UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Public Service Company of New Hampshire Project No. 2457-041-NH

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(October 24, 2016)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission) regulations, 18 C.F.R. Part 380 (Order No. 486, 52 FR 47897), the Office of Energy Projects has reviewed the application for a new license for the Eastman Falls Hydroelectric Project, located on the Pemigewasset River in the town of Franklin, in Merrimack and Belknap Counties, New Hampshire, and has prepared an Environmental Assessment (EA).

The EA contains the staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at http://www.ferc.gov using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access documents. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov, (866) 208-3676 (toll free), or (202) 502-8659 (TTY).

You may also register online at http://www.ferc.gov/docs-filing/esubscription.asp to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

Any comments should be filed within 30 days from the date of this notice. 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: Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, D.C. 20426. The first page of any filing should include docket number P-2457-041.

For further information, contact Steve Kartalia at (202) 502-6131 or Stephen.Kartalia@ferc.gov.

Kimberly D. Bose,
Secretary.

ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE

Eastman Falls Hydroelectric Project

FERC Project No. 2457-041

New Hampshire

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

October 2016

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ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
BMPs	Best Management Practices
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
Eastman Falls Project	Eastman Falls Hydroelectric Project
ESA	Endangered Species Act
FPA	Federal Power Act
fps	feet per second
FWS	U.S. Fish and Wildlife Service
Interior	U.S. Department of the Interior
kW	kilowatt
mg/L	milligrams per liter
msl	mean sea level
MWh	megawatt-hour
National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
New Hampshire DES	New Hampshire Department of Environmental Services
New Hampshire FGD	New Hampshire Fish and Game Department
New Hampshire SHPO	New Hampshire State Historic Preservation Officer
NHPA	National Historic Preservation Act
NHPUC	New Hampshire Public Utilities Commission
NPCC	Northeast Power Coordinating Council
PSNH	Public Service Company of New Hampshire (PSNH)
USDA	U.S. Department of Agriculture
WQC	401 Water Quality Certification

EXECUTIVE SUMMARY

Proposed Action

On December 18, 2015, Public Service Company of New Hampshire (PSNH) filed an application for a new license with the Federal Energy Regulatory Commission (Commission) to continue to operate and maintain the existing Eastman Falls Hydroelectric Project (Eastman Falls Project). The 6.06-megawatt (MW) project is located on the Pemigewasset River, within the town of Franklin, in Merrimack and Belknap Counties, New Hampshire. The project boundary includes approximately 476 acres of federal land managed by the U.S. Army Corps of Engineers as part of the Franklin Falls Flood Control Dam.

Project Description

The Eastman Falls Project consists of: (1) a 341-foot-long, 37-foot-high concrete gravity dam that includes: (i) a 341-foot-wide spillway with a crest elevation of 301 feet above mean sea level (msl); (ii) 6-foot-high steel flashboards with a crest elevation of 307 feet msl; and (iii) a concrete waste gate with a 16-foot-high, 30-foot-wide steel slide gate; (2) a 582-acre impoundment with a normal maximum pool elevation of 307 feet msl; and (3) a 342-foot-long, 8-foot-deep floating louver array extending upstream from the spillway to the reservoir shoreline to guide fish away from the generating facility intakes to a lowered flashboard on the spillway.

The project includes two generating facilities (generating facility Nos. 1 and 2). Generating facility No. 1 includes: (1) a 12.5-foot-high, 15-foot-wide headgate structure with a 23.75-foot-high, 17-foot-wide trashrack with 3.5-inch clear-bar spacing; (2) a 12.5-foot-high, 12.5-foot-wide, 21-foot-long concrete penstock; (3) a 40-foot-high, 20-foot-wide stop log slot; (4) a 29-foot-long, 29-foot-wide, 34-foot-high concrete and masonry powerhouse containing a single 1.8-MW turbine-generator unit; and (5) a 23-foot-wide, 14.5-foot-high, 60-foot-long draft tube.

Generating facility No. 2 includes: (1) an intake structure with a 20-foot-high, 21-foot-wide headgate with two 12.3-foot-wide, 9.3-foot-high trashracks with 3.5-inch clear-bar spacing; (2) a 20.8-foot-high, 22.4-foot-wide stop log slot; (3) an 88-foot-long, 78-foot-wide, 56-foot-high concrete and masonry powerhouse containing a single 4.26-MW turbine-generator unit;[1] and (4) a 23-foot-wide, 14.5-foot-high, 60-foot-long draft tube.

[1] Section 11.1(i) of the Commission's regulations states that the authorized installed capacity is the lesser of the ratings of the generator or turbine units. Generating facility No. 2 contains a 4.26 MW turbine connected to a 4.6 MW generator unit;

Transmission facilities at the project include: (1) two 245-foot-long, 2.4-kilovolt (kV) generator leads that connect the turbine-generator in generating facility No. 1 to a generator bus in generating facility No. 2; (2) four 110-foot-long, 2.4-kV generator leads that connect the turbine-generator in generating facility No. 2 to a generator bus in generating facility No. 2; and (3) a 100-foot-long, 2.4-kV transmission line that connects the generator bus in generating facility No. 2 to the regional grid.

The project operates in a run-of-river mode and generates 27,871 megawatt-hours (MWh) of electricity annually.

No new project construction or capacity is proposed.

Proposed Environmental Measures

PSNH proposes the following measures to protect or enhance environmental resources.

- Continue to operate the project in a run-of-river mode and ensure that impoundment water level fluctuations do not exceed ± 0.2 feet from the normal impoundment elevation of 307 feet msl with flashboards installed;[2]
- Implement an operation compliance monitoring and maintenance plan (OMCP) to monitor impoundment level, flow releases, and impoundment refill procedures;[3]
- Maintain downstream flows of 502 cubic feet per second (equal to the aquatic base flow; ABF), or 90 percent of inflow to the impoundment (whichever is less) to protect downstream aquatic habitat when refilling the impoundment after drawdowns for maintenance or emergencies; and
- Implement an invasive species management and monitoring plan (ISMMP) to monitor the spread of invasive species within the project boundary and implement control measures, if necessary.[4]

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therefore, the installed capacity of generating facility No. 2 is 4.26 MW.

[2] PSNH also proposes to discontinue maintaining a year-round minimum flow of 410 cubic feet per second (cfs), or inflow (whichever is less), downstream of the project because it would serve no purpose at a run-of-river project with no bypassed reach. The 410-cfs minimum flow is a requirement of the current license that allows PSNH to operate the project in storage-and-release mode.

[3] PSNH included a draft OMCP in Appendix B of its application.

Public Involvement and Areas of Concern

Before filing the license application, the applicant conducted pre-filing consultation in accordance with 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.

On April 26, 2016, the Commission issued a public notice accepting the application and soliciting motions to intervene and protests, stating that the application is ready for environmental analysis, and requesting comments, terms and conditions, recommendations, and prescriptions.

The primary issues associated with licensing the proposed project are the effects of project operation on aquatic resources.

Alternatives Considered

This environmental assessment (EA) considers the following alternatives: (1) the applicant's proposal, as outlined above; (2) a staff alternative that includes all of PSNH's proposed measures, the measures included in the U.S. Department of the Interior's (Interior) section 18 preliminary fishway prescriptions, and all but three of Interior's section 10(j) recommendation (a post-license issuance water quality survey, an impoundment refill procedure whereby 90 percent of inflow would be release downstream and 10 percent would be used to refill the impoundment, and consultation if the project would affect northern long-eared bat habitat); and (3) no action, meaning that the project would continue to operate, and environmental conditions at the project site would remain the same.

The staff alternative for the project includes all of the measures proposed by PSNH and six additional measures: (1) develop a plan to install up to three upstream fishways for American eel that would be operated from May 1 to October 30 (section 18); (2) develop a plan to implement downstream passage (interim measures would be implement initially and eventually be replaced by permanent measures) for American eel that would be operated from August 15 to November 15 of each year (section 18); (3) develop and implement a fishway operation and maintenance plan (FOMP), including procedures for managing debris collected at or near fish passage facilities (section 18); (4) develop and implement a fishway effectiveness monitoring plan (section 18); (5)

[4] PSNH included a draft ISMMP in Appendix C of its application.

notify the Commission and the New Hampshire State Historic Preservation Officer (SHPO) prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and (6) consult with the New Hampshire SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

Below we briefly discuss the anticipated environmental effects of issuing a new license for the proposed project under the staff alternative.

Staff Alternative

Aquatic Resources – Continuing to operate the project in a run-of-river mode, maintaining a normal impoundment elevation of 307 feet msl, and implementing the proposed impoundment refill procedure would protect aquatic habitat in the impoundment and in the Pemigewasset River downstream of the project. The proposed operation compliance monitoring plan would facilitate documentation of compliance with run-of-river operation, impoundment level requirements, and impoundment refill procedures. Constructing, operating, and maintaining upstream eel ladders would increase upstream passage efficiency for juvenile American eels. Implementing downstream American eel passage measures would ensure that eels upstream of the project, including those passed by the upstream eel ladders, would have a safe downstream passage route when mature and ready to return to the ocean to spawn. Developing a FOMP and a fishway effectiveness monitoring plan in consultation with Interior would ensure that the upstream and downstream passage measures are working as. Including debris management procedures in the FOMP would ensure that beneficial organic debris is passed downstream of the project dam and inorganic debris (trash) is properly disposed.

Terrestrial Resources – Operating the project in a run-of-river mode and maintaining a normal impoundment elevation of 307 feet msl would minimize impoundment fluctuations and maintain adequate flows downstream of the dam which would protect shoreline and riparian habitat in the impoundment and Pemigewasset River downstream of the project. Implementing an ISMMP would establish procedures to identify and limit the introduction and/or spread of invasive plants.

Threatened and Endangered Species – The federally threatened northern long-eared bat (*Myotis septentrionalis*) could occur in Belknap or Merrimack Counties; however, this species has not been documented in the project area, and no critical habitat has been identified in the project area.[5] Because this species is not known to inhabit the

[5] http://ecos.fws.gov/ipac

project area and operation and maintenance of the project would not substantially alter any potential bat habitat (i.e., no trees would be removed), relicensing the project as recommended by staff would have no effect on the northern long-eared bat.

Recreation and Aesthetic Resources – Operating the project in a run-of-river mode and maintaining a normal impoundment level of 307 feet msl would continue to provide boating and angling opportunities in the impoundment and along the Pemigewasset River downstream of the project.

Cultural Resources – Continued operation and maintenance of the project would not alter the historic character of the existing structures and would not disturb any known cultural resources.

Consulting with the New Hampshire SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities that could affect cultural resources but does not require Commission approval would ensure protection of cultural resources at the project. Consulting with the New Hampshire SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities would ensure proper treatment of those resources.

No Action Alternative

Under the no-action alternative, the project would continue to operate and environmental conditions at the project site would remain the same.

Conclusion

Based on our analysis, we recommend licensing the project with all of PSNH's proposed measures, all but three section 10(j) recommendations provided by Interior, and all of the preliminary section 18 fishway prescriptions filed by Interior. Staff does not recommend the post-license water quality survey recommended by Interior and supported by New Hampshire FGD because a study conducted by the Corps in 2009 demonstrates that project operation does not adversely affect dissolved oxygen (DO) or water temperature in the project area. Staff recommends PSNH's impoundment refill procedure instead of the refill procedure recommended by Interior because PSNH's proposal would provide the same protection of aquatic habitat at the project while allowing PSNH to refill the impoundment quicker and generate more electricity. Staff does not recommend adopting Interior's recommendation for ESA consultation on northern long-eared bat because staff determined that relicensing the project would have no effect on the northern long-eared bat and no further consultation is necessary under section 7 of the ESA.

In section 4.2 of the EA, we estimate the likely cost of alternative power for each of the four alternatives identified above. Our analysis shows that during the first year of operation under the proposed action alternative, project power would cost $264,961 or $9.51 per MWh less than the likely alternative cost of power. Under the staff alternative and staff alternative with mandatory conditions, project power would cost $255,678 or $9.17 per MWh less than the likely alternative cost of power. Under the no-action alternative, project power would cost $267,314 or $9.59 per MWh less than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (27,871 MWh annually); (2) the 6.06 MW of electric capacity would come from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by the applicant, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

We conclude that issuing a new license for the project, with the environmental measures we recommend, would not be a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

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

EASTMAN FALLS HYDROELECTRIC PROJECT
Project No. 2457-041 – New Hampshire

1.0 INTRODUCTION

1.1 APPLICATION

On December 18, 2015, Public Service Company of New Hampshire (PSNH or applicant) filed an application with the Federal Energy Regulatory Commission (Commission) for a new license for the existing Eastman Falls Hydroelectric Project (Eastman Falls Project). The 6.06-megawatt (MW) project is located at an existing dam on the Pemigewasset River within the town of Franklin, in Merrimack and Belknap Counties, New Hampshire (figures 1 and 2). The project occupies approximately 476 acres of federal land managed by the U.S. Army Corps of Engineers (Corps) as part of the Franklin Falls Flood Control Dam.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Eastman Falls Project is to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to the applicant for the Eastman Falls 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 and water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection, 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.

