208-5047	12/7/2014	Opposes
Langston Individual_20141208-5052	12/7/2014	Opposes
Pope Individual_20141208-5049	12/7/2014	Opposes
Kastner Individual_20141208-5046	12/7/2014	Opposes
Costley Individual_20141205-5008	12/5/2014	Opposes
Petterborg Individual_20141205-5083	12/5/2014	Opposes
Day Individual_20141204-5080	12/4/2014	Opposes
Greene Individual_20141204-5079	12/4/2014	Opposes
Neeser Individual_20141204-5083	12/4/2014	Opposes
Moore Individual_20141204-5001	12/4/2014	Opposes
S Seamons2 Individual_20141204-5002	12/4/2014	Opposes
C Seamons Individual_20141204-5004	12/4/2014	Opposes
RS Seamons Individual_20141204-5006	12/4/2014	Opposes
S Seamons Individual_20141204-5003	12/4/2014	Opposes
Porter Individual_20141203-5010	12/3/2014	Opposes
Cane Individual_20141202-5073	12/2/2014	Opposes
Lown Individual_20141128-5087	12/1/2014	Opposes
Meredith Individual_20141201-5001	12/1/2014	Opposes
Recker Individual_20141201-5005	12/1/2014	Opposes

Individual Letter	Date Filed	Supports/Opposes Project
Sailor Individual_20141201-5020	12/1/2014	Opposes
Dethier Individual_20141201-5019	12/1/2014	Opposes
Chenette Individual_20141124-5001	11/25/2014	Opposes
Smith Gilbert Individual_20141112-5004(29910157)	11/12/2014	Opposes
Wilkins Individual_20141112-5032(29910237)	11/12/2014	Opposes
Hubbard Individual_20141110-5044(29907781)	11/10/2014	Opposes
Twedt Individual_20141103-5010(29890796)[1]	11/3/2014	Opposes
Rhea Individual_20141031-5008(29886793)[1]	10/31/2014	Opposes
Serrano Individual_20141030-5001(29883264)[1]	10/30/2014	Opposes
Carolan Individual_20141029-5101(29880399)[1]	10/29/2014	Opposes
Lewis Individual_20141029-5118(29881994)[1]	10/29/2014	Opposes
Smith Individual_20141028-5000(29873502)[1]	10/28/2014	Opposes
Thomas Individual_20141023-5004(29863883)[1]	10/23/2014	Opposes
Damitz Individual_20141022-5071(29862221)[1]	10/22/2014	Opposes
Larsen Individual_20141022-5003(29860844)[1]	10/22/2014	Opposes
Mike Individual_20141022-5038(29861758)[1]	10/22/2014	Opposes
Perkins Individual_20141022-5039(29861759)[1]	10/22/2014	Opposes
Thiede Individual_20141022-5099(29862962)[1]	10/22/2014	Opposes
Elzey Individual_20141021-5008(29856756)[1]	10/22/2014	Opposes
Nielsen Individual_20141021-5004(29856699)[1]	10/22/2014	Opposes
Barzee Individual 20150123-5244(30092302)	1/23/2015	Supports
Spackman Individual 20150123-5244(30092302)	1/23/2015	Supports
Penrod Individual 20150123-5244(30092302)	1/23/2015	Supports
Woodward Individual 20150123-5244(30092302)	1/23/2015	Supports
Gailey Individual 20150123-5244(30092302)	1/23/2015	Supports
Harris Individual 20150123-5244(30092302)	1/23/2015	Supports
Beutler Individual 20150123-5244(30092302)	1/23/2015	Supports

APPENDIX B

MANDATORY CONDITIONS FROM BLM

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SECTION 4(e) MANDATORY TERMS AND CONDITIONS

The Department believes the application should be dismissed; however, the following conditions include requirements to address Project impacts that are anticipated should the Project be authorized.

License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 issued by Order No. 540, dated October 31, 1975, cover those general requirements that the Secretary of the Interior, acting by and through the Bureau of Land Management (BLM), considers necessary for adequate protection and utilization of the land and related resources of ldaho Falls District Idaho. Under authority of section 4(e) of the FPA, the Secretary also finds that the following conditions are necessary for the adequate protection and utilization of these reservation and the resource values for which the reservation is managed. These terms and conditions are based on those resources identified for management in the Federal Land Policy and Management Act (FLPMA) of 1976 and approved Resource Management Plan (RMP) for the BLM unit affected (See Appendix D - Pocatello RMP). Therefore, the following conditions covering specific requirements for protection and utilization of the public lands shall also be included in any license issued for the Project.

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4(e) Condition No. 1 - Activities On or Affecting Bureau of Land Management-Administered Lands

(A)The Licensee shall consult with the Bureau of Land Management (BLM) to identify and resolve any potential conflicts with BLM policy and direction prior to initiating activities on BLM-administered lands that is beyond the scope of the Project license or for which the Licensee has not otherwise obtained BLM approval.

(B) The Licensee shall cooperate with the BLM to obtain the appropriate rights-of- way or permits for use or access to BLM-administered lands prior to engaging in any activity that has the potential to affect other federally authorized activities on those lands.

(C) The Licensee shall receive written approval from BLM prior to changing the location of any Project feature or facility located on BLM-administered lands. The Licensee shall also receive written approval for any actions which are inconsistent with activities authorizing use or occupancy of BLM administered lands according the new license. Following BLM approval and at least 90 days prior to any change or departure, the Licensee shall file a report with the Federal Energy Regulatory Commission (Commission) and with the BLM, describing the change, reasons for the change, and demonstrating BLM approval of the change.

(D)The Licensee shall prepare site-specific plans for approval by the BLM for any ground disturbing activities on BLM-administered lands required by the license, including activities outlined in BLM resource management plans (RMP). RMPs prepared subsequent to issuance of the license shall be developed in reference to license articles that may be affected as a consequence of RMP implementation. The Licensee's site-specific plans shall include:

i. a map depicting the location of the proposed activity;

ii. a description of the land management area designation for the location of the proposed activity and applicable standards and guidelines;
iii. a description of alternative locations, designs, mitigation measures considered, and implementation and effectiveness monitoring designed to meet applicable standards and guidelines; and
iv. data collected from surveys, biological evaluations, or consultation as required by regulations applicable to ground or habitat disturbing activities on BLM lands in existence at the time the plan is prepared;

(1) When surveys indicate that activities may affect an Endangered Species Act (ESA) listed or proposed listed species or their habitat, the Licensee shall evaluate the impacts of the action on the species or habitat and submit this evaluation to the BLM.
(2) When surveys indicate an activity may affect a BLM sensitive species or their habitat, the Licensee shall evaluate the potential impact of the action and submit conclusions to the BLM for review and approval. BLM reserves the authority to require mitigation for the protection of these species.

(E) The Licensee shall file a Safety During Construction Plan with the Commission 60 days prior to initiating any ground-disturbing activity on BLM-administered lands. This plan will identify potential hazard areas and measures necessary to protect public safety. Areas to consider include construction activities near public roads, trails, recreation areas, and facilities.

The Licensee shall perform daily (or on a schedule otherwise agreed to by the BLM) inspections of Licensee's construction operations on BLM administered lands and adjoining fee title property while construction is in progress. The Licensee shall document these inspections and deliver this documentation to BLM on a schedule agreed to by the Licensee and BLM. Inspections must evaluate fire plan compliance, public safety, and environmental protection. The Licensee shall act immediately to address any necessary corrections.

(F) The Licensee shall consult with BLM to prepare a Spoils Disposal Plan prior to initiating any ground disturbing activity on BLM-administered lands. Upon BLM approval, the plan shall be filed with the Commission. The plan shall address disposal and/or storage of waste soil and/or rock materials (spoils) generated by road maintenance, slope failures, and construction projects. The plan shall include provisions for:

i. identifying and characterizing the nature of the spoils in accordance with applicable BLM regulations;

ii. identifying sites for the disposal and/or storage of spoils that prevent contamination of water by leachate and surface water runoff; and
iii. developing and implementing stabilization, slope reconfiguration, erosion control, reclamation, and rehabilitation measures.

(G)The Licensee shall file a Hazardous Substances Plan for oil and hazardous substance storage, spill prevention, and clean up with the Commission prior to planning, construction, or maintenance that may affect BLM administered lands. At least 90 days prior to submission, the Licensee shall provide a copy of the plan to the BLM for its review and approval. At a minimum, the plan shall:

i. outline the Licensee's procedures for reporting and responding to releases of hazardous substances, including names and phone numbers of all emergency response personnel and their assigned responsibilities; and
ii. maintain a cache of spill cleanup equipment sufficient to contain any spill from the Project.

