ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE

Williams Hydroelectric Project

FERC Project No. 2335-039

Maine

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

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commerce	U.S. Department of Commerce
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D2SI	FERC Division of Dam Safety and Inspections
DO	dissolved oxygen
dpi	dots per inch
EA	environmental assessment
ESA	Endangered Species Act
°F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
fph	feet per hour
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
HPMP	historic properties management plan
ILP	Integrated Licensing Process
Interior	U.S. Department of the Interior
ISO	Independent System Operator
ISR	White Pine Hydro's Initial Study Report
KVTU	Kennebec Valley Chapter of Trout Unlimited
Maine DEP	Maine Department of Environmental Protection
Maine DIFW	Maine Department of Inland Fisheries and Wildlife
Maine DMR	Maine Department of Marine Resources
Maine LUPC	Maine Land Use Planning Commission
Maine SHPO	Maine Historic Preservation Commission Officer
mg/L	milligrams per liter
MSZA	Mandatory Shoreland Zoning Act
MW	megawatt
MWh	megawatt-hours
National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
NGVD	National Geodetic Vertical Datum 1929
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPCC	Northeast Power Coordinating Council, Inc.
PAD	Pre-Application Document

RFMP	recreation facilities management plan
SD1	Scoping Document 1
THPO	Tribal Historic Preservation Officer
USGS	U.S. Geological Survey
White Pine Hydro	Brookfield White Pine Hydro LLC

EXECUTIVE SUMMARY

Proposed Action

On December 11, 2015, Brookfield White Pine Hydro LLC (White Pine Hydro) filed an application for a new license with the Federal Energy Regulatory Commission (Commission or FERC) to continue to operate the Williams Hydroelectric Project (Williams Project). The 13-megawatt (MW) project is located on the Kennebec River, in Somerset County, Maine, approximately 67 river miles upstream of Augusta, Maine. The project does not occupy federal land.

Project Description and Operation

The Williams Project consists of: (1) a 894.7-foot-long, 46.0-foot-high dam that includes: (a) a 202-foot-long, 15-foot-high earth embankment section with a concrete core wall; (b) a 244-foot-long, 32-foot-high stone masonry and concrete spillway section with six 32.5-foot-wide, 20.5-foot-high Tainter gates; (c) a 71.3-foot-long, 19.5-foot-high stone masonry and concrete abutment section; (d) a 203.3-foot-long, 26.5-foot-high stone masonry and concrete stanchion bay section with two 65.9-foot-wide, 17.5-foot-high and one 46.8-foot-wide, 17.5-foot-high stanchion bays; (e) a 27-foot-long, 45- to 46-foot-high bulkhead section with a 20.5-foot-wide, 7.0-foot-high surface weir gate and a 6.0-foot-wide, 12.3-foot-high Tainter gate at the upstream end of a 162-foot-long, 14-foot-wide steel-lined sluiceway; (f) a 95.5-foot-wide, 45.5-foot-high intake and powerhouse section with four headgates and two double-bay trashracks with 3.5-inch clear-bar spacing; and (g) a 51.6-foot-long, 10.0-foot-high concrete cut-off wall; (2) a 400-acre impoundment with a gross storage volume of 4,575 acre-feet and a useable storage volume of 2,065 acre-feet at a normal maximum elevation of 320 feet National Geodetic Vertical Datum 1929 (NGVD); (3) a 40.5-foot-wide, 105.5-foot-long concrete powerhouse that is integral with the dam containing a 6-MW turbine-generating unit and a 7-MW turbine-generating unit for a total installed capacity of 13 MW; (4) a tailrace that includes a 26-acre tailwater pool with a normal water surface elevation of 275 feet NGVD and a 6,000-foot-long, 150- to 175-foot-wide excavated main discharge channel; (5) a 200-foot-long generator lead and a 310-foot-long generator lead that connect the turbine-generator units to the regional grid; and (6) appurtenant facilities. Project recreation facilities include an angler parking area, a canoe portage trail, a multi-use parking area, and a concrete boat launch.

The project operates in a store-and-release mode with the impoundment elevation fluctuating up to 6 feet on a daily basis to re-regulate inflow from the upstream Wyman Project (FERC Project No. 2329), maintain downstream flow, and meet peak demands for generation. The existing license requires an instantaneous minimum flow of 1,360 cubic feet per second (cfs), or inflow (whichever is less), in the tailrace. The project generates 96,731 megawatt-hours (MWh) of electricity annually.

Proposed Measures

White Pine Hydro proposes the following measures to protect or enhance environmental resources:

- Continue the existing store-and-release mode of operation and maintain the impoundment water surface between 314 and 320 feet NGVD at all times to re-regulate peaking discharge from the upstream Wyman Project to protect downstream aquatic habitat;

- Continue to provide a continuous minimum flow of 1,360 cfs, or inflow, whichever is less, from the project to protect downstream fish and aquatic resources;

- Install a permanent upstream eel passage facility within two years of the effective date of the new license and operate the facility from June 15 to September 15 each year;

- Develop measures to provide downstream eel passage protection within 10 years of installing the upstream eel passage facility;

- Develop a plan for monitoring compliance with project operation, including any minimum flows and impoundment level requirements;

- Develop a plan to monitor the effects of project operation on nesting loons in the impoundment;

- Continue to maintain and provide public access to existing recreation sites at the project;

- Preserve project lands for continued and future recreational access to the tailwater pool and explore options for improving boat access to the tailwater pool;

- Improve the existing canoe portage trail with gravel and install safety signs;

- Develop a recreation facilities management plan (RFMP) with measures for maintaining recreation facilities and evaluating the need for additional access or for improvements to existing recreation facilities;

- Monitor use and availability of the Evergreens Campground boat launch;[1] and

- Develop an historic properties management plan (HPMP) for the protection of cultural resources.

In addition to the measures listed above, White Pine Hydro proposes to remove 375.5 acres of land and water from the existing project boundary that do not serve a project purpose. About 331 acres of this land and water is located at the uppermost extent of the impoundment, 20.2 acres are located in three parcels along the eastern shore of the impoundment, and one 20.3-acre parcel is located just northwest of the dam on the western shore of the impoundment.