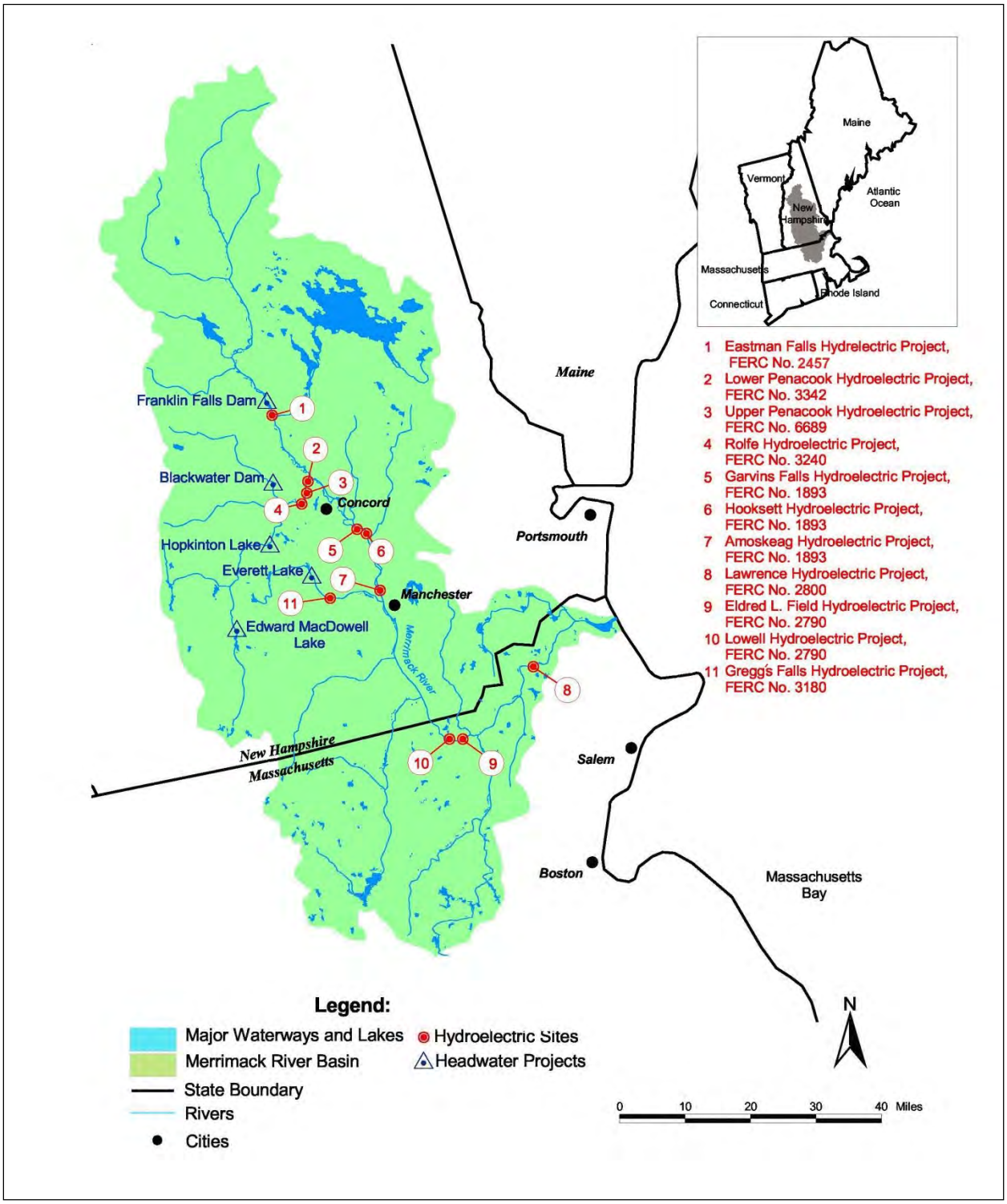

Figure 1. Map of Commission licensed projects located in the Merrimack River Basin. Source: U.S. Army Corps of Engineers, as modified by staff.

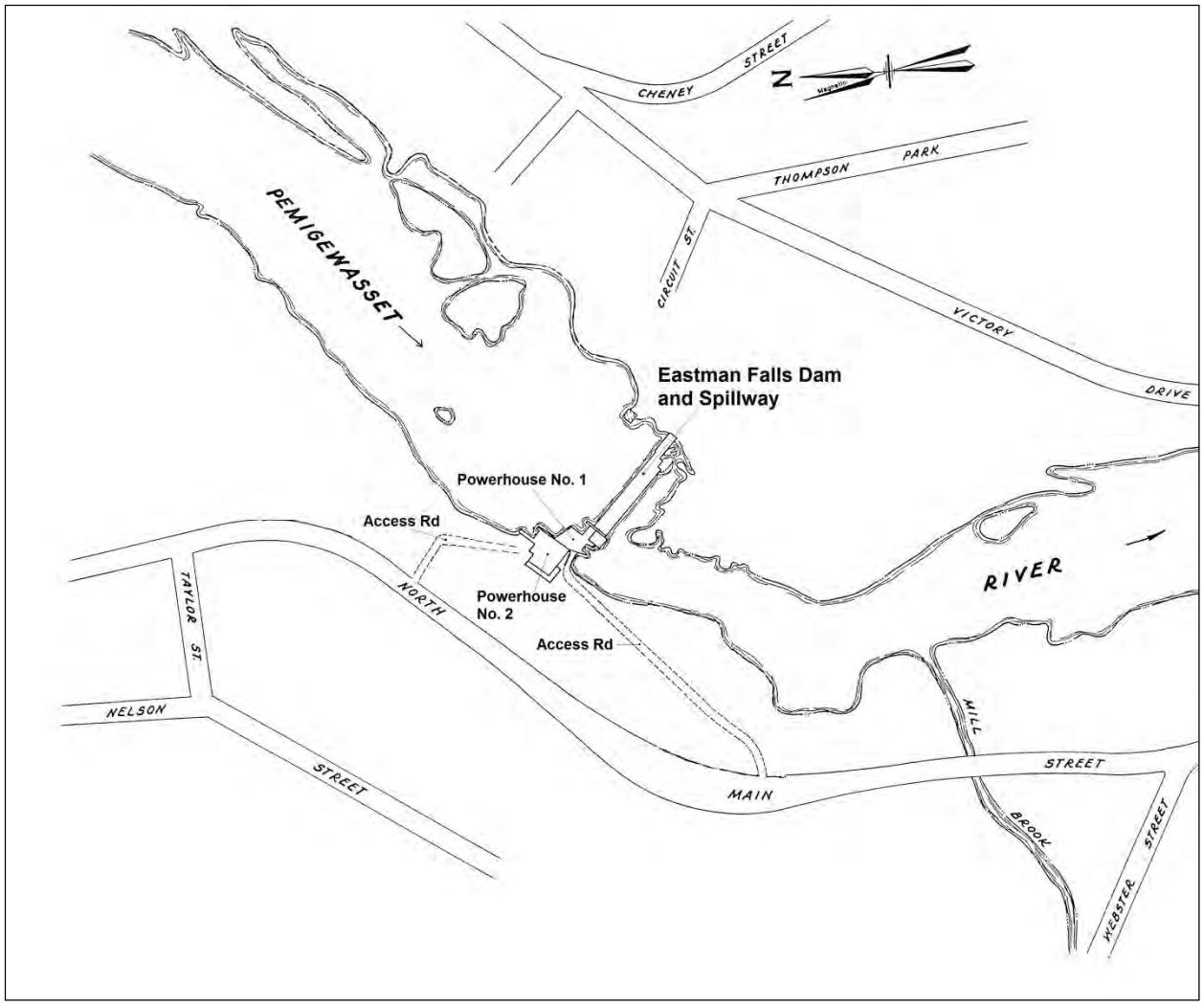

Figure 2. Existing Eastman Falls Project site plan. Source: the applicant, as modified by staff.

Issuing a license for the Eastman Falls Project would allow PSNH to generate electricity at the project for the term of the license, making electric power from a renewable resource available to the regional grid.

This environmental assessment (EA) assesses the effects associated with operation of the project, alternatives to the project, and makes recommendations to the Commission on whether to issue a license, and if so, recommends terms and conditions to become a part of any license issued.

In this EA, we assess the environmental and economic effects of operating and maintaining the project: (1) as proposed by the applicant; and (2) the applicant's proposal including the section 18 preliminary fishway prescriptions and section 10(j) recommendations. We also considered the effects of the no-action alternative. Important issues that are addressed include effects of operation of the proposed project on aquatic resources.

1.2.2 Need for Power

The Eastman Falls Project provides hydroelectric generation to meet part of PSNH's retail electric distribution customer needs. The project has an installed capacity of 6.06 MW and generates approximately 27,871 megawatt-hours (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 existing Eastman Falls Project is located in the Northeast Power Coordinating Council (NPCC) New England region of the NERC. According to NERC's 2015 forecast (NERC, 2015), summer peak demand in the NPCC New England region is projected to grow at an annual rate of 0.48 percent from 2016 through 2025.

We conclude that power from the Eastman Falls Project would help meet a need for power in the NPCC New England region in both the short- and long-term. The project provides 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 Eastman Falls Project would be subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described 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 Commerce or Interior. On June 22, 2016, Interior filed timely preliminary fishway prescriptions and a request that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project. The preliminary prescriptions are described under section 2.2.4, *Mandatory Conditions*.

1.3.1.2 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.

On June 22, 2016, Interior filed timely recommendations under section 10(j), as summarized in table 5, Section 5.3, *Recommendations of Fish and Wildlife Agencies*. In Section 5.3, we also discuss how we address the agency recommendations and comply with section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document. Table 5 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j).

In addition to the filed 10(j) recommendations, Interior, under section 10(a), recommended that the applicant serve all license amendment applications on Interior.

1.3.2 Clean Water Act

Under section 401 of the CWA, a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On December 18, 2016, PSNH applied to New Hampshire DES for 401 water quality certification for the Eastman Falls Project. New Hampshire DES received this request on

December 21, 2015. The New Hampshire DES has not yet acted on the application for water quality certification.

1.3.3 Endangered Species Act

Section 7 of the 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. One federally listed species, the northern long-eared bat (threatened) could occur in Belknap or Merrimack Counties. Although this species has not been documented within the project area, Interior states that suitable habitat exists within and adjacent to the project area in its June 22, 2016 letter. Because the project would not substantially alter the existing environment (i.e., no trees would be removed), relicensing the project as recommended by staff would have no effect on the northern long-eared bat.

1.3.4 Coastal Zone Management Act

The CZMA of 1972, as amended, requires review of the proposed project's consistency with a state's Coastal Management Program for projects within or that would affect the coastal zone. Under section 307(c)(3)(A) of the CZMA, 16 U.S.C. §1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state's CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA Program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

By letter dated November 5, 2015, New Hampshire DES stated that the project is not located within the state-designated coastal zone and the project would not affect New Hampshire's coastal resources. Therefore, the project is not subject to New Hampshire coastal management program review and no consistency certification is needed for the action.

1.3.5 National Historic Preservation Act

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

In a letter dated May 8, 2012,[6] the New Hampshire SHPO made a determination of "no potential to cause effects" on historic, architectural, or archaeological resources within the projects area of potential effects (APE). Our analysis in section 3.3.5 of this EA concludes that each of the relicensing alternatives considered in this EA have no potential to cause effects on cultural resources.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 C.F.R. § 5.1 to 5.16) 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.

Relicensing of the Eastman Falls Project was formally initiated July 2, 2012, when PSNH filed with the Commission a Pre-Application Document (PAD) and a Notice of Intent (NOI) to license the Eastman Falls Project using the Integrated Licensing Process (ILP). The Commission issued a Notice of Commencement of Proceeding on August 31, 2012.

1.4.1 Scoping

During the pre-filing consultation process, scoping meetings were held to determine what issues and alternatives should be addressed in the EA. Scoping Document 1 (SD1) was issued on August 31, 2012. Scoping meetings were held in Franklin, New Hampshire on September 19, 2012, to request 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. An environmental site review was held September 18, 2012.

In addition to comments provided at the scoping meetings, the following entities provided written comments pertaining to SD1, the PAD, and additional study needs:

Commenting Entity	Date Filed
PSNH	October 22, 2012
New Hampshire DES	October 29, 2012
Interior	October 31, 2012

[6] Filed on December 18, 2015, as part of PSNH's license application.

1.4.2 Interventions

On April 26, 2016, the Commission issued a notice accepting the application and setting June 25, 2016, as the deadline for filing protests and motions to intervene. Interior filed a notice of intervention on June 13, 2016, and the Upper Merrimack River Local Advisory Committee filed a motion to intervene on June 21, 2016.

1.4.3 Comments on the Application

A notice requesting conditions and recommendations was issued on April 26, 2016. The following entities commented:

Commenting agencies and other entities	Date filed
Interior	June 22, 2016
New Hampshire Fish and Game Department	June 28, 2016

The applicant filed reply comments on August 2, 2016.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate and environmental conditions at the project site would remain the same.

2.1.1 Existing Project Facilities

The project consists of: (1) a 341-foot-long, 37-foot-high concrete gravity dam that includes: (i) a 341-foot-wide spillway with a crest elevation of 301 feet above mean sea level (msl); (ii) 6-foot-high steel flashboards with a crest elevation of 307 feet msl; and (iii) a concrete waste gate with a 16-foot-high, 30-foot-wide steel slide gate; (2) a 582-acre impoundment with a normal maximum pool elevation of 307 feet msl; and (3) a 342-foot-long, 8-foot-deep floating louver array extending upstream from the spillway to the reservoir shoreline to guide fish away from the generating facility intakes to a lowered flashboard on the spillway.

The project includes two generating facilities (generating facility Nos. 1 and 2). Generating facility No. 1 includes: (1) a 12.5-foot-high, 15-foot-wide headgate structure with a 23.75-foot-high, 17-foot-wide trashrack with 3.5-inch clear-bar spacing; (2) a

12.5-foot-high, 12.5-foot-wide, 21-foot-long concrete penstock; (3) a 40-foot-high, 20-foot-wide stop log slot; (4) a 29-foot-long, 29-foot-wide, 34-foot-high concrete and masonry powerhouse containing a single 1.8-MW turbine-generator unit; and (5) a 23-foot-wide, 14.5-foot-high, 60-foot-long draft tube.

Generating facility No. 2 includes: (1) an intake structure with a 20-foot-high, 21-foot-wide headgate with two 12.3-foot-wide, 9.3-foot-high trashracks with 3.5-inch clear-bar spacing; (2) a 20.8-foot-high, 22.4-foot-wide stop log slot; (3) an 88-foot-long, 78-foot-wide, 56-foot-high concrete and masonry powerhouse containing a single 4.26-MW turbine-generator unit;[7] and (4) a 23-foot-wide, 14.5-foot-high, 60-foot-long draft tube.

Transmission facilities at the project include: (1) two 245-foot-long, 2.4-kilovolt (kV) generator leads that connect the turbine-generator in generating facility No. 1 to a generator bus in generating facility No. 2; (2) four 110-foot-long, 2.4-kV generator leads that connect the turbine-generator in generating facility No. 2 to a generator bus in generating facility No. 2; and (3) a 100-foot-long, 2.4-kV transmission line that connects the generator bus in generating facility No. 2 to the regional grid.

The Eastman Falls Project has a total installed capacity of 6.06 MW and generates 27,871 megawatt-hours (MWh) of electricity annually.