On a semi-annual basis, the Licensee shall provide the BLM information on the location of spill cleanup equipment on BLM-administered lands and the location, type, and quantity of oil and hazardous substances stored in the Project area. The Licensee shall inform BLM immediately as to the nature, time, date, location, and action taken for any spill affecting BLM administered lands.

(H)The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and BLM boundary markers. In the event that any markers or monuments are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by the license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of the BLM. The Licensee shall ensure that any such official survey records affected are amended as provided for by law.

(I) The Licensee shall maintain Project-related improvements and facilities located on BLM-administered lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the agency. The Licensee shall comply with all applicable Federal, State, and local laws, regulations, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. § 1251 *et seq.*, the Resources Conservation and Recovery Act, 42 U.S.C. § 6901 *et seq.*, the Comprehensive Environmental Response, Control, and Liability Act, 42 U.S.C. § 9601 *et seq.*, and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, maintenance of any facility, improvement, or equipment.

(J) The Licensee shall restore BLM-administered lands to a condition satisfactory to BLM prior to any surrender of the Project license or abandonment of Project facilities. At least one year in advance of an application for license surrender, the Licensee shall file with the Commission a restoration plan approved by the BLM. The restoration plan shall identify any capital improvements that will be removed, restoration measures, time frames, and costs. In addition, the Licensee shall commission an audit to assist the BLM in determining whether the Licensee has the financial ability to fund the decommissioning and restoration work specified in the plan.

As a condition of any transfer of the license or sale of the project, the Licensee shall guarantee or assure, in a manner satisfactory to the BLM, that the Licensee or transferee will provide for the costs of surrender and restoration.

Any license amendment that authorizes use of BLM-administered lands shall be subject to such conditions the BLM deems necessary to protect and utilize affected BLM reservations.

(K)The Licensee shall indemnify, defend, and hold the United States harmless for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the Licensee in connection with the use and/or occupancy authorized by the license. This indemnification and hold harmless provision applies to any acts and omissions of the Licensee or the Licensee's heirs, assigns, agents, employees, affiliates, subsidiaries, fiduciaries, contractors, or lessees in connection with the use and/or occupancy authorized by this license which result in: (1) violations of any laws and regulations which are now or which may in the future become applicable, and including but not limited to environmental laws such as the Comprehensive Environmental Response Compensation and Liability Act, Resource Conservation and Recovery Act, Oil Pollution Act, Clean Water Act, Clean Air Act; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States; or (4) the release or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment.

Justification

BLM administers lands within and adjacent to 2.5 miles of the Project reservoir for recreation use, wildlife habitat, livestock grazing, cultural resource protection, and facilities maintenance. Project operation and/or mitigation for impacts of the Project on BLM-administered resources must ensure actions are in compliance with laws, regulations, policies and land use plan decisions necessitating consultation with the BLM prior to implementation of any action on

federal lands to ensure the continued protection and utilization of BLM-administered resources and consistent BLM management.

BLM has the authority to address planning issues through direction within the FLPMA. Specifically, according to:

• Sec. 103(c) (7) "the public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use. . . ."
• Sec. 302 (b) "In managing the public lands, the Secretary shall, subject to this Act and other applicable law and under such terms and conditions as are consistent with such law, regulate, through easement, permits, leases, licenses, published rules, or other instruments as the Secretary deems appropriate, the use, occupancy, and development of the public lands, including, but not limited to, long-term leases to permit individuals to utilize public lands for habitation. . . . "
• Sec. 302(d)(2) "Use of public lands pursuant to a general authorization under this subsection shall be limited to areas where such use would not be inconsistent with the plans prepared pursuant to section 202. Each such use shall be subject to a requirement that the using department shall be responsible for any necessary cleanup and decontamination of the lands used. . . ."
• Sec. 302(d)(2)(A) "minimize adverse impacts on the natural environment, scientific, cultural, and other resources and values (including fish and wildlife habitat) of the public lands involved."
• Sec. 302(d)(5) "To the extent that public safety may require closure to public use of any portion of the public lands covered by an authorization issued pursuant to this subsection, . . . [the Secretary] shall take appropriate steps to notify the public concerning such closure and to provide appropriate warnings of risks to public safety."

<u>4(e) Condition No. 2 – Consultation with the Bureau of Land Management</u>

> Within 60 days of the anniversary of license issuance, the Licensee shall prepare and provide a written report in consultation with the Bureau of Land Management (BLM) documenting and/or evaluating measures necessary for the continued protection and utilization of BLM-administered lands and resources that are affected by the Project. Within 60-days of issuance of the report to BLM, the Licensee shall file the record of consultation and any recommendations with the Commission. The BLM reserves the right, after notice, comment, and administrative review, to require changes to Project operation through revision of 4(e) conditions.

Justification

The Federal Land Policy Management Act (FLPMA) requires the BLM to consult with other entities regarding the management of public resources. The Licensee's obligation to operate the Project in accordance with conditions the BLM determines necessary for the continued protection and utilization of federal-administered resources necessitates this consultation requirement for the Bear River Narrows Hydroelectric Project particularly as resource management objectives could be compromised by Project operations and would require federal action and notice and comment to rectify or mitigate.

The FLPMA (Sec. 307[a]) requires the Secretary of Interior (Secretary) through the Interior Bureaus "… to conduct investigations, studies, and experiments, [based] on [the Secretary's] initiative or in cooperation with others, involving the management, protection, development, acquisition, and conveying of the public lands."

4(e) Condition No. 3 - Travel and Access Management

> Prior to any construction activities or surface disturbance, the Licensee, in consultation with the BLM, shall develop and file with the Federal Energy Regulatory Commission (Commission) an integrated Travel and Access Management Plan for lands administered by the Bureau of Land Management (BLM) affected by the Project. Any road construction that takes place must comply with the BLM Gold Book Standards. The Travel and Access Management Plan shall be incorporated into the Comprehensive Recreation Management Plan (CRMP) and coordinated with the Integrated Wildlife Habitat Program (IWHP) and Wildlife Mitigation and Management Plan (WMMP). Upon Commission approval, the Licensee shall implement the Travel and Access Management Plan.
>
> The purpose of the Travel and Access Management Plan is to provide transportation maintenance and management, provide for public safety, improve habitat effectiveness on the winter range, protect sensitive wildlife and plant populations from human interference during critical periods of the year, manage vehicle access and numbers consistent with resource goals, coordinate off highway vehicle (OHV) management between Federal land use agencies and the Licensee, manage noxious weeds, improve aquatic connectivity, and protect cultural resources. The plan shall at a minimum:
>
> > (i) Identify management goals and objectives consistent with BLM resource protection for BLM-administered lands affected by the Project;

(ii) Identify Licensee responsibilities for road management and maintenance for roads which it has assumed responsibility, and for roads on BLM administered lands affected by the Project.
(iii) Prior to any construction activities or surface disturbance, the License shall have implemented and evaluated Best Management Practices (BMP) to:

a) Maintain and improve roads to reduce potential for road failure as a consequence of reservoir fluctuation and/or weather;
b) Mitigate for soil erosion;
c) Monitor road use and increased/decreased use of roads for recreation access;
d) Manage OHV use on and off roads within the Project and adjacent areas. The Licensee shall assume responsibility for 50% of the costs to implement and administer mitigation measures for impacts from OHV users. Costs associated with these measures may include interpretive, directional and regulatory signs, road and trail closures (including fencing, berms, and rehabilitation of unauthorized routes), trail maintenance, use supervision and enforcement;
e) Construct barriers, guardrails and other safety measures that are aesthetically pleasing;
f) Identify and implement road closures as needed;
g) Identify and implement BMPs for maintenance necessary to protect cultural resources, control the spread of noxious weeds, protect sensitive plants and threatened and endangered species, minimize soil erosion, and protect aquatic resources;

The Licensee shall accommodate unrestricted access by the BLM for purposes necessary to manage and administer BLM lands and resources that are impacted by Project operations. The Licensee shall consult the BLM for a list of times and locations when road access restrictions should be in effect. The plan shall include provisions for the maintenance of crossings and rights-of-way

A Right-of-Way shall be required consistent with permit requirements for power lines, penstocks, ditches, and pipelines.