Public Involvement and Areas of Concern

Before filing its license application with the Commission, White Pine Hydro conducted pre-filing consultation in accordance with the Commission's Integrated Licensing Process. The intent of the Commission's pre-filing process is to involve the public early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission. As part of the pre-filing process, staff conducted scoping to identify issues and alternatives. Staff distributed a scoping document to stakeholders and other interested entities on October 9, 2012. Scoping meetings were held in Solon and Hallowell, Maine on November 7 and 8, 2012, respectively. A revised scoping document was distributed on January 22, 2013.

White Pine Hydro filed its license application on December 11, 2015. On May 13, 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 relicensing the project are upstream and downstream passage for American eels and recreational access for motorized watercraft in the tailwater area.

[1] The privately-owned Evergreens Campground is located on the eastern shore of the Kennebec River immediately downstream of the project boundary. It provides the only motorized boat access to the project tailwater.

Alternatives Considered

This environmental assessment (EA) analyzes the effects of continued project operation and recommends conditions for any license that may be issued for the project. In addition to White Pine Hydro's proposal, we consider two alternatives: (1) White Pine Hydro's proposal with staff modifications (staff alternative); and (2) no action – continued operation with no changes.

Under the staff alternative, the project would be operated and maintained as proposed by White Pine Hydro except for two measures: timing of downstream eel passage and the development of an HPMP. White Pine Hydro proposes to implement downstream eel passage measures within 10 years of installing the proposed upstream eel passage facility. However, staff does not recommend this measure because the number of eels that will successfully use any new upstream passage facilities is unknown, and it is not clear when downstream passage will be needed. Instead of specifying that downstream passage measures be implemented 10 years after providing upstream passage, staff recommends that White Pine Hydro develop a downstream eel passage plan that identifies the criteria for identifying when downstream eel passage would be provided.

White Pine Hydro also proposes to develop an HPMP for the protection of cultural resources. However, staff does not recommend this measure because relicensing the project is not likely to have an effect on historic properties. Instead, staff recommends that White Pine Hydro: (1) notify the Commission and the Maine Historic Preservation Commission Officer (Maine SHPO) prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and (2) consult with the Maine SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

In addition, the staff alternative for the project includes four additional measures: (1) develop an upstream and downstream eel passage evaluation plan; (2) develop an upstream and downstream eel passage facility operation and maintenance plan; (3) modify the proposed RFMP to include the installation and maintenance of signs showing the locations of project recreational access sites; and (4) modify the proposed RFMP to include monitoring of public access at the project, including the use and availability of the Evergreens Campground boat launch.

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

Staff Alternative

Aquatic Resources – Continuing to operate the project in store-and-release mode and the proposed minimum flow would maintain existing habitat for aquatic resources in the downstream sections of the Kennebec River. Using the available storage between water surface elevations 314 and 320 feet NGVD to re-regulate peaking discharges from the upstream Wyman Project would reduce the daily flow variability downstream of the Williams Project. Installing the proposed permanent upstream eel passage facility would allow juvenile eels to safely and efficiently access an additional 26.6 miles of potential habitat upstream of Williams dam. The staff-recommended downstream eel passage plan would identify measures to reduce entrainment and impingement mortality of adult eels migrating downstream and determine the timing of when these measures would be implemented. The staff-recommended evaluation of the effectiveness of the proposed upstream and downstream eel passage measures would help to ensure that all eel passage measures are working effectively. Implementing an eel passage operation and maintenance plan would define how eel passage measures will be operated and maintained.

Terrestrial Resources – Continuing to operate the project in store-and-release mode would maintain existing shoreline habitat in the impoundment and Kennebec River downstream of the project. The proposed monitoring of common loon nesting would provide additional information on loon nesting success in the impoundment and allow for the development of mitigation measures, if necessary.

Threatened and Endangered Species – Two federally listed threatened species, the Canada lynx (*Lynx canadensis*) and northern long-eared bat (*Myotis septentrionalis*) could occur in Somerset County, Maine; however, neither species has been documented in the immediate project vicinity, and no critical habitat has been identified in the project area for either species.[2] Because these species are not known to inhabit the project area and operation and maintenance of the project would not substantially alter the existing environment (i.e., no habitat would be disturbed and no trees would be removed), relicensing the project as recommended by staff would have no effect on the Canada lynx or northern long-eared bat.

Anadromous Atlantic salmon (*Salmo salar*) in the Kennebec River are part of the Gulf of Maine Distinct Population Segment and are federally listed as endangered. Historically, anadromous Atlantic salmon migrated upstream as far as the Kennebec River Gorge in Indian Stream Township, which is approximately 40 river miles upstream of Williams dam. However, this species does not currently occupy or have access to the

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

project area due to lack of upstream fish passage at several dams downstream of Williams dam. Additionally, while there is critical habitat approximately 9.5 miles downstream of Williams dam, the project does not occupy or restrict access to any designated critical habitat in the Kennebec River. Because project operation and maintenance would not affect areas downstream of the project that are currently inhabited by endangered anadromous Atlantic salmon, relicensing the project as recommended by staff would have no effect on this species.

Recreation – White Pine Hydro's proposed RFMP would include measures for maintaining recreation facilities and evaluating the need for additional access or for improvements to existing recreation facilities. Installing and maintaining access signs as part of the modified RFMP would inform the public of recreation opportunities and ways to access the project. Monitoring recreational access as part of the modified RFMP would ensure that existing access to the project, including motorized boating access to the tailwater, would be monitored and maintained.

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. Notifying the Commission and the Maine SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities would help protect undiscovered cultural resources. Consulting with the Maine SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities would help protect undiscovered cultural resources.

No Action Alternative

Under the no-action alternative, the project would continue to operate as it has in the past. None of the proposed or recommended measures would be implemented and there would be no enhancement of environmental resources.

License Conditions

Staff recommendations for conditions of any new license for the project are based on the analysis presented in this EA. Draft license articles are attached in Appendix A.

Conclusion

Based on our analysis, we recommend licensing the project as proposed by White Pine Hydro, with some staff modifications and additional measures.