2.1.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the project facilities. Special articles would be included in any license issued, as appropriate. Operational inspection would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with 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.

2.1.3 Existing Project Operation

PSNH currently operates the project in a run-of-river mode, where outflow from the project equals inflow at all times and water levels in the impoundment are not drawn

[7] Section 11.1(i) of the Commission's regulations states that the authorized installed capacity is the lesser of the ratings of the generator or turbine units. Generating facility No. 2 contains a 4.26 MW turbine connected to a 4.6 MW generator unit; therefore, the installed capacity of generating facility No. 2 is 4.26 MW.

down for power generation. The normal elevation of the impoundment is 307 feet msl. PSNH releases a year-round minimum flow of 410 cubic feet per second (cfs) or inflow (whichever is less) through generating facility No. 1.

PSNH indicates that the project is operated remotely from its electrical system control center located in Manchester, New Hampshire. PSNH states that a transducer is used to measure impoundment water levels and the data is sent to a programmable logic controller that automatically adjusts turbine gate settings maintain stable impoundment levels. The project uses flows between 250 cfs (the minimum hydraulic capacity of generating facility No. 1) and 2,780 cfs (the maximum hydraulic capacity of generating facilities No. 1 and 2) to generate electricity. At flows less than 250 cfs, the project does not operate and all flow is either released through the waste gate or spilled over the dam. At inflows between 250 and 700 cfs, generating facility No. 1 operates and generating facility No. 2 is idle. At inflows between 700 and 1,830 cfs, generating facility No. 2 operates and generating facility No. 1 is idle. At inflows between 1,830 cfs and 2,780 cfs, both generating facilities operate. When inflow exceeds 2,780 cfs, both generating facilities operate at maximum capacity and excess flow is spilled over the flashboards or passed through the waste gate.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

None.

2.2.2 Proposed Project Operation

PSNH proposes to continue to operate the project in an instantaneous run-of-river mode where outflow from the project would equal inflow at all times and water levels in the impoundment would not be drawn down for power generation. [8] PSNH would limit fluctuations within ± 0.2 feet from the normal impoundment elevation of 307 feet with flashboards. PSNH indicates that impoundment water level control would continue to be maintained by the programmable logic controller.

[8] PSNH also proposes to discontinue maintaining a year-round minimum flow of 410 cubic feet per second (cfs), or inflow (whichever is less) downstream of the project because it would serve no purpose at a run-of-river project with no bypassed reach. The 410-cfs minimum flow is a requirement of the current license that allows PSNH to operate the project in storage-and-release mode.

The project would continue to use flows between 250 cfs (the minimum hydraulic capacity of the project) and 2,780 cfs (the maximum hydraulic capacity of the project) to generate electricity. The project would continue to generate approximately 27,871 MWh annually.

2.2.3 Proposed Environmental Measures

In addition to the proposed run-of-river operation and elimination of the 410 cfs minimum flow, PSHN proposes the following measures:

- Implement an operation compliance monitoring and maintenance plan (OMCP) to monitor impoundment level, flow releases, and impoundment refill procedures;

- Maintain downstream flows of 502 cfs (equal to the aquatic base flow; ABF), or 90 percent of inflow to the impoundment (whichever is less) to protect downstream aquatic habitat when refilling the impoundment after drawdowns for maintenance or emergencies;

- Implement an invasive species management and monitoring plan (ISMMP) to monitor the spread of invasive species within the project boundary and implement control measures, if necessary.

2.2.4 Mandatory Conditions

Section 18 Prescriptions

Interior's preliminary section 18 prescription would require PSNH to: (1) develop a plan to install up to three upstream fishways for American eel that would be operated from May 1 to October 30 (the number and location of these fishways would be determined by two seasons of monitoring); (2) develop a plan to implement downstream passage measures for American eel from August 15 to November 15 of each year (interim measures would be implemented starting in the second year of the license and permanent measures would be implemented starting in the eighth year after eels are documented using the upstream eel passage facilities); (3) develop and implement a fishway operation and maintenance plan; and (4) develop and implement a fishway effectiveness monitoring plan.

Interior also requests that any license issued for the project include a reservation of authority to prescribe fishways under section 18 of the FPA.

2.3 STAFF ALTERNATIVE

2.3.1 Project Operation

Under the staff alternative, the project would continue to operate in run-of-river mode as proposed by PSNH and it would continue to generate approximately 27,871 MWh annually.

2.3.2 Modification to Measures

Under the staff alternative, the project would include all of PSNH's proposed measures, all of Interior's section 18 preliminary fishway prescriptions, all but three of Interior's section 10(j) recommendations (a post-license issuance water quality survey, an impoundment refill procedure whereby 90 percent of inflow would be release downstream and 10 percent would be used to refill the impoundment, and consultation if the project would affect northern long-eared bat habitat), and two additional staff modifications: :

- notify the Commission and the New Hampshire State Historic Preservation Officer (SHPO) prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and

- consult with the New Hampshire SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

2.5 ALTERNATIVE CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We considered several alternatives to the applicant's proposal, but eliminated them from further analysis because they are not reasonable in the circumstances of this case. They are: (1) issuing a non-power license; (2) Federal Government takeover of the project; and (3) retiring the project.

2.5.1 Issuing a Non-power License

A non-power license is a temporary license that the Commission will terminate when it determines that another government agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license and we have no basis for concluding that the project should no longer be

used to produce power. Thus, we do not consider issuing a non-power license a realistic alternative to relicensing in this circumstance.

2.5.2 Federal Government Takeover

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence to indicate federal takeover should be recommended by Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.5.3 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions.

No participant has suggested that dam removal would be appropriate in this case, and we have no basis for recommending it. The power generated by the Eastman Falls Project is an important resource, and is relied upon to provide clean, renewable energy. This source of power would be lost if the project were retired, and replacement power would need to be found. There also would be significant costs associated with retiring the project's powerhouse and appurtenant facilities. In addition, the impoundment serves as an important recreational resource in the area. Thus, dam removal is not a reasonable alternative to relicensing the project with appropriate protection, mitigation and enhancement measures.

The second project retirement alternative would involve retaining the dam and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we don't consider removal of electric generating equipment to be a reasonable 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 (aquatic, recreation, etc.). 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 5.1, *Comprehensive Development and Recommended Alternative* of the EA.[9]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The project is located on the Pemigewasset River in Merrimack and Belknap Counties, New Hampshire. The Pemigewasset River basin has a total drainage area of about 1,021 square miles (1,003 at the project dam). From the project area, the Pemigewasset River flows about 1 mile before joining the Winnipesaukee to form the Merrimack River in New Hampshire. From the confluence of the Winnipesaukee and the Pemigewasset rivers, the Merrimack River flows southeasterly for 116 miles into the Atlantic Ocean. Land use in the project area primarily consists of residential use and the remaining land consists of commercial, transportation, industrial, and other urban uses.

There are three existing licensed hydropower projects (totaling five dams) located on the mainstem of the Merrimack River between the Eastman Falls Project and the Atlantic Ocean (figure 1). From downstream to upstream they are the Lawrence Project No. 2800, the Lowell Project No. 2790 (includes two dams), and the Merrimack Project No. 1893 (includes three dams).

3.2 SCOPE OF CUMULATIVE EFFECTS ANAYLSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 C.F.R. § 1508.7), 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 other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

[9] Unless otherwise indicated, our information is taken from the application for license filed by PSNH on January 17, 2013 and the responses to deficiencies and requests for additional information PSNH filed on March 14, 2013.

Through agency consultation and our independent analysis, we have identified American eel as a resource that would be cumulatively affected by construction and operation of the Eastman Falls Project.

3.2.1 Geographic Scope

The geographic scope of the cumulative analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

In addition to the Eastman Falls dam on the Pemigewasset River and the five dams on the mainstem of the Merrimack River, the Ayers Island dam, which is 14 miles upstream from Eastman Falls dam, has the potential to cumulatively affect American eel. In Section 3.3.2 of this EA, *Aquatic Resources*, we discuss the site-specific as well as the cumulative effects of licensing the Eastman Falls Hydro Project on American eel.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on American eel. Based on the term of the proposed license, we will look 30 to 50 years into the future, concentrating on the effects on American eel from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects 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 cumulative and site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that aquatic, terrestrial, threatened and endangered species, land use, recreation, and cultural resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to geology and soils or socioeconomics; therefore, these resources are not assessed in the EA. We present our recommendations in Section 5.1, *Comprehensive Development and Recommended Alternative* section.

3.3.1 Aquatic Resources

Affected Environment

Water Quantity

The Pemigewasset River at the project dam has a drainage area of about 1,003 square miles. The project impoundment is 582 acres with an average depth of about 8 feet. The river generally exhibits highest flows during May and lowest flows during October (table 1). Based on 77 years of flow records at the U.S. Geological Survey gages no. 01081500 and 01011000, located on the Merrimack River at Franklin Junction and the Winnipesaukee River at Tilton, respectively, the mean annual flow of the Pemigewasset River near the project site is 2,130 cfs; however, as table 1 shows, the recent 10-year average is less than half of the 77-year average. The highest flow recorded is 51,576 cfs and the lowest flow recorded is 120 cfs.

Table 1. Mean monthly flows in cfs at the Eastman Falls Project from 2005 to 2014. (Source: PSNH)

Time period	Mean flow (cfs)
January	1,200
February	1,152
March	894
April	1,093
May	1,445
June	1,154
July	1,049
August	774
September	687
October	650
November	689
December	1,111
Annual	987

Water Quality

The Pemigewasset River at the project site is designated as Class B. The New Hampshire numeric standard for DO in Class B waters is a daily average of 75 percent saturation and an instantaneous minimum of 5.0 milligrams per liter (mg/L) at all times. Water temperature is not to exhibit an increase that would appreciably interfere with designated uses. A study conducted by the Corps during a period of low flows in July through September, 2009 (Corps 2012) showed that DO both upstream and downstream

of the dam was never below 7 mg/L or less than 80 percent saturation during the study period. Water temperatures were essentially the same upstream and downstream of the dam.

Fishery Resources

The resident fish community in the project vicinity of the Pemigewasset River consists of stocked rainbow, brook, and brown trout, as well as smallmouth bass, largemouth bass, chain pickerel, pumpkinseed, redbreast sunfish, walleye, white perch, and yellow perch. Other less recreationally important species that occur in the area include white sucker, fallfish, rock bass, golden shiner, common shiner, slimy sculpin, margined madtom, yellow bullhead, and brown bullhead. Three tributaries of the Eastman Falls impoundment were sampled by New Hampshire FGD in 2005 and additional species were collected, specifically: blacknose dace, longnose dace, burbot, creek chub, and longnose sucker.

There are currently no anadromous fish present in the Pemigewasset River. Historically, the restoration program for Atlantic salmon within the Merrimack River Basin resulted in annual stockings of salmon broodstock and fry in the Pemigewasset River, upstream of the Eastman Falls dam. To improve downstream salmon passage survival, the project includes a floating louver array in the forebay, which extends 8 feet below the surface of the water and was used to guide salmon adults and smolts to a safe downstream passage route through a lowered flashboard along the spillway. The Merrimack River salmon restoration program was discontinued in 2013 and both New Hampshire FGD and Interior consulted with PSNH to determine that operating the downstream fish passage facilities at the Eastman Falls Project was not necessary beyond the fall of 2014.

Efforts to restore American shad, blueback herring, and alewives in the Merrimack River Basin are ongoing. Since 1969, the technical and policy committees for the Anadromous Fishery Management of the Merrimack River (a cooperative entity that includes Interior and New Hampshire FGD) have made fish passage recommendations throughout the Merrimack River Basin. However, the ineffectiveness of the existing upstream fishway at Essex dam (in the lower river), and the lack of fishways at Hooksett and Garvins Falls dams (located in the middle reach of the Merrimack River), have prevented these species from migrating upstream to the Eastman Falls dam.

American eel, another species with restoration and management plans throughout the East Coast (ASMFC 2000), including New England, occur in very low numbers in the Pemigewasset, but are known to exist both upstream and downstream of the Eastman Falls dam (Technical Committee 2013). PSNH reports that eels have been documented in “limited numbers” in Squam Lake which is upstream of the Eastman Falls Project.

Both New Hampshire FGD and Interior have collected adult yellow American eels during electrofishing surveys downstream of the project dam. The total number of American eels collected downstream of the project dam was 5 individuals. On the Merrimack River, all of the dams have upstream eel passage and upstream passage of eels has been documented at each dam. Garvins Falls (the first dam downstream of Eastman Falls dam), passed 514 juvenile eels upstream in 2014 and 439 juveniles in 2015.

PSNH conducted a mussel survey in August 2013, and documented the presence of five mussel species in the Pemigewasset River downstream of Eastman Falls dam: eastern elliptio, brook floater, triangle floater, eastern lampmussel, and eastern floater. A total of 2,610 mussels were counted during the survey. Eastern elliptio was the dominant species, accounting for 92 percent of the mussels counted.

Environmental Effects

Mode of Operation

PSNH proposes to continue to operate the project in an instantaneous run-of-river mode, with inflow equaling outflow on an instantaneous basis, resulting in a stable impoundment water level. The impoundment elevation would be maintained at 307 feet msl. PSNH also proposes to discontinue releasing a minimum of 410 cfs, or inflow if less, at all times, which is required in the current license. PSNH says this is no longer relevant because the project, although authorized to store and release water, has been voluntarily operating in run-of-river mode for 10 years.

Interior recommends (10(j) recommendation 1) that PSNH operate the proposed project in an instantaneous run-of-river mode. Interior's recommendation states that this operating regime may be modified due to operating emergencies beyond the control of the licensee, and for short periods upon the mutual agreement between the licensee, Interior, and New Hampshire DES. Interior's 10(j) recommendation 2 would require that PSNH maintain the impoundment at an elevation of 307 feet msl ($\pm$0.2 feet). New Hampshire FGD supports Interior's recommendations 1 and 2.