The Licensee shall consult with the BLM prior to erecting any signs on BLM administered lands that are necessary for operation or maintenance of Project operations or facilities. The Licensee must obtain approval from the BLM specific to the location, design, size, color, and content of signs. The Licensee shall be responsible for maintaining all Licensee erected signs.

Justification

Access to Project lands and facilities is currently gained via the Oneida Narrows Road, which is primarily located on BLM and PacifiCorp lands. PacifiCorp regularly maintains 6 miles of the gravel that starts just north of Highway 36 and goes to the Oneida Dam. The Bear River Ranches access road is a privately maintained road on BLM that is authorized under a ROW. The road starts at the Oneida Narrows road (adjacent to the boater take-out) and provides access to the Bear River Ranches development, located approximately one mile north of the Bear River. The Oneida Narrows Road currently provides access to BLM administered recreation sites along the Bear River and Oneida Narrows Reservoir and is also the primary access road the Oneida Dam and associated PacifiCorp facilities and day-use site. Should the project be constructed, all existing public road access to the BLM along the shoreline of the Bear River would be lost. Future roads that cross BLM administered lands and would require ROW authorizations from the BLM. Thus the BLM has a direct interest in the maintenance and management of the road network.

Prior to granting or renewing a right-of-way, the applicant must submit plans, maps or other information related to the use of the proposal for evaluation by the BLM. Each ROW shall be limited to the area necessary for operation and maintenance, will consider the protection of public safety and ensure the use authorized will cause no unnecessary damage to the environment. Each ROW shall contain terms and conditions requiring compliance with environmental quality standards applicable to Federal or State law. Such terms and conditions are intended to provide efficient management of lands subject to the ROW and to protect the interest of individuals living in the area as well as the public interest in the Federal lands.

BLM has the authority to address road maintenance and management through direction within the FLPMA. Specifically, Section 302 (b) authorizes the Secretary of Interior (Secretary) to "regulate, through easement, permits, leases, licenses, published rules, or other instruments as the Secretary deems appropriate, the use, occupancy, and development of the public lands, including, but not limited to, long-term leases to permit individuals to utilize public lands for habitation, …."

<u>4(e) Condition No. 4 - Law Enforcement and Emergency Services</u>

> Prior to any construction activities or surface disturbance, the Licensee shall develop and implement a Law Enforcement and Emergency Services Plan (LEESP) that includes provision for coordination and funding of law enforcement and emergency services personnel with jurisdiction within the Bear River Narrows Hydroelectric Project (Project). The LEESP is intended to increase the effectiveness and efficiency of law

enforcement and response for medical and other emergencies. The LEESP may include provisions for law enforcement presence, other types of public contact personnel presence, enhanced emergency communication and response procedures, public safety and security, protection measures for natural resources, recreation resources, and heritage resources within the Project generally.

The LEESP shall address medical response measures, including number, placement, and time availability of quick response units and certified "first responders." At a minimum, the LEESP shall include one strategically placed quick response unit and a certified "first responder" available at each of these units during all high use periods.

Licensee shall develop and implement the original LEESP and subsequent revisions as provided for in the LEESP.

The LEESP should include provisions to coordinate with the local counties and the Bureau of Land Management (BLM) to assess law enforcement needs and establish triggers to determine when and/or if additional law enforcement personnel are necessary to patrol BLM administered lands that are impacted by the Project. This evaluation should include an assessment of the need for additional federal law enforcement. If additional law enforcement on BLM administered lands is necessary over the period of the new license, the Licensee shall assure adequate law enforcement, including funding for additional personnel (county, state, or federal) is provided to the BLM and other law enforcement jurisdictions.

The LEESP shall include provisions for coordination with the BLM to evaluate the need for enhanced fire protection on BLM administered lands, including monitoring and evaluation of human-caused fires that affect BLM administered lands. If monitoring demonstrates an increased need for fire prevention, detection, and suppression, the Licensee shall provide for 100% of the costs of these activities.

Justification

Emergency communications and provisions for first-responders that are necessary to maintain a safe environment must be sufficient to address the demand for emergency management.

Emergency communications and provisions for first responders and the public must be adequate for maintaining public safety throughout the Project. Lack of adequate communication facilities will delay emergency response time, increasing safety concerns for the public as well as personnel who work in the project area.

Medical emergencies are not always promptly attended too because ambulance service is currently provided by emergency services from Preston, ID. As the need for emergency services increases it will likely become more difficult for this small community to continue to provide such service in this remote location.

Although County deputies do not have the authority to enforce federal law on BLM administered lands, the deputies work cooperatively with federal law enforcement officers and administer state laws on those lands. The Licensee shall maintain agreements with Franklin County to fund all or portions of patrol efforts within the Project. An increased Federal presence may become necessary to support the County effort and this law enforcement and emergency services condition provides for expansion of federal law enforcement.

BLM's authority derives from Section 303(c)(2) of the FLPMAas amended through September 1999 that directs the Secretary "to authorize Federal personnel or appropriate local officials to carry out… law enforcement responsibilities with respect to the public lands and their resources." Section 303(d) states that "in connection with the administration and regulation of the use and occupancy of the public lands, the Secretary is authorized to cooperate with the regulatory and law enforcement officials of any State or political subdivision thereof in the enforcement of the laws or ordinance of such State or subdivision."

4(e) Condition No. 5 - Historic Properties Management Plan (HPMA)

(A)Within one year of license issuance, the Licensee shall file a revised final Historic Properties Management Plan (HPMP) with the Federal Energy Regulatory Commission (Commission). The plan shall be revised in consultation with the Bureau of Land Management (BLM), Idaho State Historic Preservation Office (SHPO) and Tribal governments.

A draft of the revised plan shall be submitted to the BLM, providing 60 days for review and comment before completion of the final plan for submission to the Commission. As new historic properties are identified or additional Project effects are documented, site-specific monitoring, protection or mitigation measures shall be incorporated into HPMP updates, and subject to BLM review and comment.

(B) The Licensee shall prepare and submit annual reports to BLM describing its activities involving BLM-administered cultural resources.

(C) The Licensee shall conduct periodic reviews of the HPMP focusing on the degree to which protection and mitigation measures are contributing to cultural resource maintenance and protection. The review shall include consultation with and comments from signatories to

the Programmatic Agreement. A formal report of the review shall be prepared by Licensee and submitted to the BLM and Commission.

(D) In addition to following the Guidelines for an HPMP as described by the Commission and Advisory Council on Historic Preservation (ACHP), the revised HPMP will provide for the following:

i. Development of site-specific plans for evaluating eligibility, monitoring, protection and mitigation of historic properties on BLM land in consultation with and subject to review and approval of the BLM. Plans shall be submitted to the Commission before implementation. The following plans and actions shall be included:

1. Determinations of National Register Eligibility
During the license term, Licensee shall complete investigations necessary to determine eligibility for cultural resource properties. Evaluations shall be completed within three years of discovery of any newly identified properties. Evaluation work plans shall be developed in consultation with BLM, SHPOs and Tribes, allowing at least 60 days for review and comment on proposed work plans. Final evaluation work plans shall be subject to prior BLM and SHPO approval.

2. Site Monitoring
Within one year of issuance of a new project license, Licensee shall develop and submit a site monitoring program with data collection methods, timing, priorities and schedules for eligible and potentially eligible sites affected by the Project on BLM-administered lands. The program will be developed in consultation with BLM and SHPOs, and subject to a minimum of 60 day review and comment, before submission of the final for approval by the BLM and SHPO. Methods and data collected for the initial monitoring program shall be standardized and quantifiable so as to provide adequate data for comparison of changes to site content, condition and impacts. At a minimum, documentation shall map site boundaries; update site records; provide a detailed description of the site, describe observed impacts; and provide recommendations for site protection or mitigation of any adverse effects. The monitoring protocol should describe how effects discovered during monitoring will be mitigated. Schedules, priorities and the list of sites identified for subsequent monitoring cycles will be adjusted based on initial results, and shall be prepared by Licensee in consultation with and subject to the approval of BLM. Licensee shall update the monitoring program to incorporate new historic properties as they are identified. Monitoring reports and updated site records shall be provided to BLM at the end of each calendar year.