In Section 4.2, *Comparison of Alternatives*, we estimate the likely cost of alternative power for each of the three alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative, project power would cost $433,380, or $4.48/MWh less than the cost of alternative generation. Under the proposed action alternative, project power would cost $329,710, or $3.44/MWh less than the likely alternative cost of power. Under the staff alternative, project power would cost $317,970, or $3.33/MWh less than the cost of alternative generation.

We chose the staff alternative as the preferred alternative because: (1) the project would continue to provide a dependable source of electrical energy for the region (96,731 MWh annually); (2) the 13 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by White Pine Hydro, and additional measures recommended 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
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Washington, DC

WILLIAMS HYDROELECTRIC PROJECT
Project No. 2335-039 - Maine

1.0 INTRODUCTION

1.1 APPLICATION

On December 11, 2015, Brookfield White Pine Hydro LLC (White Pine Hydro or applicant) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) for a new license to continue to operate and maintain the existing Williams Hydroelectric Project (Williams Project). The 13-megawatt (MW) project is located approximately 67 river miles upstream of Augusta, Maine on the Kennebec River in Somerset County, Maine (see Figure 1). The Williams Project does not occupy federal land.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Williams 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 Williams 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.

Issuing a license for the Williams Project would allow White Pine Hydro to generate electricity at the project for the term of the license, making electric power from a renewable resource available to the regional grid.

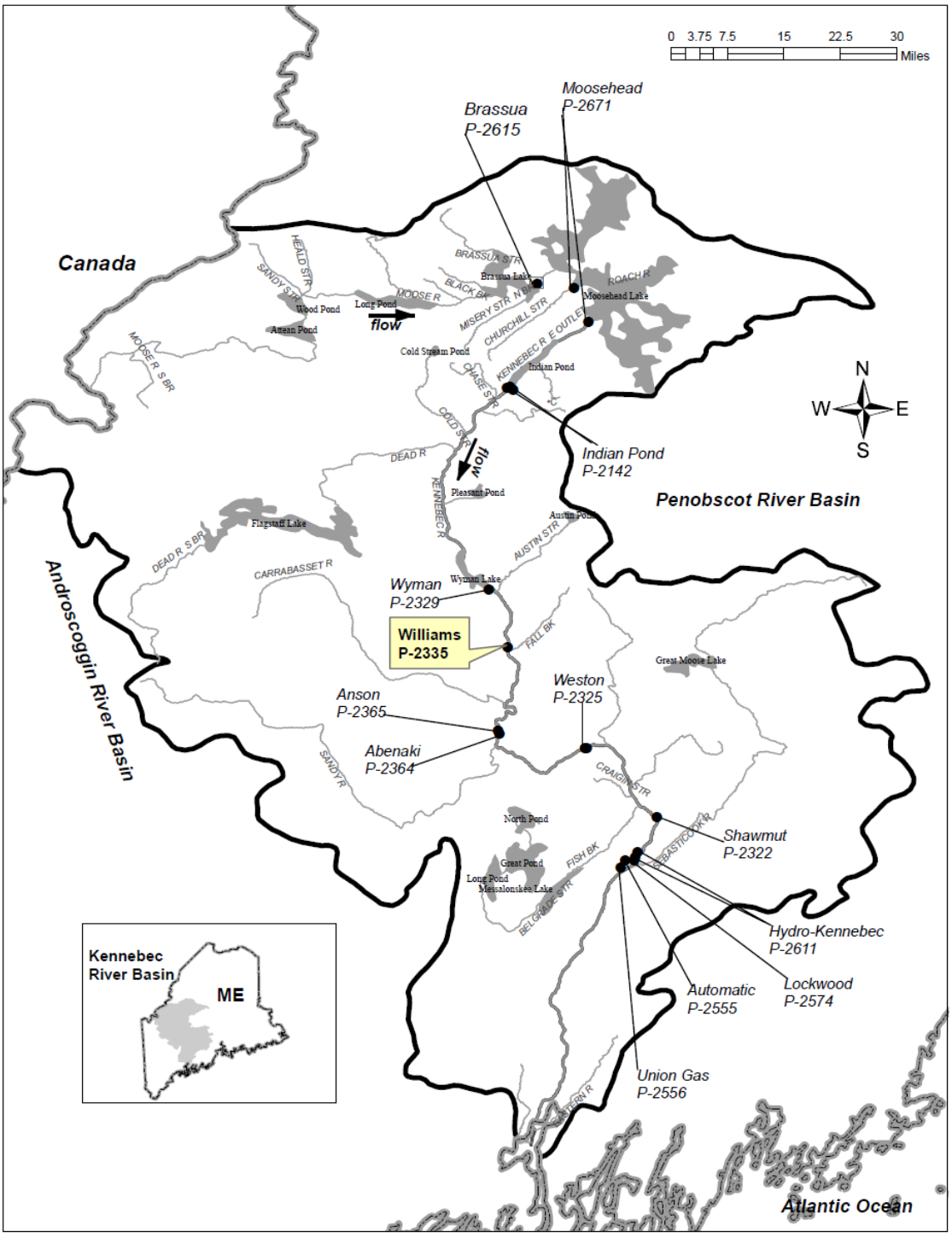

Figure 1. Location of the Williams Project and other dams in the Kennebec River Basin (Source: staff).

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 with our recommended measures (staff alternative). We also considered the effects of the no-action alternative. The primary issues associated with relicensing the project are upstream and downstream passage for American eels and recreational access for motorized watercraft in the tailwater area.

1.2.2 Need for Power

To assess the need for power, we looked at the needs in the operating region in which the project is located. The average annual generation of the Williams Project is 96,731 megawatt-hours (MWh). The power generated is sold to the Independent System Operator of New England.

The North American Electric Reliability Council (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Williams Project is located in the Northeast Power Coordinating Council, Inc. (NPCC) region of the NERC. According to NERC's 2015 forecast (NERC, 2015), from 2016 through 2025, summer demand in the New England area of the NPCC region is projected to grow at an annual rate of 0.48 percent.