Staff Analysis

Operating the project in an instantaneous run-of-river mode would maintain the impoundment at its current elevation of 307 feet msl and there would not be any impoundment fluctuations due to project operation. Further, there would be no change in the amount, schedule, and duration of flow released to the Pemigewasset River downstream of the tailrace. If the project is operated in a run-of-river mode, then the existing minimum flow of 410 cfs would serve no purpose because outflow would equal inflow at all times (i.e., when inflow exceeds 410 cfs during run-of-river operation,

outflow would exceed 410 cfs and when inflow is less than 410 cfs, outflow would equal inflow).[10]

Operating the project in a run-of-river mode would also minimize the time water is retained behind the dam and would help avoid increasing the water temperatures of the upper levels of the impoundment from solar heating. Also, because there would be no fluctuations, there would not be any effects on the reproduction of fish species that spawn in near-shore areas (Sammons and Bettoli 2000). By operating the project in a run-of-river mode, habitat in the project impoundment and habitat in the Pemigewasset River downstream of the tailrace would be unchanged compared to current conditions. Aquatic organisms, including fish and benthic macroinvertebrates, such as the brook floater mussel, would be unaffected by the proposed mode of operation.

Impoundment Refill Procedures

Periodically, the project impoundment is drawn down when flashboards are lowered during high flows, for maintenance, or for emergencies. During these times, run-of-river operation would be temporarily interrupted.

To maintain downstream flows, Interior recommends (10(j) recommendation 4) that the applicant implement an impoundment refill procedure whereby 90 percent of project inflow would be passed downstream and 10 percent would be used to refill the impoundment. New Hampshire FGD supports Interior's recommendation.

PSNH did not propose any impoundment refill procedure in its application, but in comments filed on August 2, 2016, in response to Interior's 10(j) recommendations, it stated that at some of its other projects, the amount of flow released during impoundment refill periods is equal to the aquatic base flow (ABF), which is calculated as 0.5 cfs per square mile of drainage area. In this case, that would be a flow of 502 cfs because the drainage area is 1,003 square miles. PSNH proposes to release 502 cfs during impoundment refill, unless inflow is less, in which case it would release 90 percent of inflow.

Staff Analysis

The procedures for refilling an impoundment result in a trade-off between effects on the aquatic habitat in the impoundment and aquatic habitat downstream of the dam. During most of the year, drawdowns would probably have minimal effects on aquatic

[10] There is no bypassed reach at the project; therefore, a minimum flow is not needed to protect bypassed reach habitat.

habitat and organisms in the impoundment. However, drawdowns can dewater some shallow water fish nests if they occur during the late spring or early summer spawning season for species such as smallmouth bass or sunfish. Reducing downstream flows to refill the impoundment would have the greatest adverse effect during hot summer conditions, when high water temperatures can exacerbate the effects of reduced wetted area, which could lead to additional stress or mortality for aquatic macroinvertebrates and fish.

Interior's recommended procedure for releasing 90 percent of the project inflow during impoundment refilling would ensure that flows downstream of the tailrace are near natural flow levels and that aquatic habitat downstream would quickly be returned to normal conditions. During refill of the impoundment, flow downstream of the dam would be reduced by 10 percent and the Pemigewasset River when compared to inflow to the impoundment. Short-term 10 percent reductions in downstream flows would be comparable to or even less significant than natural fluctuations in streamflow that occur throughout the year as a result of changing hydrologic conditions. Aquatic organisms such as fish and benthic invertebrates are adapted to changing streamflow conditions and would be unaffected by a temporary, 10-percent reduction in river flow. In the impoundment, the shoreline dewatered during the drawdown would gradually be submerged again by retaining 10 percent of the inflow to the impoundment. If inflow is 650 cfs (the lowest mean monthly flow, October), for example, then 65 cfs would be used to refill the impoundment. A drawdown of 1 foot at Eastman Falls is 582 acre feet, or 25,351,920 cubic feet. Therefore, under these conditions, it would take 108 hours for the impoundment elevation to increase by 1 foot using Interior's refill procedure. If inflow is 1,445 cfs (the highest mean monthly flow, May), then 145 cfs would be used to refill the impoundment and the refill would take 48 hours.

The effects of implementing PSNH's proposed impoundment refill procedure, which is based on a minimum downstream flow release of 502 cfs, or inflow, whichever is less, would be similar to Interior's 90/10 refill procedure. However, generally there would be less flow released downstream during periods when inflow exceeds 502 cfs in exchange for allowing the impoundment to refill more quickly. In the impoundment, if inflow is 650 cfs, then 148 cfs (650 minus 502) would be used to refill the impoundment and the refill would take 47 hours. If inflow is 1,445 cfs, then 943 cfs (1,445 minus 502) would be used to refill the impoundment and the refill would take 7 hours.

Operation Compliance and Monitoring Plan

PSNH proposes develop and implement an operation compliance monitoring and maintenance plan.

Interior recommends (10(j) recommendation 1) that PSNH develop a plan, within

6 months of license issuance, for monitoring run of river operation and flow releases from the project. The plan would include a description of the mechanisms, structures, level of manual and automatic operation, and methods for recording data on run-of-river operation and impoundment levels, an implementation schedule, and procedures for maintaining monitoring data for inspection by Interior, the Commission, and New Hampshire DES. New Hampshire FGD supports Interior's recommendation.

Staff Analysis

A detailed description of the equipment and procedures necessary to maintain, monitor, and report compliance would prevent possible misunderstandings of project operation and may reduce the likelihood of complaints regarding project operation being filed with the Commission. In addition, an operation compliance monitoring plan would help the agencies and Commission verify that the project is operating in a run-of-river mode. In addition to the measures specified by Interior, the plan could provide a detailed description of the protocols that PSNH would implement during scheduled and unscheduled shutdowns, including any required impoundment refill procedures which would ensure that adverse effects to aquatic habitat in the impoundment and downstream of the dam are minimized .

Water Quality Monitoring

PSNH does not propose to do any water quality monitoring because it concludes that the study of temperature and DO at the project during 2009 (Corps 2012) demonstrates that the project does not affect water quality and that State DO and temperature standards are met at the project.

Interior recommends (10(j) recommendation 3) that PSNH conduct a post-license water quality monitoring survey. Temperature and DO would be monitored continuously in the headpond and tailrace during the period June 1 to September 30, beginning in the first summer after license issuance and for up to three years. If results indicate that the project is not attaining water quality standards, then mitigation measures may be required. New Hampshire FGD supports Interior's recommendation.

Staff Analysis

New Hampshire DES (2015) concluded that project waters meet state water quality standards for DO and temperature both upstream and downstream of the Eastman Falls dam. The Corps' 2009 study (Corps 2012) supports New Hampshire DES' conclusion. As described above, there were no violations of State standards between July 1 and September 30, 2009. DO was in excess of the minimum State standard in the project vicinity during the study and the project showed little, if any, effect on water

temperature. Interior states that a post-license water quality survey is warranted because conditions during the 2009 low-flow period of the Corps' study may not have been under "worst case" conditions. There were two rain events during the study period which caused streamflow to rise and water temperature to drop. These occurred in late July and again in the third week of August. However, each of these events was followed by periods in which flows decreased to typical low-flow summer conditions and should have documented any problems that may be present with attaining State water quality standards. Conducting additional monitoring during the post-licensing period would not document any new effects on water quality because there are no proposed changes to project operation; however, additional monitoring could affirm the results of the monitoring that was conducted in 2009.

Upstream Passage for American eel

PSNH does not propose any upstream eel passage measures.

Interior's preliminary section 18 prescription, which is supported by New Hampshire FGD, would require PSNH to develop a plan to operate and maintain temporary eel ramps or traps for two years. After two years, Interior's prescription would require PSNH to install up to three permanent eel ramps or traps, in locations where the temporary eel ramps or traps successfully collect juvenile eels. Although PNSH does not propose to implement any upstream eel passage measures, it did respond to Interior's preliminary section 18 prescription by stating that it would "be more scientifically prudent" to determine the need for upstream eel passage based on a trigger, such as a continuous increase in the number of eels collected over a specific period of time. PSNH does not specify whether this collection of eels would occur at the Eastman Falls Project or at a dam further downstream in the river basin.

Staff Analysis

Juvenile American eels migrate upstream into New England rivers over an extended period from March through October and peak movements are believed to correspond to hydrologic conditions, river size, and distance from the ocean (Richkus and Whalen, 1999). Currently the only way for juvenile eels to pass upstream of the Eastman Falls dam is to climb over or around the dam, which is a well-documented behavior for juvenile eels at other dam sites.[11]

Eel ladder and trap design usually relies on a relatively small amount of water that

[11] http://www.wildlife.state.nh.us/marine/marine_PDFs/American_Eels_GulfOfMa ine.pdf.

is released onto an angled ramp covered with a textured surface over which juvenile eels can efficiently move. This basic design is successfully used for passing juvenile eels at numerous dams throughout New England (Atlantic States Marine Fisheries Commission [ASMFC], 2013). In New England, this type of eel ladder is typically operated from May until July, but seasons are extended earlier or later depending on local migration timing. Eel ladders of this type are usually removed and stored during the portion of the year when they are not being operated (ASMFC, 2013).

As indicated above, American eels have been documented in low numbers upstream of Eastman Falls dam. In addition, American eel abundance is thought to be low immediately downstream of the Eastman Falls dam and the eels that were collected were yellow eels and not juvenile eels. However, there have not been intensive surveys to confirm abundance and age or size structure of eels downstream of the project dam. Garvins Falls passed at least 514 juvenile eels during 2014 and 439 in 2015. There may be additional undocumented passage of eels over or around Garvins Falls project structures. There are over 30 miles of habitat between Garvins Falls and Eastman Falls, so it is possible that the reason few eels have been collected immediately downstream of Eastman Falls is that there is sufficient habitat downstream of Eastman Falls dam for the existing numbers of eels entering this reach.

Installation of temporary eel ramps/traps for two years could help to identify where and how many eels are trying to pass over the Eastman Falls dam. If eels are trapped in significant numbers, and the temporary ramps/traps identify locations for one or more permanent eel ramps, then it may be possible to implement upstream passage measures that improve upstream passage efficiency of juvenile American eels and allow increased numbers of eels to access habitat upstream of the dam. Ultimately this could increase the numbers of eels produced in the Pemigewasset River and aid in the recovery of the eel population. Two years of temporary trapping should provide adequate information to determine if passage is currently needed or provide information that could be used to establish triggers for providing upstream passage as PSNH suggests.

Developing an upstream eel passage plan, in consultation with the agencies, would ensure that there is an agreed upon methodology for determining the locations of temporary eel ramps or traps, evaluating their effectiveness, and selecting the number and locations of permanent eel ramps.

Downstream Passage for American eel

PSNH does not propose to implement any downstream eel passage measures.

Interior's preliminary section 18 prescription, which is supported by New Hampshire FGD, would require PSNH to develop a plan to provide downstream eel

passage in a phased approach, beginning with interim measures by August 15 of the second year after license issuance (Phase 1) and eventually implementing permanent measures (Phase 2) by August 15 of the eighth year after eels are first documented using upstream eel passage facilities at the project.

Interior's prescription specifies that Phase 1 downstream passage could include one or more of the following measures: (1) not operating the project from dawn until dusk during the downstream passage season (August 15 to November 15) under certain hydrologic conditions (when 0.5 inches of rain or more fall within a 24-hour period, or when inflow increases by 50 percent over a 24-hour period, then the project would shut down for that evening plus the following two nights); (2) operating the existing downstream fish bypass from dawn until dusk during the August 15 to November 15 period; or (3) installing and operating a fish passage siphon in the vicinity of the intake(s).

Phase 2 of the downstream eel passage prescription would require PSNH to install a permanent downstream passage facility or facilities[12] with: (1) surface and bottom entrances, (2) new trashracks or overlay screens[13] with a maximum clear bar spacing of 0.75 inches and a maximum approach velocity of 1.64 feet per second, (3) an attraction flow to the bypass (or bypasses) of 2-3 percent of turbine capacity per bypass, (4) a weir or orifice spacing of every 25 linear feet[14], and (5) a plunge pool depth of 4 feet or at least ¼ the project head.

Staff Analysis

In New England, adult eel out-migration generally occurs from September to December, with peak movements usually at night during periods when river flow is increasing.[15] Under existing conditions, the only route for downstream passage is over the spillway of the dam or through the turbines. As discussed above, the abundance of adult eels requiring downstream passage is thought to be low, although intensive surveys

[12] Interior's prescription does not specify whether there would be one or multiple facilities.

[13] Overlay screens are screen panels that are placed either seasonally or permanently over existing trashracks for the purpose of reducing the clear bar spacing and reducing fish entrainment.

[14] Interior does not explain the purpose of the weir or orifice spacing requirement; therefore, we cannot address or evaluate the effects of this specification.

[15] http://www.wildlife.state.nh.us/marine/marine_PDFs/American_Eels_GulfOfMa ine.pdf.

to document upstream eel abundance and distribution have not be conducted. If PSNH begins passing juvenile eels upstream, then the adults would become sexually mature and need to migrate downstream to spawn approximately 8 to 30 years later, based on the reported range in eel maturation (Oliveira and McCleave 2000).

Interior's prescription includes an interim option for shutting down the project to provide downstream eel passage. If project shutdown were used, the project would not operate from dawn until dusk from August 15 to November 15 under the hydrologic conditions described above. During these periods of non-operation, all water would be released downstream, most likely either over the spillway or through the spillway waste gate, and this would be the only route available to eels that are moving downstream. Survival of eels passing over the spillway or through the waste gate would likely be high because the spillway is smooth concrete and free from structures that eels could strike during passage. Water depth at the base of the spillway appears to provide adequate plunge depth to protect eels from injury as they pass from the spillway back into the river downstream of the dam. During project shutdown, there would be no potential for eels to become entrained in the turbines or impinged on the trashracks; therefore, any mortalities or injuries associated with these project features would be eliminated. Studies suggest that turbine mortality of eels varies widely based on many factors, including turbine type, size, and speed. Mortality rates range from 5 to 75 percent (Shepard 2015), with smaller and faster Kaplan turbines generally causing higher mortality than slower and larger Francis turbines. Recent studies of similar size but slower Kaplan turbines on the Connecticut River reported estimated mortality rates of 19 to 38 percent (TransCanada 2016). Because there would be no impingement or entrainment and passage over the spillway or through the waste gate would likely result in high survival, project shutdown would likely provide safer downstream passage for eels than existing conditions.