3. Site Protection and Stabilization

The Licensee shall prepare and implement site-specific plans for protection or stabilization of known or newly identified historic properties (including traditional cultural properties) on BLM land that are affected by Project operations. The Licensee shall develop the treatment plans in consultation with BLM, SHPOs, and Tribes, allowing a minimum of 60 days for review and comment on a draft prior to development of final plans. Plans shall be subject to BLM and SHPO approval. Plans shall a) assess feasibility and alternative methods for protection, stabilization or restoration of affected, eligible properties, b) identify treatment objectives, priorities, and implementation schedule and c) be responsive to the criteria under which a site is considered eligible for the National Register. The Licensee shall maintain the site protection measures until the treatment has achieved objectives and has been assessed as no longer needed in consultation with BLM and SHPO. If monitoring results or condition assessments indicate that protection measures are needed, the Licensee shall prepare site-specific feasibility plans for protection or stabilization for six sites on BLM-administered lands. Licensee shall conduct post treatment efficacy monitoring and provide a report of results to the BLM.

4. Data Recovery

When in-place protection is not technically feasible, the Licensee shall develop and implement plans to recover data from affected eligible historic properties on BLM-administered lands. Plans shall be developed and implemented in consultation with the Advisory Council on Historic Preservation (ACHP) as necessary, BLM, SHPOs, and Tribes, allowing a minimum of 60 days for review and comment on proposed plans. Data recovery plans shall be responsive to the criteria under which the site is considered eligible to the National Register.

ii. Curation:

The Licensee shall arrange and fund long term curation, at a repository meeting federal curation standards, for any collections and documentation resulting from Licensee's prior or future studies of BLM administered resources in the APE. The Licensee shall comply with the curation standards and requirements established by 36 C.F.R. 79, the curation repository and the Idaho SHPO.

iii. Plan for updated inventories within the APE; including:

If, over the period of the License, flow management or Project operations result in newly exposed, previously unsurveyed lands with potential for discoverable sites in the project APE, the Licensee shall inventory BLM administered lands and provide a report to BLM on known and newly identified sites.

The Licensee shall ensure that all surveys and documentation meet federal and state agency requirements, and shall consult with the BLM on the design of any new field inventories on BLM land. The Licensee shall provide a minimum of 60 days for BLM review and comment on draft survey reports and site forms. Final reports shall be subject to BLM approval.

iv. Interpretation and Education Plan

Licensee shall consult with BLM, SHPO and Tribes on the development and implementation of any cultural Interpretive and Educational plan(s) proposed by Licensee on BLM-administered lands in the APE. Interpretative facilities or protection signage proposed on BLM lands shall be subject to prior BLM approval.

v. Prior to requesting BLM approval on any plan or project which would potentially affect Native American historic or prehistoric properties, sacred sites, or properties of traditional cultural and religious importance, the Licensee shall provide a minimum of 60 days for BLM to consult with affected Tribes.

vi. The Licensee shall make records available to BLM of cultural resource data gathered by Licensee for inventory, evaluation, monitoring, or site mitigation on BLM-administered land. vii. The Licensee should document procedures for maintaining confidentiality and security of sensitive site data and records protected under the ARPA and NHPA; viii. The Licensee should outline procedures for protecting historic properties during emergency undertakings; including how emergency undertakings will be defined, and how the BLM will be notified and consulted when BLM lands are involved.

vii. The Licensee shall immediately notify BLM if any human remains, funerary items, sacred objects or objects of cultural patrimony, as defined in the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered on BLM lands within the APE and Project. Discovery and stop work requirements shall be described in accordance with 43 C.F.R.10, for inadvertent discoveries of Native American human remains and other items subject to NAGPRA on federal lands.

viii. The Licensee shall immediately notify BLM of any discovery of previously unidentified cultural resources encountered during Licensee Project work on BLM lands.

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Justification

The Advisory Council on Historic Preservation and the Federal Energy Regulatory Commission have provided guidelines for developing an HPMP (*Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, May 20, 2002). Implementation of the HPMP is directed by execution of a Programmatic Agreement between the Commission, the Licensee, ACHP, SHPOs, and other signatories. The HPMP and Programmatic Agreement are instruments for implementing protection, mitigation and enhancement for cultural resources affected by the Project during the term of the new license, to comply with Section 106 NHPA. In the Commission's HPMP guidelines it reads:

> *"Applicants are encouraged to draft their HPMP in consultation with other stakeholders and submit it at the time they file a license application with the commission. Completion of a final HPMP is more easily accomplished prior to issuance of a new license, thereby alleviating many delays and compliance problems after issuance."*

Recommendations in the ACHP and Commission's HPMP Guidelines and requirements of 36 C.F.R 800, include:

- complete evaluations for eligibility to the National Register for purposes of Section 106 NHPA;
- incorporate measures to avoid, minimize or mitigate project effects for potentially eligible historic properties on BLM lands;
- provide for periodic evaluation of plan effectiveness, and adaptive revision in consultation with agencies, SHPOs and Tribes to accommodate new information or changes in site eligibility or effects as defined by regulation;
- provide for curation of collections and procedures for emergency undertakings.

Provision for periodic review and adaptive revision of the HPMP, and periodic reporting and meetings, is recommended by the ACHP and Commission's HPMP Guidelines; and re-evaluation is provided for in 36 C.F.R. 800.4(c)(1). Scheduling to complete actions in the HPMP is found in the ACHP and Commission's HPMP Guidelines.

<u>A (i) Determinations of National Register Eligibility</u>
Under Section 106 of the NHPA, the effects of relicensing the hydropower project on historic properties must be taken into account as prescribed in 36 C.F.R. 800. Fundamental to this evaluation is the requirement to determine the eligibility of properties to the National Register of Historic Places for Section 106 purposes (36 C.F.R. 60 and 36 C.F.R. § 800.4 (c)).

Of the archaeological or historic sites identified in the Project APE, sites considered not eligible for inclusion on the National Register include BR-1 (Wooden Granary), BR-2 (Two Wooden Granaries), BR-3 (Rock Diversion Dam), IHSI 41-17908 (Steel Stringer Bridge), IHSI 41-17909 (Steel Stringer Bridge), 10FR38 (Historic Trash Scatter), SB-56 (Recent Trash Scatter), 10FR16 (Historic Trash Scatter). Sites considered eligible or potentially eligible for Section 106 purposes include ISHI 41-17907 (Historic Farmstead) and ISHI 41-17895 (Twin Lakes Canal Co. Siphon). In addition, an area was identified on BLM land within the APE as potentially containing burials.

The potential burial site should also be included in the HPMP. Monitoring of this site is recommended if it cannot be avoided by the project.

Providing for re-evaluation of historic properties during the term of the license due to changing circumstances (e.g., passage of time or changes in property integrity) is recommended in the ACHP and Commission's HPMP Guidelines; and by 36 CFR 800.4 (c)(1) implementing the NHPA. Post-licensing discovery is provided for in regulations implementing the National Historic Preservation Act 36 CFR 800.13, 36 CFR 800.4 and recommended by the ACHP and Commission's HPMP Guidelines.

i(2) Site Monitoring

Monitoring is necessary to identify site-specific Project effects and causes of impacts on National Register eligible or unevaluated sites. Monitoring also tracks the outcome of protection, stabilization or mitigation measures implemented for adaptive management over the term of the new license. Provision of a monitoring protocol, and program of shoreline monitoring, is recommended in the ACHP and Commission's HPMP Guidelines.

i(3) Site Protection and Stabilization

Historic property specific treatment plans are recommended in the ACHP and Commission's HPMP Guidelines. Protection and stabilization treatments are measures that avoid, minimize or mitigate adverse effects to historic properties as provided for in 36 C.F.R. § 800.6 implementing the NHPA. Maintenance of stabilization and protection facilities is integral to the long term success of the protection measure. Guidance and direction for protecting historic properties on BLM administered land is provided in BLM Manual 8140. Among the multiple authorities (Appendix B: Cultural Resources) that provide for the preservation of historic resources and archaeological values on public lands is the FLPMA, which makes no distinction regarding National Register eligibility. Mitigation of adverse effects to historic properties is provided at 36 C.F.R 800.6 regulations implementing compliance with Section 106 of NHPA.

i(4) Data Recovery

Restoration and data recovery of historic properties are measures that mitigate adverse effects as provided for in 36 CFR 800.6(a) implementing Section 106 of the National Historic Preservation Act.

ii. Curation

Curation of archaeological site collections and associated documentation is required by regulations at 36 C.F.R. 79. Curation is integral to the mitigation of effects.

iii. Updated Inventories and Future Undertakings
Newly exposed lands that may contain undiscovered cultural resources would need updated inventories to identify potentially affected historic properties, in accordance with Section 106 of the NHPA and 36 CFR 800.