We conclude that the power from the Williams Project would help meet a need for power in the NPCC region in both the short- and long-term. The power generated by the project may displace generation from non-renewable sources which may avoid some power plant emissions and create an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

Any new license for the 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

Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the

Secretaries of the U.S. Department of Commerce (Commerce) or the U.S. Department of the Interior (Interior). On July 12, 2016, Commerce and Interior each filed a request that the Commission include a reservation of authority to prescribe fishways under section 18 in any license issued for the project.

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 is determined 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 July 12, 2016, Interior and Maine Department of Marine Resources (Maine DMR) filed timely recommendations under section 10(j). These recommendations are summarized in Table 11 and discussed in section 5.3, *Summary of Section 10(j) Recommendations*.

In addition to the filed 10(j) recommendations, Interior, under section 10(a), recommended: (1) the applicant guarantee access to downstream waters for recreation and other uses; and (2) the applicant serve all license amendment applications on Interior.

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. If the state agency fails or refuses to act on a request for certification, within a reasonable period of time (which shall not exceed one year) after receipt of such request, the certification requirements are deemed waived.

On July 11, 2016, White Pine Hydro applied to the Maine Department of Environmental Protection (Maine DEP) for a 401 water quality certification for the project. Maine DEP received this request on July 11, 2016. The Maine DEP has not yet acted on the application for water quality certification.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of endangered species or result in the destruction or adverse modification of the critical habitat of such species. Based on Interior's information, planning, and conservation (IPaC) decision support system,[3] the federally threatened Canada lynx (*Lynx canadensis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis)* could occur in Somerset County, Maine. No designated critical habitat for these species occurs within the project area. The federally endangered Gulf of Maine Distinct Population Segment of anadromous Atlantic salmon (*Salmo salar*) historically migrated upstream as far as the Kennebec River Gorge in Indian Stream Township, which is approximately 40 river miles upstream of Williams dam. However, Atlantic salmon currently do not occupy or have access to the project area due to lack of upstream fish passage at several dams downstream of Williams dam. Additionally, there is critical habitat approximately 9.5 miles downstream of Williams dam, but the project does not occupy or restrict access to Atlantic salmon designated critical habitat.

Our analysis of project impacts on the Canada lynx, northern long-eared bat, and anadromous Atlantic salmon is presented in section 3.3.3, *Threatened and Endangered Species*. Based on available information, we conclude that relicensing the project, as recommended by staff, would have no effect on these species.

1.3.4 Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA), as amended, requires review of the 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.

In a letter dated July 8, 2015,[4] the Maine Department of Agriculture, Conservation, and Forestry stated that the Williams Project is not located within Maine's coastal boundary and would not affect Maine's coastal resources. Therefore, the project does not require certification of consistency with Maine's CZMA program.

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[3] See http://ecos.fws.gov/ipac.

[4] See appendix B of final license application.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that a federal agency "take into account" how 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).

There are ten archaeological sites and four historic sites that eligible for listing in the National Register at the project. The licensee is not proposing any actions that could affect archaeological and historic sites.

In a March 24, 2015, letter, the Maine State Historic Preservation Commission Officer (Maine SHPO) informed White Pine Hydro that the relicensing of the project would not affect historic properties. Our analysis presented in section 3.3.5, *Cultural Resources*, concludes that each of the relicensing alternatives considered in this EA would not affect cultural resources.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 C.F.R. §§ 5.1 to 5.16) require applicants to 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, the ESA, the NHPA, and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations.

Relicensing of the project was formally initiated August 17, 2012, when White Pine Hydro filed with the Commission a Pre-Application Document (PAD) and a Notice of Intent to license the project using the Integrated Licensing Process (ILP). The Commission issued a Notice of Commencement of Proceeding on October 9, 2012.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. 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 October 9, 2012. Scoping meetings were held in Solon and Hallowell, Maine on November 7 and 8, 2012, respectively, 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 on November 8, 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
National Marine Fisheries Service (NMFS)	December 7, 2012
Interior	December 10, 2012
Maine DMR	December 5, 2012
Maine DEP	December 7, 2012
Maine Department of Inland Fisheries and Wildlife (Maine DIFW)	December 10, 2012
Aroostook Band of Micmacs	December 10, 2012
Kennebec Valley Trout Unlimited	December 10, 2012
Craig Denis	November 9, 2012
Joseph Albuit	December 10, 2012
Chris Sockalexis	December 10, 2012
White Pine Hydro	December 10, 2012

A revised Scoping Document, addressing these comments, was issued on January 22, 2013.

1.4.2 Interventions

On May 13, 2016, the Commission issued a notice accepting the application and setting July 12, 2016, as the deadline for filing protests and motions to intervene. Interior and Maine DIFW each filed a notice of intervention on July 12 and 13, 2016, respectively.

1.4.3 Comments on the Application

A notice requesting comments, recommendation, and preliminary terms and conditions was issued on April 26, 2016. The following entities commented:

Commenting Entity	Date Filed
Interior	July 12, 2016
NMFS	July 12, 2016
Maine DMR	July 12, 2016
Maine DEP	July 13, 2016
Maine DIFW	July 13, 2016

White Pine Hydro did not file a response to comments.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative as the baseline environmental condition for comparison with other alternatives.