Interior's prescription includes an interim option for operating the existing downstream fish bypass (louver array and lowered flashboard) from dawn to dusk from August 15 to November 15. Unlike the shutdown option, under this option the project would continue to operate and some eels are likely go through the project turbines and experience the same rates of mortality as described above. The existing trashrack clear spacing of 3.5 inches would not exclude even large adult eels from the project intakes. The existing fish louver array in the forebay extends only 8 feet below the impoundment surface and guides fish to a lowered flashboard section along the spillway. Because of this design, which is appropriate for surface-oriented salmon or clupeids, it may not be very effective for outmigrating eels. Those eels that are successfully guided and passed via the louvers and lowered flashboard would experience the same survival rates as under the shutdown option. Overall this option is likely to provide better eel survival than existing conditions but not as good as the shutdown option.

Interior's prescription includes an interim option for installing and operating a fish

passage siphon in the vicinity of the intake(s) from dawn to dusk from August 15 to November 15. As with the louver array and lowered flashboard option, the project would continue to operate and some eels would probably go through the project turbines and experience mortality rates as described above. However, guidance efficiency with the siphon system may be better than with the surface-oriented louver array. Unlike the existing louver array and lowered flashboard section, the siphon would attract adult eels from a depth where they are more likely to be naturally migrating. Those eels that are attracted into the siphon are likely to experience similar rates of survival to the project shutdown. Therefore, this option is likely to provide better eel survival than existing conditions and the louver array and lowered flashboard options, but not as good as the shutdown option.

Interior's prescription for permanent downstream eel passage includes several specifications designed to reduce eel entrainment and impingement, as well as successfully attract and guide adult eels safely past the dam. Unlike the project shutdown interim passage option, the permanent downstream eel passage facility would be designed to operate while the project is generating. New trashracks or overlays with 0.75-inch clear spacing would prevent all adult eels from passing through the intakes and turbines. Adult eels would also be able to avoid impingement on the new trashracks or overlays if they are designed with a maximum approach velocity of 1.64 feet per second, which is less than the burst swimming speed of adult eels (Bell 1991). Entrances near both the bottom and surface of the impoundment are likely to attract adult eels from throughout the water column, so the effectiveness of the permanent facility could be better than either the existing louver array and lowered flashboard or the siphon interim passage options. We are not aware of studies comparing the effectiveness of different attraction flows; however, if Interior's prescription for 2-3 percent of turbine capacity is effective, then adult eels would locate and enter the downstream passage facility and are likely to pass safely through the conveyance structure which would most likely be a pipe. The fishway effectiveness monitoring plan, discussed below, would be a mechanism for modifying the amount of attraction flow if testing and monitoring indicate that modifications are necessary. Finally, a plunge pool located or excavated to ensure 4-feet of depth or at least one fourth of project head would protect eels as they drop from the pipe outfall of the eel bypass facility into the river downstream of the dam. Overall, by preventing turbine passage through the prescribed trashrack clear spacing and maximum approach velocity, the permanent downstream eel passage facility would eliminate eel entrainment mortality, just like the interim passage shutdown option described above. If adult eels are attracted and successfully passed through the permanent facility, then the survival of those eels would be similar to that under the interim shutdown option as well.

Developing a downstream eel passage plan, in consultation with the agencies, would provide a format for selecting interim downstream passage measures and evaluating their effectiveness. In addition, a downstream passage plan could include

procedures for selecting permanent downstream passage measures and determining when such measures would be needed.

Operation and Maintenance of Fish Passage Facilities

Interior's preliminary section 18 prescription, which is supported by New Hampshire FGD, would require PSNH to develop a fishway operation and maintenance plan (FOMP).

Staff Analysis

Some fish passage facilities require precise operation and maintenance to be effective. Interior's prescribed FOMP would be developed and implemented in consultation with the agencies and would include details about how any fish or eel passage facilities constructed at the project would be operated, including the times of the day and year, quantity of conveyance flow, and procedures for routine cleaning and maintenance. Implementing such a plan would ensure that the fish passage facilities are operated as intended and are properly maintained.

In addition, the FOMP could address proper debris disposal. Debris that accumulates on the trashrack or overlays would reduce their effectiveness at protecting fish from entrainment or impingement. If the trashrack is covered with debris, fish may become entangled in the debris rather than sliding off the trashrack as intended, or the approach velocity at the trashrack could increase which could result in a greater amount of fish entrainment or impingement. Debris that collects on the fish passage facilities can create a blockage and reduce the effectiveness of the facilities.

Additionally, proper management of debris is important because organic debris sustains lower order trophic organisms, such as benthic macroinvertebrates, which in turn influences the productivity of higher order organisms, such as fish. Organic debris also provides habitat for macroinvertebrates and fish. Leaves and large woody debris would provide habitat downstream of the dam and enhance the carrying capacity of the Pemigewasset River for macroinvertebrates and fish by providing cover and velocity shelters. Inorganic debris such as trash provides no benefit to aquatic resources and developing and implementing a FOMP with debris management procedures would provide a way for it to be removed and disposed of properly.

Fishway Effectiveness Monitoring Plan

Interior's preliminary section 18 prescription, which is supported by New Hampshire FGD, would require PSNH to develop a fishway effectiveness monitoring plan.

Staff Analysis

Interior's prescribed fishway effectiveness monitoring plan would be developed and implemented in consultation with the agencies and could include testing or monitoring of the existing louver array and lowered flashboard system or any of the new interim or permanent upstream or downstream eel passage measures that may be installed and operated at the project. Testing and monitoring the fish passage facilities could provide information that would be useful for determining whether adjustments to the fishways may be needed. Examples of possible modifications include, but are not limited to, the amount of attraction flow and depth of water through the fishways, adjustments to the entrance and exit of the fishways, or changes in the dates of operation of the fishways. Implementing the fishway effectiveness plan would ensure that the fish passage facilities are as effective as possible.

Cumulative Effects

The Eastman Falls Project, in combination with the other existing hydroelectric projects located in the Merrimack River Basin, has the potential to cumulatively affect American eels. The cumulative adverse effects can occur from multiple hydroelectric developments within a river basin and include injuries and mortality from turbine passage and interference with eel movements. Providing upstream passage for juvenile eels could expand access to potential habitat upstream of the project dam. If juvenile eels successfully pass upstream of the project dam, they would be vulnerable to turbine-related injury and mortality when they migrate downstream to spawn as mature eels; therefore, providing downstream passage measures would minimize entrainment and turbine-related mortality for these downstream migrants. Overall, improving eel passage conditions at Eastman Falls dam could cumulatively benefit American eel populations in the Merrimack River basin.

3.3.2 Terrestrial Resources

Affected Environment

The project is located in the Northeastern Highland eco-region (Griffith et. al., 2009) and is part of the Merrimack River basin. In central New Hampshire, this river basin is characterized by narrow floodplains and stream terraces surrounded by rolling hills. Trees in the basin are primarily coniferous, including white pine (*Pinus strobus*), red pine (*Pinus resinosa*), hemlock (*Tsuga canadensis*), and red spruce (*Picea rubens*).

Much of the land in the project area is undeveloped deciduous, coniferous, or mixed forest. The flood zone upstream of the Franklin Falls dam is primarily forest and

old field/early successional cover. Between Franklin Falls dam and Eastman Falls dam, lands are primarily developed with a buffer of forested land along the banks. Downstream of Eastman Falls dam, land is also primarily developed and its shorelines are characterized by steep river embankments. Vegetative cover in the project area is primarily second growth, mixed hardwood forest, with areas of individual trees and stands of white and red pine. Common tree species include red oak (*Quercus rubra*), red maple (*Acer rubrum*), aspen (*Populus* sp.), ash (*Fraxinus* sp.), and hickory (*Carya* sp.).

Three exemplary natural communities and systems are present in the project area: Major River Silver Maple Floodplain System, Herbaceous River Bank Floodplain Community, and Aquatic Bed Community. Although these communities and systems are not rare, they have been identified as high-quality habitats. Major River Silver Maple Floodplain System habitat was identified at 10 locations upstream of Franklin Falls dam. This habitat is limited in the project area by steeply sloping topography. An Herbaceous River Bank Floodplain community was identified at one location within the Franklin Falls recreation area. Aquatic Bed communities were identified at nine locations within the littoral habitat of the impoundment.

Wetlands

Wetlands in the project area are forested (2.2 acres), palustrine emergent (2.0 acres), and scrub-shrub (12.0 acres), and are mostly present upstream of the Franklin Falls dam. Wetlands in the project area are limited by topography to narrow fringe areas, coves, and near the confluence of small tributaries along the shoreline.

Forested wetlands within the project boundary are present in depressions within the floodplain. Common trees in these forests include silver maple (*Acer saccharinum*), sycamore (*Platanus* sp.), and cottonwood (*Populus* sp.). An herbaceous layer of annual and perennial plants is also present.

Palustrine emergent wetlands are present in narrow bands along the project shoreline. Vegetation in these wetlands includes sedges, rushes, and grasses.

Scrub shrub wetlands are the most common wetland type within the project boundary. These wetlands occur along the upper limits of the emergent wetlands and are dominated by woody vegetation less than 20 feet tall. Willows, alders, and dogwood are common in the drier areas, and buttonbush is more common in the semi-permanently flooded areas.

Invasive Species

Five state invasive botanical species were identified in the project area during

2013 survey efforts: Japanese knotweed (*Polygonum cuspidatum*), multiflora rose (*Rosea multiflora*), purple loosestrife (*Lythrum salicaria*), autumn olive (*Elaeagnus umbellata*), and variable leaf milfoil (*Myriophyllum heterophyllum*). Japanese knotweed was documented at 13 locations, and is present in riparian areas near the powerhouse. Milfoil was documented at five sites in shallow waters along the shoreline and in coves. The other three species were identified at one location each.

Wildlife

The project area provides various wildlife habitat including open/agricultural grassland, wooded riparian areas, and wetland and riverine areas. Mammals in the project area include beaver, deer, rabbit, fox, raccoon, and grey squirrel. Numerous birds use the riverine and riparian habitats along the Pemigewasset River for feeding and nesting habitat, including bald eagle, common goldeneye, common merganser, cormorants, herons, ducks, geese, bank swallows, trees swallows, ruffed grouse, and American woodcock.

Avian Species of Special Interest

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a state threatened species. Bald eagles will hunt and scavenge for a variety of foods, but they prefer fish and are attracted to undisturbed lakes, reservoirs, and large rivers (FWS, 2007). Suitable habitat for bald eagles is present around the impoundment and along the Pemigewasset River. Bald eagles have been observed in flight and perched adjacent to the impoundment, but there are no known nests within the project boundary.

Common Loon

The common loon (*Gavia immer*) is a state threatened species. Loons have great difficulty walking on land, and must nest right at the water's edge where their reproductive success is susceptible to water level changes. Loons also prefer protection from prevailing winds and waves, overhead vegetation or lateral cover, and a wide viewing angle of their territory (Evers, 2004). No common loons or nests were observed during 2013 field surveys.

Common Nighthawk

The common nighthawk (*Chordelis minor*) is a state threatened species. This bird uses pine barrens, openings in Appalachian oak-pine forests, rocky ridges, and urban habitats. There have been historic sightings of the common nighthawks near the city of

Franklin. However, preferred habitat is largely absent from the project area and no common nighthawks were observed during 2013 field surveys.

Osprey

The osprey (*Pandion haliaetus*) is a state species of special concern. Osprey feed on fish and require nearby water bodies with substantial fish populations to sustain their family unit. Osprey are known to occur near the project area. However, no osprey or nests were observed during 2013 field surveys.

Environmental Effects

Wetlands

PSNH proposes to operate the project in an instantaneous run-of-river mode and maintain a normal impoundment elevation of 307 feet msl.

Under section 10(j), Interior recommends (recommendations 1 and 2) that PSNH operate the project in instantaneous run-of-river mode and maintain a normal impoundment level of 307 feet msl. New Hampshire FGD commented that it supports Interior's recommendation.

Staff Analysis

Wetlands provide high quality habitat for various wildlife. Wetlands in the project area are mostly limited to adjacent shoreline areas. Operating the project in an instantaneous run-of-river mode and maintaining the impoundment level at 307 feet msl would minimize impoundment fluctuations and maintain adequate flows downstream of the dam, protecting the existing riparian communities and the exemplary natural communities both in the impoundment and downstream.

Invasive Plants

PSNH proposes to develop and implement an invasive species management and monitoring plan, in consultation with federal and state resource agencies. As detailed in its draft plan (Appendix C of the license application), PSNH proposes to monitor the project area for invasive species and conduct meandering surveys in riparian areas every five years. PSNH also proposes to use best management practices to minimize the potential spread of invasive species. If invasive species are identified, PSNH would follow recommended protocols established by the New Hampshire DES Exotic Species Program.

Under section 10(j), Interior recommends (recommendation 5) that PSNH develop and implement a plan to monitor and control invasive species at the project in consultation with Interior and New Hampshire FGD. New Hampshire FGD commented that it supports Interior's recommendation.

Staff Analysis

Invasive plants can out-compete native ones, which could lead to a loss of diversity affecting forage and habitat for animal species. Invasive species are limited within the project boundary, occurring in sandy sections of shoreline and littoral areas having an unconsolidated mud bottom. Invasive plant species found in the project area include variable leaf milfoil, Japanese knotweed, multiflora rose, purple loosestrife, and autumn olive.

The Corps actively manages milfoil patches within the Franklin Falls flood control area, using both herbicides and non-chemical controls. PSNH proposes to survey riparian zones within the project boundary every 5 years to identify and monitor invasive species. Further, PSNH will avoid purposefully planting invasive species within the project area and would follow state protocol to manage the spread of invasive species.

PSNH is not proposing any significant changes to project operation or any new construction that would affect the introduction or spread of invasive plants. However, because routine maintenance activities (i.e., mowing, weed wacking) within the project area has the potential to spread invasive plants, monitoring invasive species would provide information about the spread of invasive plants, and could result in the implementation of measures to stop or reverse the spread of invasive plant species.

3.3.3 Threatened and Endangered Species

Affected Environment

The northern long-eared bat (*Myotis septentrionalis*) was listed as federally threatened on April 2, 2015. In a letter dated May 1, 2015, the U.S. Fish and Wildlife Service (FWS) confirmed that there has been no documented presence of any listed species within the project area. However, in a letter dated June 22, 2016, Interior stated that although the bat has not been documented in the project area, because suitable habitat exists (i.e., wooded riparian and upland areas), project activities should be evaluated to determine if habitat would be affected.