iv. Interpretation and Education
Cultural resource protection and interpretive signs are an important part of a program to discourage vandalism and encourage proper visitor behavior. Public outreach and interpretation are provided for in ARPA Section 10 and in the ACHP and Commission's HPMP Guidelines. Public awareness and interpretation programs to protect cultural resources are objectives in the BLM 8170 Manual direction.

v. Consultation with Tribes
Consultation with Tribes is required by the NHPA and 36 C.F.R. 800 for identification of properties of religious and cultural importance (36 C.F.R. § 800.4) and assessing the undertaking's effects to such properties (36 C.F.R. § 800.2; 36 C.F.R. § 800.5). Federal agency government-to government consultation with Tribes is required by Executive Orders 13007 (Indian Sacred Sites, 1996) and Executive Order 13175 (Consultation and Coordination with Tribal Governments, 2000).

vi. Data Sharing
Information gathered about cultural resources within BLM's jurisdiction should be made available for BLM's management under Section 106 of the National Historic Preservation Act and the FLPMA.

vii. Confidentiality
Confidentiality is required under 36 C.F.R. § 296.18, and is a principle of the ACHP and Commission's HPMP Guidelines.

viii. Emergency Undertakings
Developing procedures for taking historic properties into account during operations which respond to a disaster or emergency is consistent with provisions in 36 C.F.R. § 800.12.

ix. Compliance with NAGPRA
Notification under NAGPRA is required under 43 C.F.R. § 10.4, and directed by the ACHP and Commission's HPMP Guidelines.

x. Historic Property Discoveries
BLM needs to be notified when previously unidentified properties are discovered, in accordance with post licensing discoveries provided for in 36 C.F.R. § 800.13 and the ACHP and Commission's HPMP Guidelines.

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APPENDIX C

DRAFT LICENSE ARTICLES

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I. MANDATORY CONDITIONS

On December 15, 2014, the U.S. Department of the Interior, Bureau of Land Management (BLM), filed 16 preliminary 4(e) conditions (appendix B). These conditions are described in section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*, of the environmental impact statement (EIS). We consider nine of these conditions (1A, 1B, 1C, 1E, 1H, 1I, 1J, 1K, and 3 [those aspects that pertain to unrestricted BLM access to project roads and designing signage to BLM standards]) to be administrative or legal in nature and not specific environmental measures. Of the seven conditions we consider to be environmental measures applicable to the Bear River Narrows Project, we include six[1] of these conditions in the staff licensing alternative as specified by BLM.

We recognize, however, that the Commission is required to include valid 4(e) conditions in any license issued for the project. As such, the BLM condition that we do not recommend would be included in a new license.

II. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project in addition to the mandatory conditions.

Article 3XX. *Dam Stability Design Considerations*. The licensee must conduct (1) an updated seismic hazard analysis, including local fault identification; (2) additional analysis of measures that may be needed to control seepage along the penstock, such as a filter diaphragm wall; and (3) analysis of measures that may be needed to control erosion during overflow spillway operation and when the dam is overtopped during a high-flow event that exceeds the capacity of the overflow spillway, such as training walls along the overflow spillway and an additional stilling basin or other protective measures along the toe of the dam on either side of the overflow spillway. The licensee must incorporate the results of these analyses into the final design of the project dam and hydroelectric project. The final project design submitted to the Commission for approval must include the results of the updated seismic hazard analysis and the additional analysis of measures to control seepage along the penstock and erosion during overflow spillway operation and if the dam is overtopped during a high-flow event.

Article 3XX. *Canyon Slope Stability Analysis*. The licensee must conduct a site-specific geotechnical investigation and stability analyses to evaluate the potential for

[1] As explained in section 5 of the draft EIS, we do not recommend condition 4, develop a law enforcement and emergency services plan.

slope instability at the two proposed borrow sites and the canyon walls adjacent to project features, including both sides of the dam and the west slope adjacent to the powerhouse, substation, parking area, and boater put-in. If the analyses conclude that any slopes are not stable during construction, usual, or unusual loading conditions, or would develop unacceptable deformations under earthquake loading conditions, the final design must include specific engineering measures that will prevent slope failures during project construction and operation. The final project design submitted to the Commission for approval must include the results of the geotechnical investigation and slope stability analyses upon which any proposed engineering measures are based.

Article 4XX. *Commission Approval and Filing of Reports and Amendment Applications.*

(a) Requirement to File Plans for Commission Approval

Various conditions of this license found in the U.S. Department of the Interior, Bureau of Land Management's (BLM's) section 4(e) conditions (appendix B) require the licensee to prepare plans in consultation with other entities for approval by BLM and implement specific measures without prior Commission approval. Each such plan must also be submitted to the Commission for approval. These plans are listed below.

BLM Condition	Plan Name	Due Date
1D	Site-specific plans for any ground-disturbing activities on BLM-administered land required by the license	Not specified
1F	Spoils disposal plan	Prior to initiating any ground-disturbing activity on BLM-administered land
1G	Hazardous substances plan for oil and hazardous substance storage, spill prevention, and clean up	Prior to planning, construction, or maintenance that may affect BLM-administered land
4	Law enforcement and emergency services plan	Prior to any construction activities or surface disturbance
5	Historic Properties Management Plan	Within 1 year of license issuance

The licensee must include with each plan filed with the Commission documentation that the licensee developed the plan in consultation with BLM, the U.S. Fish and Wildlife Service, Idaho Department of Environmental Quality, Idaho Department of Fish and Game, and Idaho State Historical Society and has received approval from BLM, as appropriate. The Commission reserves the right to make changes to any plan submitted. Upon Commission approval, the plan becomes a requirement of the license, and the licensee must implement the plan or changes in project operations or facilities, including any changes required by the Commission.

The following 4(e) conditions must be applied to all lands within the project boundary, as needed: safety during construction plan (condition 1E); spoils disposal plan (condition 1F); hazardous substances plan (condition 1G); and travel and access management plan (condition 3).

(b) Requirement to File Reports

One BLM section 4(e) condition requires Twin Lakes to file reports with other entities. Because these reports relate to compliance with the requirements of this license, each such report must also be submitted to the Commission. These reports are listed in the following table.

BLM Condition	Description	Due Date
2	Reports regarding documenting and evaluating measures necessary for the continued protection of resources on BLM-administered land	Within 120 days of the anniversary of license issuance (annually)

The licensee must submit to the Commission documentation of any consultation, and copies of any comments and recommendations made by any consulted entity in connection with each report. The Commission reserves the right to require changes to project operations or facilities based on the information contained in the report and any other available information.

(c) Requirement to File Amendment Applications

Certain BLM 4(e) conditions in appendix B contemplate unspecified long-term changes to project operations or facilities for the purpose of mitigating environmental impacts (e.g., mitigation if BLM sensitive species or their habitats are found during site-specific planning for ground-disturbing activities on BLM-administered land [1D]; and modification of 4(e) conditions based on annual reports regarding measures necessary to protect resources on BLM managed land [2]). These changes may not be implemented

without prior Commission authorization granted after the filing of an application to amend the license.

Article 4XX. *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior pursuant to section 18 of the Federal Power Act.

Article 4XX. *Columbia River Basin Fish and Wildlife Program*. The Commission reserves the authority to order, upon its own motion or upon the recommendation of federal and state fish and wildlife agencies, affected Indian Tribes, or the Northwest Power and Conservation Council, alterations of project structures and operations to take into account to the fullest extent practicable the regional fish and wildlife program developed and amended pursuant to the Pacific Northwest Electric Power Planning and Conservation Act.

Article 4XX. *Erosion Control Plan.* Within 1 year of license issuance, the licensee must revise the draft Erosion Control Plan filed on April 1, 2014, and file the plan with the Commission for approval. The plan must be based on the final project design, including any construction or ground-disturbing activities at onsite or offsite mitigation sites. The plan must include, at a minimum, the following: (1) an erosion control report that discusses strategy of the Erosion Control Plan; (2) site drawings of existing and proposed conditions, including: project boundaries and construction activity areas; landowners affected by the work; excavations, grades, paved areas, pond elevations, structures, and utilities; drainage easements required; surface water and wetlands, drainage patterns, and watershed boundaries; location of vegetative cover; location of proposed best management practices; and location of turbidity monitoring stations; (3) topographic survey showing drainage and irrigation water conveyance system and finished grade contours at 2-foot intervals; (4) plans of proposed permanent drainage systems after construction is complete; (5) mapping of all erodible soils; (6) final limits of soil disturbance for each site; (7) a best management practices inspection and maintenance schedule; (8) final vegetation, landscaping, and permanent stabilization measures; (9) turbidity monitoring protocols; (10) incorporation of best management practice-11, vehicle/equipment washing and maintenance from Idaho Department of Environmental Quality (Idaho DEQ, 2005); (11) the provisions of Bureau of Land Management (BLM) condition 1F, spoils disposal plan; and (12) the provisions of BLM condition 1G, hazardous substances plan, that pertain to project construction.