2.1.1 Existing Project Facilities

The Williams dam is located approximately 67 river miles upstream of Augusta, Maine on the Kennebec River. The project consists of: (1) a 894.7-foot-long, 46.0-foot-high dam that includes: (a) a 202-foot-long, 15-foot-high earth embankment section with a concrete core wall; (b) a 244-foot-long, 32-foot-high stone masonry and concrete spillway section with six 32.5-foot-wide, 20.5-foot-high Tainter gates; (c) a 71.3-foot-long, 19.5-foot-high stone masonry and concrete abutment section; (d) a 203.3-foot-long, 26.5-foot-high stone masonry and concrete stanchion bay section with two 65.9-foot-wide, 17.5-foot-high and one 46.8-foot-wide, 17.5-foot-high stanchion bays; (e) a 27-foot-long, 45- to 46-foot-high bulkhead section with a 20.5-foot-wide, 7.0-foot-high surface weir gate and a 6.0-foot-wide, 12.3-foot-high Tainter gate at the upstream end of a 162-foot-long, 14-foot-wide steel-lined sluiceway; (f) a 95.5-foot-wide, 45.5-foot-high intake and powerhouse section with four headgates and two double-bay trashracks with 3.5-inch clear-bar spacing; and (g) a 51.6-foot-long, 10.0-foot-high concrete cut-off wall; (2) a 400-acre impoundment with a gross storage volume of 4,575 acre-feet and a useable storage volume of 2,065 acre-feet at a normal maximum elevation of 320 feet National Geodetic Vertical Datum 1929 (NGVD); (3) a 40.5-foot-wide, 105.5-foot-long concrete powerhouse that is integral with the dam containing a 6-MW turbine-generating unit and a 7-MW turbine-generating unit for a total installed capacity of 13 MW; (4) a tailrace that includes a 26-acre tailwater pool with a normal water surface elevation of 275 feet NGVD and a 6,000-foot-long, 150- to 175-foot-wide excavated main discharge channel; (5) a 200-foot-long generator lead and a 310-foot-long generator lead that connect the turbine-generator units to the regional grid; and (6) appurtenant facilities. See Figure 2.

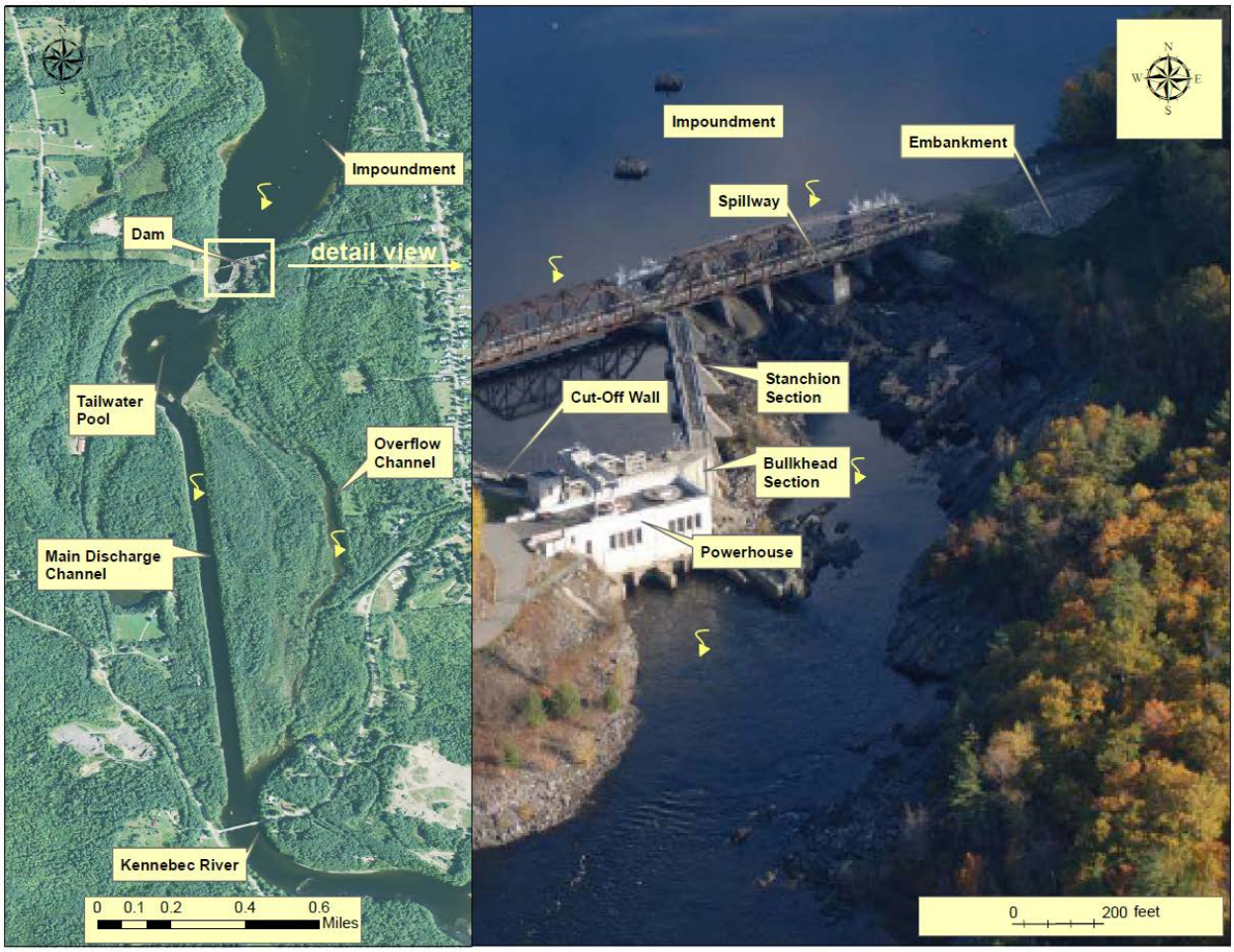

Figure 2. Williams Project site plan (Source: license application, as modified by staff).

The Williams Project generates 96,731 megawatt-hours (MWh) of electricity annually.

White Pine Hydro operates and maintains four formal recreational facilities located within the project boundary, including an angler parking area, a canoe portage trail, a multi-use parking area, and a concrete boat launch.

The existing project boundary around the Williams Project includes lands up to contour elevation 332 feet NGVD including the maximum water surface elevations of the impoundments (i.e., 320 feet NGVD) and lands associated with project structures, such as the dam, generator leads, powerhouse, recreational facilities, and appurtenant facilities.

2.1.2 Project Safety

The Williams Project has been operating for more than 28 years under an existing license. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the project's facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the term of the new license to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.3 Existing Project Operation

The majority of inflow to the Williams Project impoundment is mainstem Kennebec River flow that is regulated by the Wyman Project (FERC Project No. 2329), which is located approximately 8.5 miles upstream of Williams dam. Other inflow to the project area comes from several tributaries to the impoundment (i.e., Meadow Brook, Jackson Brook, Mahoney Hill Brook, Lily Pond Outlet Stream, Owen's Stream, Number 1 Brook, Eagle's Mere Brook, and Mucky Brook). Water from the Williams impoundment can be released to the Kennebec River downstream of the dam through the project powerhouse, through the spillway gates or stanchion bays, or through the sluiceway. However, releases from the sluiceway only occur occasionally to remove debris from the impoundment.