Traditional ranges for the northern long-eared bat include most of the central and eastern U.S., as well as the southern and central provinces of Canada, coinciding with the greatest abundance of forested area. Habitat includes large tracts of mature, upland

forests and typically feeds on moths, flies, and other insects. These bats are flexible in selecting roost sites, choosing roost trees that provide cavities and crevices. Winter hibernation typically occurs in caves and the areas around them can be used for fall-swarming and spring-staging. No critical habitat has been designated for this species.

In January 2016, FWS finalized the 4(d) rule for this species which focus on preventing effects on bats in hibernacula associated with the spread of white-nose syndrome[16] and effects of tree removal on roosting bats or maternity colonies (FWS, 2016). As part of the 4(d) rule, FWS proposes that take incidental to certain activities conducted in accordance with the following habitat conservation measures, as applicable, would not be prohibited: (1) occurs more than 0.25 mile from a known, occupied hibernacula; (2) avoids cutting or destroying known, occupied maternity roost trees during the pup season (June 1 – July 31);[17] and (3) avoids clearcuts within 0.25 mile of known, occupied maternity roost trees during the pup season (June 1 – July 31).

Environmental Effects

Neither PSNH or any stakeholders are recommending any changes in project operation that could affect the northern long-eared bat. In addition, no one is proposing any measures that would result in removal of suitable roosting and foraging habitat or the disturbance of bat hibernacula.

Staff Analysis

The project is located within the White Nose Syndrome Buffer Zone, but there are no known northern long-eared bat hibernacula or maternity roost trees near the project. Although not previously documented in the project area, bats could use habitat within the project area during summer months for foraging or roosting. However, even if bats were present, project operation would not have any expected effect on their habitat or food availability because no tree removal or disturbance to potential northern long-eared bat habitat would occur. Therefore, relicensing the project with any of the measures considered in this EA would have no effect on this species.

[16] Hibernacula is where a bat hibernates over the winter, such as in a cave. White-nose syndrome is a fungal infection that agitates hibernating bats, causing them to rouse prematurely and burn fat supplies. Mortality results from starvation or, in some cases, exposure.

[17] Pup season refers to period when bats birth their young.

3.3.4 Land Use and Recreation Resources

Affected Environment

Land Use

The Eastman Falls Project is located in the Pemigewasset River Basin watershed is about 1,021 square miles with over 1,100 miles of rivers and 17,000 acres of lake, pond, and reservoir areas. The watershed is primarily forested, while other lands in the Eastman Falls watershed would be characterized as urban/developed areas and agricultural lands. Land use in the immediate project vicinity is primarily rural residential, with several residences located along Eastman Falls Road near the project area. The Eastman Falls Project boundary also includes 476 acres of inundated federal lands associated with the Corps' Franklin Falls Flood Control Dam, although the dam and facilities are not part of the Eastman Falls Project.

Recreation

The Pemigewasset River flows south through the White Mountains National Forest, Franconia Notch State Park, and several regional and local recreation areas, including trail systems, wildlife management areas, private campgrounds, and boating facilities.

Recreational activities occurring in the project boundary include fishing, swimming, kayaking, canoeing, rafting, hiking, and picnicking. The Eastman Falls Project impoundment provides free public access to boat launches, picnic areas, put-in launches, parking lots, fishing access and canoe portage around the project.

New Hampshire FGD oversees the annual stocking of the Pemigewasset River, which supports recreational fishing in the project vicinity.

The Corps owns and operates Franklin Falls Dam, which lies in the middle of the Eastman Falls Project boundary, and approximately 1.5 miles upstream of the Eastman Falls dam. Franklin Falls dam is a year-round recreation area with a permanent pool of 440 acres and a maximum depth of approximately 7 feet. The Franklin Falls dam has a variety of recreation facilities that are not considered as part of the recreational facilities associated with Eastman Falls Project.

Environmental Effects

The applicant proposes to maintain existing public access within the project boundary and does not propose any new recreational facilities.

Staff Analysis

Public access to the Pemigewasset River for recreational use, including fishing, boating, picnicking, and swimming, would be unaffected by continued operation of the Eastman Falls Project. In addition, none of the proposed or recommended measures would affect recreation in the project area.

3.3.5 Cultural Resources

Affected Environment

Area of Potential Effect

The Advisory Council on Historic Preservation defines an area of potential effect (APE) as the geographic area or areas in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE for the Eastman Falls Hydro Project includes: (a) lands enclosed by the project boundary; and (b) lands or properties outside the project boundary in which project operations or project-related actions may cause changes in the character or use of historic properties, if any exist.

Historical Background

The Eastman Falls dam project was originally constructed by the Pemigewasset Power Company in 1903, redeveloped by the Boston and Maine Railroad in 1910-1911, and further redeveloped by the Public Service Company of New Hampshire (PSNH) in 1937 and 1983. The two powerhouses sit along the west bank of the Pemigewasset River. The generating facility No. 1 powerhouse was built in 1937. The generating facility No. 2 powerhouse was originally constructed in 1910 and retrofitted in 1983, when a majority of the concrete substructure was replaced and a portion of an access road was reconstructed. The original dam provided water to mills on both sides of the river. However, one side of the river no longer contains intact facilities and has been subdivided from the proposed hydroelectric dam site. The original mill building was destroyed by fire in 1903.

Historical Properties

The Eastman Falls dam and its associated powerhouses are not included on the National Register of Historic Places (National Register).

Environmental Effects

The applicant does not propose any changes to the existing powerhouses or any new structures.

Staff Analysis

In a letter dated May 8, 2012, filed as part of the applicant's original license application, the New Hampshire SHPO stated that the Eastman Falls facilities may be eligible for listing on the National Register; however, relicensing the project would have no potential to cause effects on historic, architectural, or archaeological resources. We have reviewed the applicant's relicensing proposal and the SHPO's determination and based on this information, Commission staff find that no historic properties would be affected by the proposed continued operation of the project.

During the term of any license, the applicant would occasionally need to conduct maintenance activities in the project area or on project facilities. These activities could include replacement of broken windows on the powerhouse, powerhouse roof or masonry repairs, or general landscaping and yard maintenance within the project boundary. These activities would not require prior Commission approval; however, they could affect historic resources in the project area. Consulting with the New Hampshire SHPO prior to conducting these activities would ensure that historic resources are not adversely affected.

During the license term, it is possible that unknown archaeological or historic resources may be discovered during project operation or other project related activities that require land-disturbing activities. To ensure the proper treatment of any potential archaeological or cultural resources, a condition could be included in any license issued for the project requiring that the applicant notify the Commission and the New Hampshire SHPO if previously unidentified archaeological or cultural artifacts are encountered. In the event of any such discovery, the applicant would discontinue all exploratory or construction-related activities until the proper treatment of any potential archaeological or cultural resources is established.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate and environmental conditions at the project site would remain the same.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Eastman Falls Project's use of the Pemigewasset River for hydropower purposes to see what effect various environmental measures would have on the projects' costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp*.,[18] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a 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 EA 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 ECONOMIC BENEFITS OF THE PROJECT

Table 2 summarizes the assumptions and economic information we use in our analysis. This information was either provided by PSNH in the license application, response to additional information request, or estimated by staff. We find that the values provided by PSNH are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; licensing costs;

[18] 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.

and normal operation and maintenance costs. Throughout this section all dollars are 2016 unless otherwise specified.

Table 2. Parameters for economic analysis of the Eastman Falls Project (Source: staff and PSNH).

Parameter	Value	Source
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Inflation and escalation	0.0 percent	Staff
Interest/discount rate	7.35 percent	PSNH
Cost of capital	7.35 percent	PSNH
Federal tax rate	34 percent	Staff
Local tax rate	2.6 percent	Staff
Net investment [a]	$5,295,705	PSNH
Annual operation and maintenance [b]	$175,000	PSNH
Energy rate [c]	$40.71/MWh	Staff

[a] Net investment includes the cost of existing facilities depreciated to 2016, and the $400,000 cost to prepare the license application (see PSNH's filing on January 13, 2016, and Exhibit D page 5 of the license application).
[b] Annual operation and maintenance (see Exhibit D page 4 of the license application).
[c] The energy rate is based on the 2015 average real time locational marginal price for New Hampshire according to the Independent System Operator New England.

4.2 COMPARISON OF ALTERNATIVES

Table 3 summarizes 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 alternatives considered in this EA.

Table 3. Summary of the annual cost of alternative power and annual project cost for the alternatives for the Eastman Falls Project (Source: staff).

	No Action	PSNH's Proposal	Staff Alternative
Installed capacity (MW)	6.06	6.06	6.06
Annual generation (MWh)	27,871	27,871	27,871
Annual cost of alternative power ($/MWh)	$1,134,628 40.71	$1,134,628 40.71	$1,134,628 40.71
Annual project cost ($/MWh)	$867,314 31.12	$869,667 31.12	$878,950 31.54
Difference between the cost of alternative power and project cost ($/MWh)[a]	$267,314 9.59	$264,961 9.51	$255,678 9.17

[a] Numbers in parenthesis denote negative values, thus these costs are greater than the cost of alternative power.

4.2.1 No-Action Alternative

Under the no-action alternative, the Eastman Falls Project would generate an average of 27,871 MWh of electricity annually, have an annual alternative power value of $1,134,628, or $40.71/MWh, and a total annual cost of $867,314, or $31.12/MWh. Overall, the project would produce power at a cost which is about $267,314, or $9.59/MWh, less than the cost of alternative power.

4.2.2 PSNH's Proposal

As proposed by PSNH, the Eastman Falls Project would have the same average annual generation and the same annual power value as the no action alternative. Based on the parameters listed in Table 2 and the cost of measures identified in Table 4, we estimate that the total annual cost of alternative power would be $869,667, or $31.20/MWh. Overall, the project would produce power at a cost which is about $264,961, or 9.51/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

Under the staff alternative, the Eastman Falls Project would have the same average annual generation and the same annual power value as the no action alternative. Based on the parameters listed in Table 2 and the cost of measures identified in Table 4, we

estimate that the total annual cost of alternative power would be $878,950, or $31.54/MWh. Overall, the project would produce power at a cost which is about $255,678, or $9.17/MWh, less than the cost of alternative generation.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4 gives the cost of each of the environmental enhancement measure 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. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects to operate and maintain the Eastman Falls Project (Source: PSNH and staff).

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Administrative				
Notify Interior if an amendment or appeal of any fish and wildlife-related license conditions or extension of time are filed	Interior, New Hampshire FGD	$0	$0	$0
Project Operation				
Operate the project in an instantaneous run-of-river mode	PSNH, Interior, New Hampshire FGD, Staff	$0	$0	$0
Maintain impoundment elevation of 307 feet msl (± 0.2 feet)	PSNH, Interior, New Hampshire FGD, Staff	$0	$0	$0
Implement an impoundment refill protocol for drawdown such that 90 percent of inflow passes downstream and 10 percent of inflow refills impoundment [a]	Interior, New Hampshire FGD	$0	$0	$0

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Release 502 cfs downstream during impoundment refill unless inflow is less than 502 cfs, then implement 90-10 percent flow ratio [a]	PSNH, Staff	$0	$0	$0
Aquatic Resources				
Develop and implement a fishway operation and maintenance plan [b]	Interior, New Hampshire FGD, Staff	$3,000	$1,000	$1,365
Develop and implement an upstream eel passage plan including temporary ramps/traps, data collection, and up to three permanent upstream eel passage facilities [c]	Interior, New Hampshire FGD, Staff	$20,000	$500 plus $3,000/yr. for 2 years of data collection	$3,350
Develop and implement an interim downstream eel passage plan including interim downstream passage measures and a permanent downstream eel passage facility [d]	Interior, New Hampshire FGD, Staff	$25,000	$500	$3,540
Develop and implement a fishway effectiveness monitoring plan [e]	Interior, New Hampshire FGD, Staff	$5,000	$3,000/yr. for 2 years of monitoring	$1,028
Develop and implement an operation and flow monitoring plan	PSNH, Interior, New Hampshire FGD, Staff	$4,000	$500	$987
Develop and implement a post-license water quality monitoring plan [f]	Interior, New Hampshire FGD	$3,000	$5,000/yr. for 1 year of monitoring	$727

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Terrestrial Resources				
Develop and implement an invasive species management and monitoring plan	PSNH, Interior, New Hampshire FGD, Staff,	$5,000	$5,000 every 5 yrs to conduct surveys.	$1,366
Cultural Resources				
Notify Commission and SHPO if previously unidentified archaeological or cultural artifacts are encountered during project construction	Staff	$0	$0	$0
Consult with SHPO prior to making changes to project operation or facilities	Staff	$0	$0	$0

[a] While staff cannot assign costs to this measure because the depth and duration of the impoundment drawdown and refill are unknown, it is likely that implementing the licensee's proposed refill procedure would result in more rapid refill of the impoundment and some small incremental increase in annual generation.

[b] The cost of this measure includes passing organic debris downstream of the project dam to improve aquatic habitat.

[c] This is the cost to develop and implement an upstream eel passage plan, collect data for two years, two upstream eel passage facilities, and keeping the facilities operational during the upstream eel migration season.

[d] Implementing interim downstream eel passage measures would consist of ceasing project generation from dusk until dawn from August 15 through November 15, annually, or to construct and operate a siphon system to protect eels during outmigration. Ceasing project operation would reduce annual generation by about 2,501 MWh and have an annual cost of $101,816; however, constructing a siphon system would have an annual cost of $3,540. Therefore, staff includes the estimated cost to construct a siphon system.

[e] This is the cost to develop and implement a downstream eel passage effectiveness plan that includes monitoring for 2 years.

[f] This is the cost to develop and implement a post-license water quality monitoring plan that includes monitoring for 1 year.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, 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 licenses issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Eastman Falls Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency comments filed on these projects and our review the environmental and economic effects of the proposed project and economic effects of the project and its alternatives, we selected the staff alternative as the preferred alternative. We recommend the staff alternative because: (1) issuance of a new hydropower license by the Commission would allow PSNH to continue to operate the project as a dependable source of electrical energy; (2) the 6.06 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of the staff alternative would exceed those of the no-action alternative; and (4) the proposed measures would protect and enhance aquatic, terrestrial, and cultural resources.