The revised Erosion Control Plan must be developed after consultation with the Idaho Department of Fish and Game, Idaho DEQ, U.S. Fish and Wildlife Service, and BLM. The licensee must include with the plan filed with the Commission

documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Operation and Maintenance Hazardous Substances Plan.* Within 3 years of license issuance, the licensee must file with the Commission, for approval, an operation and maintenance hazardous substances plan, as required by Bureau of Land Management (BLM) condition 1G.

The operation and maintenance hazardous substances plan must be developed after consultation with the Idaho Department of Fish and Game, Idaho Department of Environmental Quality, U.S. Fish and Wildlife Service, and BLM, and filed with the Commission for approval. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Replacement of Existing Diversion Structure*. Within 1 year of license issuance, the licensee must file with the Commission for approval, a plan for the replacement of the diversion structure for water right 13-969A. The replacement structure must be capable of delivering up to 3.46 cubic feet per second (the amount of the water right) at all water levels under which the proposed reservoir will operate. The licensee must consult with the owners of water right 13-969A regarding design, schedule, and construction of the replacement diversion structure.

The plan must be developed after consultation with the Idaho Department of Environmental Quality and filed with the Commission for approval. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and

provided to the owners of the water right, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Revised Dissolved Oxygen Management Plan*. Within 180 days of license issuance, the licensee must file with the Commission, for approval, a revised Dissolved Oxygen Management Plan originally filed with the license application on November 27, 2013. The revised plan must include the following additional items: (1) the basis for the claim that the bypassed water would be at 100 percent dissolved oxygen saturation and how that will be ensured; (2) a description of how long air injection at the turbines would occur before jetting water at 100 percent saturation is implemented and the decision-making process for transitioning from air injection to bypassing saturated water; and (3) a description of options that will be considered if air injection and bypassing the turbines with high dissolved oxygen saturated water do not result in water downstream of the project meeting state standards for dissolved oxygen, including conceptual costs associated with each viable option assessed.

The revised Dissolved Oxygen Management Plan must be developed after consultation with the Idaho Department of Fish and Game, Idaho Department of Environmental Quality, Bureau of Land Management, and U.S. Fish and Wildlife Service. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the revised plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Minimum Flow Releases from Mink Creek Diversion Dam.* The licensee must maintain an instantaneous minimum flow of 20 cubic feet per second (cfs) from April through September and 15 cfs from October through March immediately downstream of the licensee's Mink Creek diversion dam.

Article 4XX. *Bear River Flows*. The licensee must operate the project such that Bear River flows downstream of the confluence of Mink Creek match releases from the upstream Oneida dam (Bear River Project, FERC No. 20) during construction and routine operation (defined as periods when the reservoir is not refilling) and provide a minimum flow of 251 cfs or inflow to the project, whichever is less, during construction, operation, and reservoir refilling.

Article 4XX. *Reservoir Operating Range*. The licensee must operate the project with a normal (defined when project inflows do not exceed the hydraulic capacity of the turbines) maximum reservoir elevation of 4, 734 feet above sea level and must not draw down the reservoir below elevation 4,718 feet above sea level, which corresponds to 5,000 acre-feet of storage.

Article 4XX. *Construction Flow Monitoring Plan*. Within 1 year of license issuance, the licensee must file with the Commission, for approval, a construction flow monitoring plan to document that the flows specified in article 4XX are maintained during construction of the dam and during initial reservoir filling and if interrupted, facilitate prompt corrective actions. The plan must include, at a minimum, the following: (1) identification of the downstream monitoring location; (2) a description of the proposed flow monitoring equipment and quality assurance measures; and (3) provisions for reporting any flow interruptions to the agencies and the Commission, including a description of measures taken or that would be taken to restore flows, and procedures that would be implemented to prevent future flow interruptions during the construction and reservoir filling period.

The construction flow monitoring plan must be developed after consultation with the Idaho Department of Fish and Game, Idaho Department of Environmental Quality, U.S. Fish and Wildlife Service, and Bureau of Land Management. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Operation Compliance Monitoring Plan*. Within 3 years of license issuance, the licensee must file with the Commission, for approval, an operation

compliance monitoring plan that provides for monitoring flows in Mink Creek immediately downstream of the Twin Lakes Canal Company's Mink Creek diversion dam and in Bear River immediately downstream of the licensee's proposed pumping station and monitoring water levels in the proposed reservoir. The plan must include, at a minimum, the following: (1) the proposed locations of all three gages; (2) a description of proposed monitoring equipment, including make and model; (3) quality control procedures and the expected precision of all three gages; (4) a description of the timing, magnitude, and rates of proposed reservoir drawdown and refill; (5) protocols for modifying the reservoir drawdown or refill schedules based on operational or environmental considerations; and (6) provisions for filing annual reports with the Commission. The reports must include daily reservoir elevations and the equivalent storage volume and average hourly flow for the two flow monitoring gages. The reports must also include a comparison table of same time flows as measured at the new Mink Creek and Bear River gages and inflow to the project as measured at the existing gage downstream of the Oneida dam (Bear River Project, FERC No. 20).[2] Notes must be included regarding the beginning and end of any reservoir drawdown and refilling (with quantification of flows withheld during refilling).

The operation compliance monitoring plan must be developed after consultation with the Idaho Department of Fish and Game, Idaho Department of Environmental Quality, U.S. Fish and Wildlife Service, Bureau of Land Management, and United States Geological Survey. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Mink Creek Non-Native Fish Control Plan.* Within 180 days of license issuance, the licensee must file with the Commission, for approval, a plan to control non-native fish in Mink Creek from its headwaters to its confluence with Bear River. The plan must include, at a minimum, the specific methods that would be used to control non-native fish, the implementation schedule for control actions that will be

[2] This gage is former United States Geological Survey gage number 10086500, now owned and operated by PacifiCorp Energy.

initiated during the second year of the license term and followed for the duration of the term. The plan must also provide for the filing of annual reports that documents: (1) control actions taken; and (2) the number, species, and age class of all fish (native and non-native) captured. Following the first report, each report thereafter must include a trend analysis to monitor non-native fish control efforts and Bonneville cutthroat trout populations in Mink Creek and any recommendations to revise the Mink Creek non-native fish control plan (if any). .

The Mink Creek non-native fish control plan, and any subsequent reports must be developed after consultation with the Idaho Department of Fish and Game, U.S. Forest Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan and subsequent reports filed with the Commission, documentation of consultation, copies of comments and recommendations on the completed plan and subsequent reports, and specific descriptions of how the agencies' comments are accommodated by the plan or subsequent reports. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan or reports with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Mink Creek Fish Barrier Passage Plan*. Within 180 days of license issuance, the licensee must file with the Commission, for approval, a plan to remove upstream barriers to fish passage on Mink Creek. The plan must include, at a minimum, the following: (1) identification of barriers to upstream movement of Bonneville cutthroat trout; (2) prioritization of barriers to be removed; (3) methods and a schedule for each identified barrier to upstream fish passage to be made passable; (4) identification of any water user agreements that may be needed prior to barrier removal efforts; and (5) an analysis that considers how passage at each barrier on Mink Creek may independently and cumulatively effect distribution and populations of native and non-native fishes throughout Mink Creek.

The Mink Creek fish barrier passage plan must be developed after consultation with the Idaho Department of Fish and Game, U.S. Forest Service, and the U.S. Fish and Wildlife Service. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies' to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Mink Creek Canal Intake Fish Screening Plan.* Within 180 days of license issuance, the licensee must file with the Commission, for approval, a plan for installing and maintaining a fish screen at the Twin Lakes' Mink Creek canal intake structure on Mink Creek. The plan must include: (1) the specific design of the proposed fish screen; (2) a schedule for installation of the fish screen; and (3) a screen maintenance, inspection, and operation protocol.

The Mink Creek canal intake fish screening plan must be developed in consultation with the Idaho Department of Fish and Game and U.S. Fish and Wildlife Service and filed with the Commission for approval. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Bear River Pumping Station Intake Fish Screening Plan Finalization.* Within 180 days of license issuance, the licensee must file with the Commission, for approval, a revised Bear River pumping station intake fish screening plan. The plan must be based on the conceptual fish screening plan shown in exhibit F-8 of the final license application.