The Williams Project operates in a store-and-release mode where the impoundment level is fluctuated up to 6 feet on a daily basis (i.e., between 314 and 320 feet NGVD) to re-regulate inflow from the Wyman Project, maintain downstream flow, and meet peak demands for hydroelectric generation. The Williams Project uses flows between 500 cfs (cubic feet per second) (minimum hydraulic capacity of the powerhouse) and 5,100 cfs (maximum hydraulic capacity of the powerhouse) to generate electricity while maintaining an instantaneous minimum flow of 1,360 cfs, or inflow, whichever is less, in the tailrace.

Water from the impoundment discharges into the tailwater pool and then enters the main discharge channel approximately 1,800 feet downstream of the powerhouse. When flow releases from Williams dam exceed 5,500 cfs, flow in the tailwater pool overflows into a 7,000-foot-long side channel (i.e., overflow channel) that runs parallel to the main

channel. The confluence of the main discharge channel and overflow channel is approximately 6,000 feet downstream of the tailwater pool.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Operation and Environmental Measures

White Pine Hydro proposes to:

- Continue the existing store-and-release mode of operation and maintain the impoundment water surface between 314 and 320 feet NGVD at all times to re-regulate peaking discharge from the upstream Wyman Project to protect downstream aquatic habitat.
- Continue to provide a continuous minimum flow of 1,360 cfs, or inflow, whichever is less, from the project to protect downstream fish and aquatic resources.
- Install a permanent upstream eel passage facility within two years of the effective date of the new license and operate the facility from June 15 to September 15 each year.
- Develop measures to provide downstream eel passage protection within 10 years of installing the upstream eel passage facility.
- Develop a plan for monitoring compliance with project operation, including any minimum flows and impoundment level requirements.
- Develop a plan to monitor the effects of project operation on nesting loons in the impoundment.
- Continue to maintain and provide public access to existing recreation sites at the project.
- Preserve project lands for continued and future recreational access to the tailwater pool and explore options for improving boat access to the tailwater pool.
- Improve the existing canoe portage trail with gravel and install safety signs.
- Develop a recreation facilities management plan (RFMP) with measures for maintaining recreation facilities and evaluating the need for additional access or for improvements to existing recreation facilities.
- Monitor use and availability of the Evergreens Campground boat launch.[5]
- Develop an historic properties management plan (HPMP) for the protection of cultural resources.

[5] The privately-owned Evergreens Campground is located on the eastern shore of the Kennebec River immediately downstream of the project boundary. It provides the only motorized boat access to the project tailwater.

In addition to the measures listed above, White Pine Hydro proposes to remove 375.5 acres of land and water from the existing project boundary that do not serve a project purpose. About 331 acres of this land and water is located at the uppermost extent of the impoundment, 20.2 acres are located in three parcels along the eastern shore of the impoundment, and one 20.3-acre parcel is located just northwest of the dam on the western shore of the impoundment.

2.2.2 Mandatory Conditions

Section 18 Prescriptions

Interior and Commerce did not file any section 18 prescriptions; however, both agencies requested that the Commission reserve authority to prescribe fishways under section 18 of the FPA.

2.3 STAFF ALTERNATIVE

The staff alternative includes all but two of the measures proposed by White Pine Hydro (described below), all but two of the measures recommended by the agencies under section 10(j) of the FPA (described below), and the following additional staff-recommended measures: (1) develop a downstream eel passage plan that identifies the criteria for identifying when downstream eel passage would be provided; (2) develop an upstream and downstream eel passage evaluation plan; (3) develop an upstream and downstream eel passage facility operation and maintenance plan; (4) modify the proposed RFMP to include the installation and maintenance of signs showing the location of project recreational access sites; (5) modify the proposed RFMP to include monitoring of public access at the project, including the use and availability of the Evergreens Campground boat launch; (6) notify the Commission and the Maine SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and (7) consult with the Maine SHPO if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

Staff does not recommend White Pine Hydro's proposed measure to implement downstream eel passage measures within 10 years of installing the proposed upstream eel passage or Interior and Maine DMR's 10(j) recommendation for downstream eel passage timing within 2 years of the effective date of any new license. Instead, staff recommends the downstream eel passage plan described above that would define the method and establish the timing for providing downstream eel passage protection. Staff also does not recommend White Pine Hydro's proposed measure to develop an HPMP for the protection of cultural resources. Instead, staff recommends measures to protect cultural resources that could be discovered during the term of any license. In addition, staff does

not recommend Interior and Maine DMR's section 10(j) recommendation regarding down ramping rates because staff found that existing down ramping procedures do not likely have any adverse effects on salmonids in the project area. Finally, staff does recommend Interior's section 10(a) recommendation regarding notification of future license amendments, because the Commission already provides mechanisms for notification of amendments.

Proposed and recommended measures are discussed under the appropriate resource sections and summarized in section 5 of this EA.

2.4 ALTERNATIVES 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.

2.4.1 Issuing Non-power License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental 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 for the project and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider issuing non-power licenses a realistic alternative to relicensing in this circumstance.

2.4.2 Federal Government Takeover of the Project

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 that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.4.3 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 Williams 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. 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

This section includes: (1) a general description of the project vicinity, (2) an explanation of the scope of cumulative effects analysis, and (3) our analysis of the proposed action and recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.). Historic and current conditions are described under each resource area. The existing conditions are the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of the proposed mitigation, protection and enhancement measures, and any cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.1, *Comprehensive Development and Recommended Alternative*.[6]

3.1 GENERAL DESCRIPTION OF THE KENNEBEC RIVER BASIN

The Kennebec River begins at the outlet to Moosehead Lake and flows south for approximately 145 river miles where it joins the Androscoggin River and several smaller rivers to form Merrymeeting Bay. Water from Merrymeeting Bay passes into the

[6] Unless otherwise indicated, our information is taken from the application for license filed by White Pine Hydro on December 11, 2015, and responses to requests for additional information filed on April 28 and 29, 2016.