In the following sections, we make recommendations as to which environmental measures proposed by PSNH or recommended by agencies or other entities should be included in any new license that may be issued for the project. In addition to PSNH's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any new license that may be issued for the project.

5.1.1 Measures Proposed by PSNH

Based on our environmental analysis of PSNH's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by PSNH would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project:

- Continue to operate the project in a run-of-river mode and ensure that impoundment water level fluctuations do not exceed ± 0.2 feet from the normal impoundment elevation of 307 feet msl with flashboards installed[19];

- Implement an operation compliance monitoring and maintenance plan (OMCP) to monitor impoundment level, flow releases, and impoundment refill procedures;

- Maintain downstream flows of 502 cfs (equal to the aquatic base flow; ABF), or 90 percent of inflow to the impoundment (whichever is less) to protect downstream aquatic habitat when refilling the impoundment after drawdowns for maintenance or emergencies; and

- Implement an invasive species management and monitoring plan (ISMMP) to monitor the spread of invasive species within the project boundary and implement control measures, if necessary.

5.1.2 Additional Measures Recommended by Staff

We recommend all of the measures described above and six additional measures: (1) develop a plan to install up to three upstream fishways for American eel that would be operated from May 1 to October 30 (section 18); (2) develop a plan to implement downstream passage (interim measures would be implement initially and eventually be replaced by permanent measures) for American eel that would be operated from August 15 to November 15 of each year (section 18); (3) develop and implement a fishway operation and maintenance plan (FOMP)(section 18), including procedures for managing debris collected at or near fish passage facilities (section 18); (4) develop and implement a fishway effectiveness monitoring plan (section 18); (5) notify the Commission and the New Hampshire State Historic Preservation Officer (SHPO) prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and (6) consult with the New Hampshire SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

[19] PSNH also proposes to discontinue maintaining a year-round minimum flow of 410 cubic feet per second (cfs), or inflow (whichever is less) downstream of the project because it would serve no purpose at a run-of-river project with no bypassed reach. The 410-cfs minimum flow is a requirement of the current license that allows PSNH to operate the project in storage-and-release mode.

Below, we discuss our additional staff-recommended measures.

Upstream American Eel Passage

PSNH does not propose any measures for upstream passage of American eel. Interior's preliminary section 18 prescription would require PSNH to develop and implement a plan to install temporary eel ramps or traps for the first two upstream passage seasons following license issuance. Then, based on the results of the two years of data collection, and in consultation with Interior, PSNH would be required to install up to three permanent eel ramps or traps. New Hampshire FGD supports Interior's preliminary prescription.

The only eels collected downstream from Eastman Falls dam in the project vicinity are 5 adult yellow eels that were sampled by Interior and New Hampshire FGD during electrofishing surveys. About 40 miles downstream of the project, at the Garvins Falls dam, juvenile eels have been collected and passed (514 in 2014 and 439 in 2015), but it is unknown whether any of those eels have continued upstream far enough to attempt passage at Eastman Falls dam. The prescribed temporary eel ramps or traps would help to further understand the need for and potential effectiveness of installing upstream juvenile eel passage facilities at the Eastman Falls dam. If juvenile eels are collected in the temporary ramps or traps, then that would help determine the best locations for installing permanent ramps or traps. Therefore we recommend adopting this measure because it would provide information on upstream eel passage and would be worth the estimated average annual cost of $3,350 (estimate is for 2 permanent ramps/traps).

Downstream American Eel Passage

PSNH does not propose any measures for downstream passage of American eel. Interior's preliminary section 18 prescription would require PSNH to develop and implement a plan to provide downstream eel passage in a phased approach, beginning with interim measures by August 15 of the second year after license issuance (Phase 1) and eventually implementing permanent measures (Phase 2) by August 15 of the eighth year after eels are first documented using upstream eel passage facilities at the project.

Interior's prescription specifies that Phase 1 downstream passage could include one or more of the following measures: (1) not operating the project from dawn until dusk during the downstream passage season (August 15 to November 15) under certain hydrologic conditions (when 0.5 inches of rain or more fall within a 24-hour period, or when inflow increases by 50 percent over a 24-hour period, then the project would shut down for that evening plus the following two nights); (2) operating the existing downstream fish bypass from dawn until dusk during the August 15 to November 15

period; or (3) installing and operating a fish passage siphon in the vicinity of the intake(s).

Phase 2 of the downstream eel passage prescription would require PSNH to install a permanent downstream passage facility or facilities with: (1) surface and bottom entrances, (2) new trashracks or overlay screens with a maximum clear bar spacing of 0.75 inches and a maximum approach velocity of 1.64 feet per second, (3) an attraction flow to the bypass (or bypasses) of 2-3 percent of turbine capacity per bypass, (4) a weir or orifice spacing of every 25 linear feet, and (5) a plunge pool depth of 4 feet or at least ¼ the project head. New Hampshire FGD supports Interior's preliminary prescription.

Eel abundance upstream of the Eastman Falls Project is unknown, although PSNH reports that some eels have been collected from Squam Lake, which is in the Pemigewasset River basin approximately 13 miles upstream of the project. Additionally, because we are recommending measures that would provide upstream passage for juvenile eels, it is likely that the numbers of adult eels upstream of the project will increase during the term of any new license. Based on this information, we expect that protection measures for downstream migrating adult American eels will be needed during the term of any new license.

Interior's phased approach to providing downstream passage would defer the cost of constructing any permanent facilities until 8 years after the Eastman Falls Project is actively passing juvenile eels upstream of the dam. Prior to implementation of any permanent measures, implementation of one of the three interim measures would likely provide some protection for the limited number of adult eels that are likely migrating downstream during existing conditions. Based on available information, we conclude that Interior's preliminary section 18 measures for downstream eel passage would improve downstream passage protection for eels that migrate downstream past the Eastman Falls Project and would be worth the estimated average annual cost is $3,540; therefore, we recommend that it be included in any new license issued for the project.

Fishway Operation and Maintenance Plan

Interior's preliminary section 18 prescription would require a Fishway Operation and Maintenance Plan. New Hampshire FGD supports Interior's preliminary prescription.

Interior's prescribed FOMP would be developed and implemented in consultation with the agencies and would include details about how any fish or eel passage facilities constructed at the project would be operated, including the times of the day and year, quantity of conveyance flow, and procedures for routine cleaning and maintenance, including debris removal. Implementing such a plan would ensure that the fish passage facilities are operated as intended and are properly maintained.

In addition to fishway operation and maintenance procedures, the FOMP should address proper debris disposal. Debris that is removed from fish passage facilities during maintenance will likely be a mixture of organic and inorganic material. As appropriate, this debris should be sorted and organic debris should be passed downstream to prevent disruption of any ecosystem function and to provide habitat for macroinvertebrates and fish. Inorganic debris (i.e., trash) should be disposed of properly.

Developing and implementing a FOMP (with procedures for debris management) would ensure that any fish passage facilities are operating properly and would be worth the $1,365 annual cost; therefore, we recommend that any new license issued for the Eastman Falls Project require PSNH to develop and implement a FOMP.

Fishway Effectiveness Monitoring Plan

Interior's preliminary section 18 prescription would require a Fishway Effectiveness Monitoring Plan. New Hampshire FGD supports Interior's preliminary prescription.

In order to provide effective passage, any fishways installed at the Eastman Falls Project would need to be monitored to ensure that they are designed and working properly. If monitoring indicates that the fishways are operating poorly, then design or operational modifications could be made to improve fishway performance. For example, adjustment to conveyance and attraction flows, design or location of the fishway entrance and exit, dates of operation, or plunge pool depth or location, may be necessary. Developing and implementing a fishway effectiveness monitoring plan would ensure that the fishways are operating effectively and would be worth the $1,028 annual cost; therefore, we recommend that any new license issued for the Eastman Falls Project require PSNH to develop and implement a fishway effectiveness monitoring plan.

Cultural Resources

There are no known historical or archaeological properties within the project boundary listed or eligible for listing in the National Register. However, archaeological or historic sites could be discovered during any land-disturbing activities that may occur during the term of any license that is issued. Therefore, we recommend that the applicant notify the Commission and the New Hampshire SHPO if previously unidentified archaeological or historic properties are discovered during the course of operating and maintaining project works or other facilities at the project. In the event of any such discovery, the applicant would discontinue any activities related to the discovery until the proper treatment of any potential archaeological or cultural resources is established.

During the term or any license issued for the project, the applicant would occasionally need to conduct maintenance activities in the project area or on project

facilities. These activities could include replacement of broken windows on the powerhouse, powerhouse roof or masonry repairs, or general landscaping and yard maintenance within the project boundary. These activities would not require prior Commission approval; however, they could affect historic resources in the project area. Therefore, to ensure that historic resources are not adversely affected from maintenance activities, we recommend that the applicant consult with the New Hampshire SHPO prior to conducting any maintenance activities that do not require Commission approval but could affect cultural resources.

5.1.3 Measures Not Recommended

Water Quality Survey

Interior recommends (10(j) recommendation 3) that PSNH conduct water temperature and DO monitoring continuously in the headpond and tailrace for up to 3 years during the period of June 1 to September 30. New Hampshire FGD supports Interior's recommendation. PSNH does not propose to do any post-license water quality monitoring.

In 2015, New Hampshire DES concluded that project waters meet state water quality standards for DO and temperature both upstream and downstream of the Eastman Falls dam. The Corps' 2009 study supports New Hampshire DES' conclusion. DO was in excess of the minimum State standard in the project vicinity during the study and the project showed little if any effect on water temperature. Interior states that a post-license water quality survey is warranted because conditions during the 2009 low-flow period of the Corps' study may not have been under "worst case" conditions. There were two rain events during the study period which caused streamflow to rise and water temperature to drop. These occurred in late July and again in the third week of August. However, each of these events was followed by periods in which flows decreased to typical low-flow summer conditions and should have documented any problems that may be present with attaining State water quality standards. Conducting additional monitoring during the post-licensing period would not document any new effects on water quality because there are no proposed changes to project operation; however, additional monitoring could affirm the results of the monitoring that was conducted in 2009. Based on this information, we conclude that additional water quality monitoring would not be worth the $727 annual cost; therefore, we do not recommend requiring PSNH to conduct additional water quality monitoring as part of any new license that is issued for the Eastman Falls Project.

Impoundment Refill Procedure

Periodically, the project impoundment is drawn down for maintenance, after flashboards are lowered during high flows, or for unscheduled emergencies. To maintain

downstream flows, Interior recommends (10(j) recommendation 4) that the licensee implement an impoundment refill procedure whereby 90 percent of project inflow would be passed downstream and 10 percent would be used to refill the impoundment. PSNH instead proposes to implement an impoundment refill procedure based on releasing the ABF flow of 502 cfs during impoundment refilling. If inflow is less than 502 cfs, then PSNH's proposal would be the same as Interior's and it would release 90 percent of inflow.

Both impoundment refill procedures would protect aquatic habitat in a similar way, but the different procedures for refilling an impoundment result in a trade-off between effects on the aquatic habitat in the impoundment and aquatic habitat downstream of the dam. Interior's procedure is more protective of downstream habitat than PSNH's during periods when inflow exceeds 502 cfs because more flow would be released downstream resulting is more wetted area of the stream channel. Under the same inflow conditions, PSNH's procedure is generally more protective of aquatic habitat in the impoundment because it would allow the impoundment to refill more quickly, which would re-submerge any dewatered habitat near the shoreline.

While staff cannot assign costs to this measure because the depth and duration of the impoundment drawdown and refill are unknown, the licensee's proposed refill procedure would result in more rapid refill of the impoundment and likely result in an incremental increase in annual generation. Because the environmental effects of the two procedures are similar and because PSNH's procedure is likely to cost less, we recommend that PSNH's procedure be included in any license issued for the project.

Northern Long-eared Bat Consultation

Interior recommends (Interior 10(j) recommendation 6) that if the project would involve tree clearing, or would otherwise affect northern long-eared bat habitat, FERC should initiate consultation under section 7 of the ESA.

As discussed in section 3.3.3, *Threatened and Endangered Species*, staff found that relicensing the project with any of the measures considered in this EA would have no effect on this species. Therefore, no further consultation is needed at this time.

Interior Notification of License Amendments

Interior recommends that the licensee be required to notify Interior if an amendment or appeal of any fish and wildlife-related license conditions or extension of time is filed with the Commission (10(a) recommendation 1).

For significant amendments related to fish and wildlife resources, the Commission's regulations require the licensee to consult with Interior while preparing the amendment application.[20] For other amendments, appeals, and requests for extensions of time, Interior can receive notification of any filings and issuances through the Commission's eSubscription service.[21] Because existing Commission regulations and services allow Interior to be informed of amendments, appeals, and requests for extensions of time, we do not recommend including Interior's recommendation as a requirement of any new license that may be issued for this project.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Although there is no documented fish entrainment or mortality at the project, it is likely that some fish pass and would continue to pass through the project turbines and some of those fish are probably injured or killed. Implementation of downstream eel passage measures would likely decrease entrainment mortality but some level of fish (including eel) mortality is likely to continue to occur.

5.3 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 by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission finds 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 shall attempt to resolve such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency. In response to our Ready for Environmental Analysis notice, Interior (letter filed on June 22, 2016) recommended six fish and wildlife measures. Of the six recommendations, two recommendations (5 and 6) are considered to be outside the scope of section 10(j) and have been considered under section 10(a) of the FPA and are addressed in section 3, *Environmental Analysis*, and section 5.1, *Comprehensive Development and Recommended Alternative*. Of the 4

[20] If a licensee files a request to amend its license or to amend any fish and wildlife-related license condition, the licensee may need to consult with Interior pursuant to sections 4.38(a)(6) and 4.201(c) of the Commission's regulations. 18 C.F.R. §§ 4.38(a)(6) and 4.201(c) (2015).

[21] The Commission's eSubscription service can be accessed at http://www.ferc.gov/docs-filing/esubscription.asp.

recommendations that we consider to be within the scope of section 10(j), we recommend adopting two. Table 5 lists the 10(j) recommendations and whether the recommendations are adopted under the staff alternative. Section 5.1.3, *Measures Not Recommended*, discusses the reasons we do not recommend adopting three of these measures.