The revised Bear River pumping station intake fish screening plan must be developed in consultation with the Idaho Department of Fish and Game and U.S. Fish and Wildlife Service and filed with the Commission for approval. The licensee must include with the plan filed with the Commission documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Land disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Revised Noxious Weed Prevention and Revegetation Plan*. Within 180 days of license issuance, the licensee must revise its Noxious Weed Prevention and Revegetation Plan filed on November 27, 2013, and file the revised plan with the Commission for approval. The revised plan must include the following additional items: (1) identification of proposed photo points for monitoring upland revegetation activities; (2) criteria for revegetation success based on existing vegetation community structure in areas of proposed disturbance or at reference sites with similar vegetation structure; (3) a provision that criteria for successful revegetation of upland areas are met for two successive growing seasons after initial success criteria are met; (4) discussion of any irrigation needed to expedite plant growth; (5) documentation of existing water rights and those necessary for ensuring survival of plantings; (6) description of any measures to enhance existing wildlife habitat; (7) a provision for a site steward to oversee management of the revegetation sites; and (8) an implementation schedule.

The revised Noxious Weed Prevention and Revegetation Plan must be developed after consultation with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the Idaho Department of Fish and Wildlife. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Avian Protection at the Project Transmission Lines.* The licensee must construct and maintain the project transmission line in accordance with Avian Power Line Interaction Committee (APLIC) guidelines provided in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*.

The licensee must consult with the U.S. Fish and Wildlife Service and Idaho Department of Fish and Game in adopting these guidelines, and must develop and implement a design that will provide adequate separation of energized conductors,

groundwires, and other metal hardware, adequate insulation, or any other measures necessary to protect birds from electrocution hazards.

Within 90 days after completion of construction, the licensee must file as-built drawings of the transmission line with the Commission.

Article 4XX. *Terrestrial Mitigation Plan*. At least 120 days prior to land-disturbing activities, the licensee must file, for Commission approval, a plan to conserve, enhance, and restore terrestrial habitat in the Bear River watershed to mitigate for project effects. The plan must include, at a minimum, the following items related to riparian habitat mitigation: (1) a schedule for mitigation actions; (2) provisions to monitor for natural reproduction of planted riparian trees and incorporate additional plantings, if necessary, over the term of a license to mitigate for lack of natural regeneration; (3) provisions to include riparian plantings along the entire reservoir perimeter to facilitate generation of wetland habitats in the 15 acres where Twin Lakes expects suitable habitat to develop; (4) success criteria for riparian enhancements and restoration sites, based on desired conditions to replace functional values of inundated areas; (5) provisions to enhance 49 acres of broadleaf forested fringe wetland riparian habitat at the licensee's Condie and Winder reservoirs, including irrigation methods; (6) provisions to monitor plantings to ensure success criteria are met; and (7) provisions for annual reporting of monitoring and planting activities. The plan must include revised Exhibit G drawings showing a project boundary enclosing the mitigation lands.

The plan must also include, at a minimum, the following items related to special status wildlife species: (1) a description of the number and locations for raptor and landbird nesting platforms and boxes, including the existing habitat in the vicinity of the nesting boxes so that an assessment can be made whether the boxes would be an enhancement of the existing conditions; and (2) details of fencing design and placement on lands adjacent to the proposed reservoir that would exclude cattle from the buffer zone while allowing safe passage for wildlife.

The terrestrial mitigation plan must be developed after consultation with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the Idaho Department of Fish and Wildlife. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the consulted agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Land-disturbing activities must not begin until the licensee is notified by the Commission that

the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

The licensee must prepare the annual report that describes monitoring and planting activities specified in item 9 of the riparian mitigation measures in consultation with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the Idaho Department of Fish and Wildlife and include any recommendations for protocol modifications or other actions related to the monitoring results. If any such recommendation requires changes to the Commission-approved riparian mitigation plan, the licensee must file the proposed changes with its annual report to the Commission. The licensee must include with the report documentation of consultation, copies of comments and recommendations on the completed report after it has been prepared and provided to agencies, and specific descriptions of how agencies' comments are accommodated by the report. The licensee must allow a minimum of 30 days for the agencies to comment before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to any recommended actions in the report. Land-disturbing activities must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement any actions in the approved report, and, as appropriate, the terrestrial mitigation plan, including any changes required by the Commission.

Article 4XX. *Final Construction Schedule*. Within 2 years of license issuance, the licensee must file with the Commission for approval, a final construction schedule that minimizes the disturbance to key wildlife activities from construction-related activities, including migratory bird nesting, bald eagle nesting, and big game (elk and mule deer) migration, winter habitat use, and fawning. The schedule must be developed after consultation with Idaho Department of Fish and Game. The licensee must include with the schedule documentation of consultation, copies of recommendations on the completed schedule after it has been prepared and provided to Idaho Department of Fish and Game, and specific descriptions of how the agency's comments are accommodated by the schedule. The licensee must allow a minimum of 30 days for the agency to comment and make recommendations before filing the schedule with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the schedule. Land-disturbing activities must not begin until the licensee is notified by the Commission that the schedule is approved. Upon Commission approval, the licensee must implement the schedule, including any changes required by the Commission.

Article 4XX. *Recreation Plan*. Within 1 year of license issuance, the license must file, for Commission approval, a plan to mitigate for project effects on recreation resources in the project area. The plan must include the following items, at a minimum: (1) a comprehensive discussion of all proposed recreation facilities including: (a) a new multi-use recreation facility with a campground, boat ramp, and hiking trail on the new reservoir; and (b) a new river access and boat launch with parking and portable toilets immediately below the new dam; (2) detailed site plans, implementation schedule, and costs for constructing and operation of the new recreational facilities; (3) a description of the procedures for managing recreational resources, monitoring recreational use at the project, addressing impacts on environmental resources, and documenting recreational needs and trends over the term of the new license; (4) a description of how the need for any new measures to support recreational use and/or protect environmental resources, and/or construct new project facilities will be identified based on recreation use over the term of the new license; (5) a schedule for consultation with the agencies and stakeholders on a periodic basis to identify updates to the plan, if needed based on the monitoring of recreational use at the project, and a process for review of the updated plan before submitting it to the Commission for approval; and (6) a description of how flow information would be published, including the website and the schedule of flow intervals, to ensure that the public is aware of remaining flow-related recreational opportunities exist downstream of the project.

The recreation plan must be developed after consultation with the Bureau of Land Management, Idaho Department of Parks and Recreation, Idaho Department of Environmental Quality, Idaho Department of Fish and Game, American Whitewater, Franklin County, and PacifiCorp. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the consulted entities, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Shoreline Conservation Buffer*. At least 60 days prior to land disturbing activities, the licensee must establish a shoreline conservation buffer that includes conservation rights to all lands within 300 feet upslope of the normal high water mark of the proposed reservoir at elevation 4,734 feet above sea level. The shoreline conservation buffer, excluding project recreation facilities, must be managed to maintain natural conditions and promote wildlife habitat and movement.

Article 4XX. *Land Management Plan*. Within 1 year of license issuance, the licensee must file for Commission approval, a plan to manage lands within the project boundary. The plan must include: (1) an identification and description of land use in the proposed project boundary, including maps identifying the locations of land use types, a description of how these use classifications were defined and delineated, and descriptions of activities and uses that would be allowed within those classifications; (2) road and public access measures at the project to ensure access to the public, nearby landowners, and to PacifiCorp to access the Oneida development; (3) measures to monitor and document changes in land use for the term of the license; (4) provisions for consultation with Bureau of Land Management (BLM), Idaho Department of Parks and Recreation, Idaho Department of Environmental Quality (Idaho DEQ), Idaho Department of Fish and Game, and PacifiCorp during implementation of the plan and measures to periodically review and update the plan; and (5) provisions for coordination with other plans, including but not limited to erosion control (article 4XX), spill prevention (article 4XX), terrestrial (article 4XX), recreation (article 4XX), and cultural plans (article 4XX).

The land management plan must be developed after consultation with the BLM, Idaho Department of Parks and Recreation, Idaho DEQ, Idaho Department of Fish and Game, and PacifiCorp. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the consulted entities, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 4XX. *Visual Aesthetics*. The licensee must select the color of (i.e., paint) the powerhouse to blend with the local environment to the maximum extent possible.