Atlantic Ocean through another section of the Kennebec River that is essentially a saltwater tidal channel.

The Kennebec River Basin has a total drainage area of about 5,890 square miles. The upper two-thirds of the Kennebec River Basin is characterized by hilly, mountainous terrain, and the lower third consists of rolling coastal plains. The Williams Project is located on the mainstem of the Kennebec River about 67 river miles upstream of the head-of-tide which is upstream of Merrymeeting Bay, near Augusta, Maine. The majority of land in the project vicinity is rural and sparsely populated plains with high hills.

There are 13 existing FERC licensed hydroelectric generating projects in the Kennebec River Basin (see Figure 1). Nine of these facilities, including the Williams Project, are located on the mainstem of the Kennebec River. The Williams Project is located between the Wyman Project and the Anson Project (FERC Project No. 2365).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 C.F.R. § 1508.7), an action may cause cumulative effects on the environment if its impacts overlap in time and/or space with the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the information provided in license application, we have identified migratory fish (i.e., alewife, American eel, American shad, Atlantic salmon, Atlantic sturgeon, blueback herring, shortnose sturgeon, and striped bass), aquatic habitat, and wetlands as resources that could be cumulatively affected by continued operation of the project.

3.2.1 Geographic Scope

The geographic scope of the cumulative effects analysis defines the physical limits or boundaries of the proposed action's effects on the resource. We have identified the geographic scope for migratory fish to include the Kennebec River Basin from the upstream Brassua Hydroelectric Project (FERC Project No. 2615) on the Moose River to the mouth of the Kennebec River at the Atlantic Ocean. We have identified the geographic scope for aquatic habitat and wetlands to include the Kennebec River Basin from the upstream extent of the Williams Project impoundment to the mouth of the Kennebec River at the Atlantic Ocean.

3.2.2 Temporal Scope

The temporal scope of our cumulative effects analysis includes a discussion of past, present, and reasonably foreseeable future actions and their effects on each resource that could be cumulatively affected. Based on the potential term of a license, the temporal scope will look 30 to 50 years into the future, concentrating on the effects on the resources from reasonably foreseeable future actions.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the project-specific 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, recreational access and facilities, and cultural resources may be affected by the proposed action and alternatives. We have not identified any substantive issues related to geology and soils, aesthetics, or socioeconomics associated with the proposed action; and therefore, these resources are not addressed in the EA. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Aquatic Resources

Affected Environment

Water Quantity

The average annual flow at the Williams Project is approximately 4,863 cfs.[7] The Kennebec River generally exhibits highest flows during April and May and lowest flows during August and September (see Table 1). Flows exceed 5,100 cfs (i.e., the maximum hydraulic capacity of the project) about 26.7 percent of the time and exceed 1,360 cfs (i.e., the minimum flow required by the current license) about 99.6 percent of the time.

[7] Staff calculated an average annual flow using data collected from 1971 to 2014 at U.S. Geological Survey (USGS) gage no. 01046500 (Bingham gage), located 7 miles upstream of Williams dam.

Table 1. Mean, minimum, and maximum monthly discharge for the Kennebec River at Bingham, Maine.

Month	Mean Monthly Flow (cfs)	Minimum Monthly Flow (cfs)	Maximum Monthly Flow (cfs)
January	4,241	1,430	7,120
February	4,551	1,540	8,898
March	4,655	1,525	10,690
April	7,788	2,627	16,080
May	8,349	2,192	22,160
June	5,303	1,638	13,600
July	4,100	1,954	11,540
August	3,446	1,809	8,296
September	3,483	1,829	8,399
October	3,954	2,292	8,364
November	4,243	2,169	12,380
December	4,238	1,825	12,510

The project impoundment is approximately 4.5 miles-long, has an estimated surface area of 400 acres, and has approximately 2,065 acre-feet of usable storage. When flow is within the range of the project's hydraulic capacity (i.e., 500 to 5,100 cfs), White Pine Hydro uses Williams dam to re-regulate the peaking flow released from the Wyman Project, which is approximately 8.75 miles upstream of Williams dam. This reregulation reduces the range of short term flow fluctuations (see Figure 3) downstream of Williams dam.[8]

[8] Outflows from the Wyman Project range from the required minimum flow of 1,200 cfs to the project's maximum hydraulic capacity of 9,050 cfs.