Table 5. Analysis of fish and wildlife agency recommendations for the Eastman Falls Project.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
1. Operate the project in an instantaneous run-of-river mode	Interior	Yes	$0	Yes
1. Develop and implement an operation and flow monitoring plan	Interior	Yes	$987	Yes
2. Maintain impoundment elevation of 307 feet msl (± 0.2 feet)	Interior	Yes	$0	Yes
3. Develop and implement a post-license water quality monitoring plan	Interior	Yes	$727	No
4. Implement an impoundment refill protocol for drawdown such that 90 percent of inflow passes downstream and 10 percent of inflow refills impoundment	Interior	Yes	$0	No
5. Develop and implement an invasive species management and monitoring plan	Interior	No	$1,366	Yes
6. Consult about northern long-eared bat if habitat would be affected by project activities before clearing any trees	Interior	No	$0	No

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) 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 federal and state comprehensive plans for improving, developing, or conserving waterways affected by the project. We reviewed 6 comprehensive plans that are applicable to the Eastman Falls Project located in New Hampshire.[22] No inconsistencies were found.

6.0 FINDING OF NO SIGNIFICANT IMPACT

If the Eastman Falls Project is licensed with the additional staff recommended measures and mandatory conditions, the project would operate while providing protective measures to fish, wildlife, recreational access, aesthetics, and protecting any unidentified cultural or historic resources in the project area.

Based on our independent analysis, issuance of a license for the Eastman Falls Project, as proposed with the additional staff-recommended measures and mandatory conditions, would not constitute a major federal action significantly affecting the quality of the human environment.

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8.0 LIST OF PREPARERS

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APPENDIX A

LICENSE CONDITIONS RECOMMENDED BY STAFF

In this section, we present license articles for staff-recommended measures that would not be addressed by mandatory conditions. On June 22, 2016, the U.S. Department of the Interior (Interior) filed several preliminary section 18 fishway prescriptions. These prescriptions would be included in any license that is issued for the project and they are presented in section 2.2.4 of this EA.

Draft Article 201. *Administrative Annual Charges*. The licensee must pay the United States annual charges, effective the first day of the month in which this license is issued, and as determined in accordance with provisions of the Commission's regulations in effect from time to time, for the purposes of:

(a) reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 6.06 megawatts; and

(b) recompensing the United States for the use, occupancy and enjoyment of 476 acres of its lands (other than for transmission line right-of-way).

Draft Article 202. *Exhibit Drawings.* Within 45 days of the date of issuance of this license, as directed below, the licensee must file two sets of the approved exhibit drawings, form FERC-587, and GIS data in electronic file format on compact disks (CD) with the Secretary of the Commission, ATTN: OEP/DHAC.

(1) Digital images of the approved exhibit drawings must be prepared in electronic format. Prior to preparing each digital image, the FERC Project-Drawing Number (i.e., P-2457-1001 through P-2457-1014) must be shown in the margin below the title block of the approved drawing. Exhibit F drawings must be segregated from other project exhibits, and identified as Critical Energy Infrastructure Information (CEII) material under 18 C.F.R. § 388.113(c). Each drawing must be a separate electronic file, and the file name must include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this license, and a file extension in the following format [P-247-1001, F-1, Description, MM-DD-YYYY.TIF].

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (i.e., latitude and longitude coordinates, or state plane coordinates). The points must be arranged in a triangular format for geographic information system (GIS) georeferencing the project boundary drawing to the polygon data, and must be based on a standard map coordinate system. The spatial

reference for the drawing (i.e., map projection, map datum, and units of measurement) must be identified on the drawing and each reference point must be labeled. In addition, each project boundary drawing must be stamped by a registered land surveyor. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY – black & white raster file
FILE TYPE – Tagged Image File Format (TIFF), CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION – 300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE FORMAT – 22" X 34" (minimum), 24" X 36" (maximum)
FILE SIZE – less than 1 megabyte desired

A third set (Exhibit G only) and a copy of Form FERC-587 must be filed with the Bureau of Land Management office at the following address:

Bureau of Land Management
Branch of Lands (ES-930)
20 M Street S.E.
Washington, D.C. 20003

Form FERC-587 is available through the Commission's website at the following URL: http://www.ferc.gov/docs-filing/forms/form-587/form-587.pdf. Although instruction no. 3 requires microfilm copies of the project boundary maps in aperture card format, electronic copies that meet the digital specifications in this ordering paragraph should be substituted. If the FERC-587 cannot be downloaded from the Internet, a hard copy may be obtained by mailing a request to the Secretary of the Commission.

(2) Project boundary GIS data must be in a georeferenced electronic file format (such as ArcView shape files, GeoMedia files, MapInfo files, or a similar GIS format). The filing must include both polygon data and all reference points shown on the individual project boundary drawings. An electronic boundary polygon data file(s) is required for each project development. Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) must include: FERC Project Number, data description, date of this license, and file extension in the following format [P-2457, boundary polygon/or point data, MM-DD-YYYY.SHP]. The filing must be accompanied by a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., UTM, State Plane, Decimal Degrees, etc.), the map datum (i.e., North American 27, North American 83, etc.), and the units of measurement (i.e., feet, meters, miles, etc.). The text file name must include: FERC Project Number, data description, date of this

license, and file extension in the following format [P-2457, project boundary metadata, MM-DD-YYYY.TXT].

In addition, for those projects that occupy federal lands, a separate georeferenced polygon file(s) is required that identifies transmission line acreage and non-transmission line acreage affecting federal lands for the purpose of meeting the requirements of 18 C.F.R. §11.2. The file(s) must also identify each federal owner (e.g., Bureau of Land Management, Forest Service, U.S. Army Corps of Engineers, etc.), land identification (e.g., forest name, Section 24 lands, national park name, etc.), and federal acreage affected by the project boundary. Depending on the georeferenced electronic file format, the polygon, point, and federal lands data can be included in a single file with multiple layers.

Draft Article 203. *Amortization Reserve*. Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project must be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee must set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee must deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee must set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee must maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves must be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios must be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity must be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Draft Article 204. *Headwater Benefits.* If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the prior license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater

improvement, the licensee must reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations.

Draft Article 205. *As-built Exhibits*. Within 90 days of completion of construction of the facilities authorized by this license, including the new upstream and potential downstream eel passage facilities, the licensee must file for Commission approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built.

Draft Article 301. *Contract Plans and Specifications*. At least 60 days prior to the start of any construction, the licensee must submit one copy of its plans and specifications and supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these must be a courtesy copy to the Director, D2SI). The submittal to the D2SI –New York Regional Engineer must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the D2SI – New York Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

Draft Article 302. *Cofferdam and Deep Excavation Construction Drawings*. Should construction require cofferdams or deep excavation, the licensee must review and approve the design of contractor-designed cofferdams and deep excavations and must: (1) have a Professional Engineer who is independent from the construction contractor review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction; and (2) ensure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer and two copies to the Commission (one of these copies must be a courtesy copy to the Commission's Director, D2SI), of the approved cofferdam and deep excavation construction drawings and specifications, and the letters of approval.

Draft Article 303. *Project Modification Resulting From Environmental Requirements*. If environmental requirements under this license require modification that may affect the project works or operations, the licensee must be consult with the Commission's Division Dam Safety and Inspections – New York Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the

proposed work does not adversely affect the project works, dam safety, or project operation.

Draft Article 401. *Requirement to File Plans, Reports, and Amendments*.

(a) Schedule for Filing Plans for Commission Approval

Any plan required by the U.S. Department of the Interior's (Interior) section 18 fishway prescription must be filed with and approved by the Commission prior to implementation to ensure that it does not conflict with project purposes and will not adversely affect dam safety. Therefore, within 60 days of license issuance, the licensee must file a schedule for filing each plan required by Interior's prescription with the Commission. For each plan, the schedule must specify: (1) the name of the plan, (2) the section or sections in Interior's prescription that requires the plan, (3) each entity that will be consulted during preparation of the plan, and (4) the date the plan will be filed with the Commission. Plans that are contemplated by Interior's prescription, but not necessarily required at this time, should not be included in the schedule. In order to meet any plan implementation dates specified in Interior's prescription, the filing dates in the schedule should account for the time necessary for the Commission to review and approve the plan (i.e., 60 days for plans that include new construction and 30 days for all other plans). The Commission reserves the right to make changes to the schedule for filing plans.

(b) Schedule for Filing Reports

Any report of study or monitoring results required by Interior's section 18 fishway prescription must be filed with the Commission to confirm compliance with the requirements of this license. Therefore, within 60 days of license issuance, the licensee must file a schedule for filing each report required by Interior's prescription. For each report, the schedule must specify: (1) the name of the report, (2) the section or sections in Interior's prescription that requires the report, (3) each entity that will be consulted during preparation of the report, and (4) the date the report will be filed with the Commission. Reports that are contemplated by Interior's prescription, but not necessarily required at this time, should not be included in the schedule. The Commission reserves the right to make changes to the schedule for filing reports.

(c) Reporting of Temporary Modification of Project Operation

Any temporary modification of project operation that is allowed by Interior's section 18 fishway prescription must be reported to the Commission. Planned temporary modifications of project operation must be reported to the Commission at least 30 days prior to implementing the modification. Unplanned temporary modifications of project operation must be reported as soon as possible, but no later than 10 days after each such incident. Each report must be filed with the Commission and must include a description

of the reason for the planned or unplanned temporary modification of project operation. If unplanned, the report must also include proposed measures, if applicable, to prevent future modifications.

(d) Requirement to File Amendment Applications

Any unspecified, long-term changes to project operation or facilities (e.g., installation of the permanent downstream eel passage facility) that are contemplated by Interior's section 18 fishway prescription may not be implemented without prior Commission authorization granted after the filing of an application to amend the license.

Draft Article 402. *Run of River Operation*. The licensee must operate the project in a run-of-river mode, such that inflows approximate outflows on an instantaneous basis. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the licensee. If operation of the project causes a deviation from run-of-river mode, the licensee must notify the Commission as soon as possible, but no later than 10 days after each such incident.

Draft Article 403. *Impoundment Refill*. When refilling the project impoundment after flashboards are lowered during high flows, for maintenance, or for emergencies, the licensee must release a minimum flow of 502 cfs downstream to the Pemigewassett River, unless inflow is less, in which case it must release 90 percent of impoundment inflow.

Draft Article 404. *Operation Compliance Monitoring Plan*. Within six months of the effective date of this license, the licensee must file with the Commission, for approval, an operation compliance monitoring plan for the project. The plan must include, but is not limited to:

(a) a description of how the project will be operated to maintain compliance with the run of river operation required in Draft Article 402;

(b) a description of the impoundment refill procedures required in Draft Article 403;

(c) a description of the mechanisms and structures (i.e., type and exact locations of all flow and reservoir elevation monitoring equipment and gages) to be used for maintaining compliance with operational requirements, procedures for maintaining and calibrating monitoring equipment, and the methods and frequency for reporting monitoring data to the Commission, the U.S. Department of the Interior (Interior), New Hampshire Department of Environmental Services (New Hampshire DES), and the New Hampshire Fish and Game Department (New Hampshire FGD); and

(d) an implementation schedule.

The licensee must include with the plan, documentation of consultation with Interior, New Hampshire DES, and New Hampshire FGD; 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 and to 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 plan is approved by the Commission. Upon Commission approval, the licensees must implement the plan, including any changes required by the Commission.

Draft Article 405. *Debris Management*. In addition to the requirements of the Fishway Operation and Maintenance Plan (FOMP) required by Interior's section 18 fishway prescription, the FOMP shall describe:

(a) procedures for separation of organic and inorganic debris;
(b) procedures for off-site disposal of inorganic material; and
(c) procedures for reintroducing organic debris to the Pemigewasset River downstream of Eastman Falls dam, as appropriate.

Draft Article 406. *Reservation of Authority to Prescribe Fishways*. Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior or Secretary of Commerce pursuant to section 18 of the Federal Power Act.

Draft Article 407. *Invasive Species Management and Monitoring Plan.* Within six months of the effective date of this license, the licensee must file for Commission approval a plan to manage and monitor invasive plant species in the project area. The plan must include, but not be limited to: (1) a description of invasive species monitoring methods and the frequency of monitoring; (2) a description of best management practices that will be used to reduce the spread of nuisance species found at the project; (3) a description of any criteria that will be used to determine when control measures are needed and a description of any control measures that the licensee will implement to control nuisance species found at the project (i.e., manual pulling, chemical application, biological controls); and (4) a schedule for filing any monitoring reports with New

Hampshire Department of Environmental Services (New Hampshire DES), the U.S. Department of the Interior (Interior), and the Commission for review.

The plan must be prepared after consultation with New Hampshire DES and Interior. The licensee must include with the plan 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. 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.

Draft Article 408. *Protection of Cultural Resources.* Prior to implementing any project modifications not specifically authorized by this license, including but not limited to maintenance activities, land-clearing or land-disturbing activities, the licensee must consult with the New Hampshire Historic Preservation Commission (New Hampshire SHPO) to determine the effects of the activities and the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the New Hampshire SHPO.

If a project modification is determined to affect a historic property, the licensee shall file for Commission approval a Historic Properties Management Plan (HPMP) prepared by a qualified cultural resource specialist after consultation with the New Hampshire SHPO. In developing the HPMP, the licensee shall use the Advisory Council on Historic Preservation and the Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP shall include the following items: (1) a description of each historic property; (2) a description of the potential effect on each historic property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The licensee shall not implement any project modifications, other than those specifically authorized in this license, until informed by the Commission that the requirements of this article have been fulfilled.

Draft Article 409. *Protection of Undiscovered Cultural Resources.* If the licensee discovers previously unidentified cultural resources during the course of constructing, maintaining, or developing project works or other facilities at the project, the licensee

must stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the New Hampshire SHPO to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the New Hampshire SHPO immediately.

If a discovered cultural resource is determined to be eligible for the National Register of Historic Places (National Register), the licensee must file for Commission approval an HPMP prepared by a qualified cultural resource specialist after consultation with the New Hampshire SHPO. In developing the HPMP, the licensee must use the Advisory Council on Historic Preservation's and the Federal Energy Regulatory Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP must include the following items: (1) a description of each discovered property, indicating whether it is listed in or eligible to be listed in the National Register; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The licensee must not resume land-clearing or land-disturbing activities in the vicinity of a cultural resource discovered during construction, until informed by the Commission that the requirements of this article have been fulfilled.

Draft Article 410. *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.