Article 4XX. *Programmatic Agreement and Historic Properties Management Plan*. The licensee must implement the "Programmatic Agreement Between the Federal Energy Regulatory Commission and the Idaho State Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuance of a License to Twin Lakes Irrigation District for the Operation of the Bear River Narrows Project, in Franklin County, Idaho (FERC No. 12486-008)," executed on ____, and including but not limited to the Historic Properties Management Plan (HPMP) for the project. In the event that the Programmatic Agreement is terminated, the licensee shall continue to

implement the provisions of its approved HPMP. The Commission reserves the authority to require changes to the HPMP at any time during the term of the license.

Article 4XX. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the

licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX D

CONSTRUCTION EQUIPMENT USE ESTIMATES

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September 15, 2014
Project No. 12-4900

Mr. Doug Hjorth
The Louis Berger Group, Inc.
412 Mount Kemble Avenue
Morristown, NJ 07960

via email: DHjorth@louisberger.com

TRANSMITTAL
AIR QUALITY ANALYSIS SUPPORT INFORMATION
BEAR RIVER NARROWS PROJECT EIS

Dear Mr. Hjorth:

In accordance with our July 22, 2014 Budgetary Estimate letter, transmitted herewith for your review is our construction equipment identification estimate for the Bear River Narrows Project. We reviewed the construction schedule and conceptual design information provided in the Final License Application (FLA) to develop a list of the construction equipment required to construct the project during the Peak Construction Period. We understand that this information will be used by Louis Berger in the air quality analysis, which will be part of the Environmental Impact Statement for the project.

Our estimate is based on the relevant information included in the Supporting Design Report compiled by Twin Lakes Canal Company in December 2013, including the cross section titled "Oneida Hydro Embankment – Maximum Cross Section" on page 160 of the PDF file. We have also considered the applicant's proposed schedule shown on Page C-2 of the November 2013 license application.

Key construction information and assumptions for the dam and hydroelectric development are summarized below:

- Earthen Dam with a "core" constructed from silt and clay material and external "shells" constructed from sand and gravel material;
- A maximum dam height of approximately 110 feet and a width of approximately 700 feet at the crest;
- An approximate total dam volume of 550,000 cubic yards constructed from earthen materials (sand, gravel, silt, and clay) obtained from a borrow area located approximately 4,000 feet upstream from the Dam;
- A 20 foot-wide RCC overtopping protection layer placed on the downstream face of the dam;
- The residual soil overburden along the abutments will be removed down to rock before placing earth fill;

- The base of the Dam will be founded on alluvial soils within the existing stream channel. Therefore, a slurry cutoff wall will be constructed to reduce seepage through the alluvial soils underneath the dam. The total area of the cutoff wall is about 15,000 vertical square feet;
- A grout curtain will be constructed at the abutments and within the stream channel to a depth of 150 feet;
- A 650-foot-long, 14-foot-diameter steel penstock will be used to divert the river slow during construction; and
- The Powerhouse will be approximately 80 feet tall and 55 feet wide and will contain two 5.5 MW turbines.

Our list of construction equipment for the Peak Construction Period (estimated to be about one year) is provided in ***Attachment A.*** The list also includes an estimate of the hours of usage per day for each piece of equipment.

The construction equipment list is based on an aggressive construction schedule that is generally consistent with the proposed schedule provided in the FLA. The aggressive construction schedule will provide higher emissions estimates which will results in a conservative air quality analysis.

If you have any questions or require any additional information, please contact me at 412-825-2008 or email at john.osterle@rizzoassoc.com.

Respectfully submitted,

RIZZO Associates

Digitally signed by
John P. Osterle
Date: 2014.09.15
10:27:06 -04'00'

John P. Osterle, P.E.
Vice President- Dams and Water Resources Projects

JDD/JPO/kam

Attachment

ATTACHMENT A

	Hours Use Per Day											
Equipment	**Month 1**	**Month 2**	**Month 3**	**Month 4**	**Month 5**	**Month 6**	**Month 7**	**Month 8**	**Month 9**	**Month 10**	**Month 11**	**Month 12**	**Notes**
Excavation													
Off-Road Dump Truck (CAT 740 or similar)	24.0	24.0	8.0										3 trucks to get roads established and do bulk excavation
Medium Hydraulic Excavator (~30 ton)	16.0	16.0	8.0										2 excavators to get roads established and do bulk excavation
Small Hydraulic Excavator (~10 ton)		8.0	8.0										1 excavator for foundation cleanup
Frontloader (~25 ton)	8.0	8.0	8.0										truck loading of excavated material
Bulldozer (D6 or similar)	16.0	16.0	8.0										1-2 bulldozers for bulk excavation and grading disposal area
Slurry Wall													
Long Reach Excavator			16.0										2 shifts
Off-Road Dump Truck (CAT 740 or similar)			16.0										truck to help with disposal
Slurry Mixer			16.0										2 shifts
Slurry Pump			16.0										2 shifts
Front Loader			16.0										to load trucks for disposal
Grouting													
Drilling and Grouting Rig			16.0	16.0									2 shifts
Grout Mixer			8.0	8.0									2 shifts, grouting only part of each shift
Grout Pump			8.0	8.0									2 shifts, grouting only part of each shift
Fill Placement													
Scraper				60.0	60.0	60.0	60.0	60.0	60.0				3 scrapers, 2 shifts
Frontloader (~25 ton)				20.0	20.0	20.0	20.0	20.0	20.0				loader assisting with truck loading and stockpiling
Medium Hydraulic Excavator (~30 ton)				20.0	20.0	20.0	20.0	20.0	20.0				excavator at borrow area to assist with loading and stockpiling
Bulldozer (D6 or similar)				40.0	40.0	40.0	40.0	40.0	40.0				dozer at borrow area and at fill area
Off-Road Dump Truck (CAT 740 or similar)				40.0	40.0	40.0	40.0	40.0	40.0				2 trucks hauling material
Soil Compactor (~15 ton)				40.0	40.0	40.0	40.0	40.0	40.0				2 compactors at dam site
RCC													
RCC Batch Plant				8.0	8.0	8.0	8.0	8.0	8.0				one shift of placement for 20' wide RCC strip, concurrent with one shift of earthwork
Off-Road Dump Truck (CAT 740 or similar)				16.0	16.0	16.0	16.0	16.0	16.0				two trucks for RCC placement
Vibratory Roller				8.0	8.0	8.0	8.0	8.0	8.0				one roller
Small Bulldozer				8.0	8.0	8.0	8.0	8.0	8.0				one dozer
Frontloader (~25 ton)			16.0	24.0	24.0	8.0	8.0	8.0	8.0				one loader to feed screen, one loader to feed plant
Small Tampers, Blowers				8.0	8.0	8.0	8.0	8.0	8.0				
Air Compressor				8.0	8.0	8.0	8.0	8.0	8.0				one compressor for cleaning operations
Mobile Screen			16.0	16.0	16.0								screen to process onsite gravels and sands for RCC aggregate, two shifts to stockpile
Generator (~30kVa)				8.0	8.0	8.0	8.0	8.0	8.0				if no power hookup on site
Conveyor (diesel powered)				4.0	4.0	4.0	4.0	4.0	4.0				
Conventional Concrete Spillway													
110 Ton Crawler Crane							8.0	8.0	8.0				
Concrete Batch Plant							4.0	4.0	4.0				
Concrete Pump							4.0	4.0	4.0				
Generator (~30kVa)							4.0	4.0	4.0				if no power hookup on site
Penstock and Powerhouse													
110 Ton Crawler Crane	8.0							8.0	8.0	8.0	8.0	8.0	initial penstock work for diversion
Concrete Batch Plant	4.0							4.0	4.0	4.0	4.0	4.0	
Concrete Pump	4.0							4.0	4.0	4.0	4.0	4.0	
Generator (~30 kVa)	8.0							4.0	4.0	4.0	4.0	4.0	welding, running batch plant, etc.
Miscellaneous													
Water Truck	8.0	8.0	8.0	16.0	16.0	16.0	16.0	16.0	8.0	8.0	8.0	8.0	watering roads, supporting fill compaction for dam
Truck Crane	8.0	8.0	8.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	miscellaneous work including forms, etc.
Vacuum Truck	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	supporting foundation work, grouting work, concrete cleanup, RCC cleanup, etc
Light Towers	8.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	to support double shift work
Water Pumps (small portable)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	miscellaneous small water pumps
Grader	16.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	road establishment and maintenance