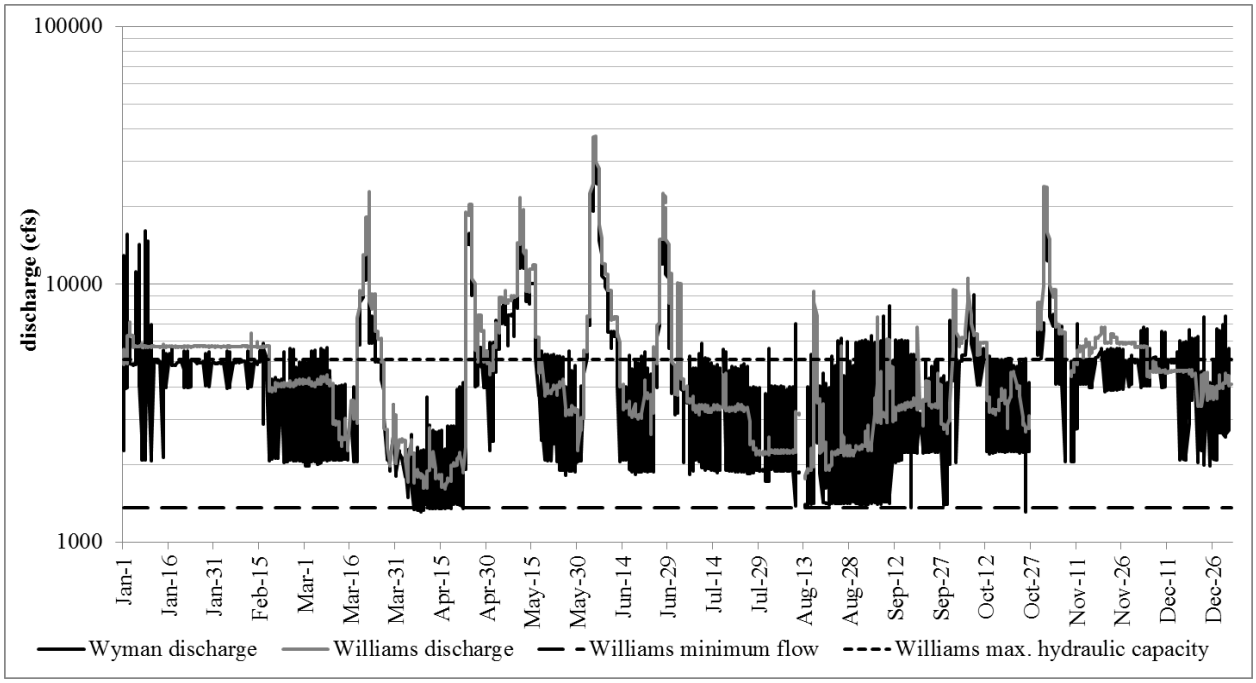

Figure 3. Hourly discharge data for the Wyman and Williams Projects in 2012 (Source: staff analysis of operation data provided in White Pine Hydro's April 29, 2016, filing).

Water Quality

Impoundment

During the summer and early fall of 2013, White Pine Hydro collected water quality samples from the deepest part of project impoundment (i.e., an approximately 26-foot deep hole located 800 feet upstream of the dam). Temperature and dissolved oxygen (DO) profiles showed relatively little variation between the surface and bottom of the water column, which indicates that the impoundment did not stratify during the sampling period. During the survey period, water temperature in the project's impoundment ranged from 51 degrees Fahrenheit (°F) to 73 °F and DO ranged from 7.4 milligrams per liter (mg/L) to 10.6 mg/L. Values for total phosphorus, chlorophyll *a*,[9] and Secchi depth[10] indicate that the impoundment could be characterized as intermediate between

[9] Chlorophyll *a* is a measure of the amount of phytoplankton in the water and reflects the biological productivity of the water body.

[10] Secchi depth is a measure of water transparency. To measure Secchi depth, an 8-inch disk with a black and white pattern is lowered into the water column until it is no longer visible from the surface and then the disk is raised until it is visible again. The

oligotrophic and mesotrophic based on Maine's lake trophic status guidelines (MDEP, 2012c; Table 2). Additionally, Maine DEP collected water temperature, DO, pH, and total phosphorus[11] data in 2005, 2006, 2007, and 2012 upstream of the project impoundment near Bingham and obtained similar values for each of the measured parameters (see Table 3).

Table 2. The range and average for water quality parameters in the Williams Project impoundment and Maine DEP trophic state guidelines.

Water Quality Parameter	Range	Average	Oligotrophic	Mesotrophic
Water temperature (°F)	51.4-73.2	67.1	NA	NA
Dissolved oxygen (mg/L)	7.4-10.6	8.4	NA	NA
pH	7.2-7.3	7.2	NA	NA
Total phosphorus (mg/L)	0.005-0.012	0.007	< 0.0045	0.0045-0.02
Chlorophyll *a* (ppm)	0.001-0.0015	0.0011	< 0.0015	0.0015-0.007
Secchi depth (m)	2.7-6.3	5.0	> 8.0	4-8

Table 3. Previous dissolved oxygen, pH, temperature, and total phosphorus data collected by Maine DEP in the Kennebec River near Bingham.

Date	DO (mg/L)	pH	Temperature (ºF)	Total Phosphorus (mg/L)
8/16/2005	7.7	7.2	73.4	NA
7/20/2006	10.5	6.5	76.6	NA
8/24/2006	7.6	6.6	69.8	NA
7/02/2007	7.5	7.6	67.6	0.008
7/24/2007	7.5	6.5	66.6	NA

depths at which the disk disappears and reappears are averaged and reported as the Secchi depth.

[11] Maine DEP did not collect total phosphorus data in 2005 or 2006.

Date	DO (mg/L)	pH	Temperature (ºF)	Total Phosphorus (mg/L)
8/21/2007	8.4	6.5	67.3	NA
7/24/2012	8.1	6.6	70.7	NA
7/26/2012	8.5	7.2	71.4	0.008
8/20/2012	8.3	7.0	66.2	NA

Tailwater

White Pine Hydro deployed continuous data loggers in the tailwater to record water temperature from July 24 to December 4, 2013, and DO concentrations from July 24 to September 18, 2013. Water temperatures and DO concentrations in the tailwater were consistent with those observed in the impoundment. Water temperature collected by the data loggers ranged from 36.7 °F to 75.0 °F and DO concentrations ranged from 7.5 mg/L to 8.8 mg/L. Lower water temperatures were recorded in the tailrace because the temperature loggers were deployed until December 4, 2013. The water temperature data from mid-July through late-October 2013 ranged from 51.2 °F to 75.0 °F.

Fisheries

Resident fish

The resident fish community in the project area includes coldwater and warmwater game and non-game species. White Pine Hydro conducted electrofishing surveys in the impoundment, tailwater pool, main discharge channel, overflow channel, the mainstem Kennebec River from the main discharge channel to the Route 201-A bridge, and several tributaries upstream and downstream of the project dam (see Figures 4 and 5). Juvenile smallmouth bass were the most frequently collected species in the impoundment, main discharge channel, and overflow channel. Fallfish and white suckers were the most frequently collected species in the tailwater pool, while burbot and juvenile smallmouth bass were the most frequently collected species near the Route 201-A bridge. Non-game species, such as blacknose dace, dominated collections in the tributaries, but a few juvenile and adult trout were also collected. Other species collected in the project area include: brook trout, brown bullhead, brown trout, chain pickerel, common shiner, creek chub, eastern banded killifish, finescale dace, golden shiner, landlocked Atlantic salmon, longnose sucker, nine-spined stickleback, pumpkinseed sunfish, rainbow trout, slimy sculpin, splake, three-spined stickleback, white perch, and yellow perch.

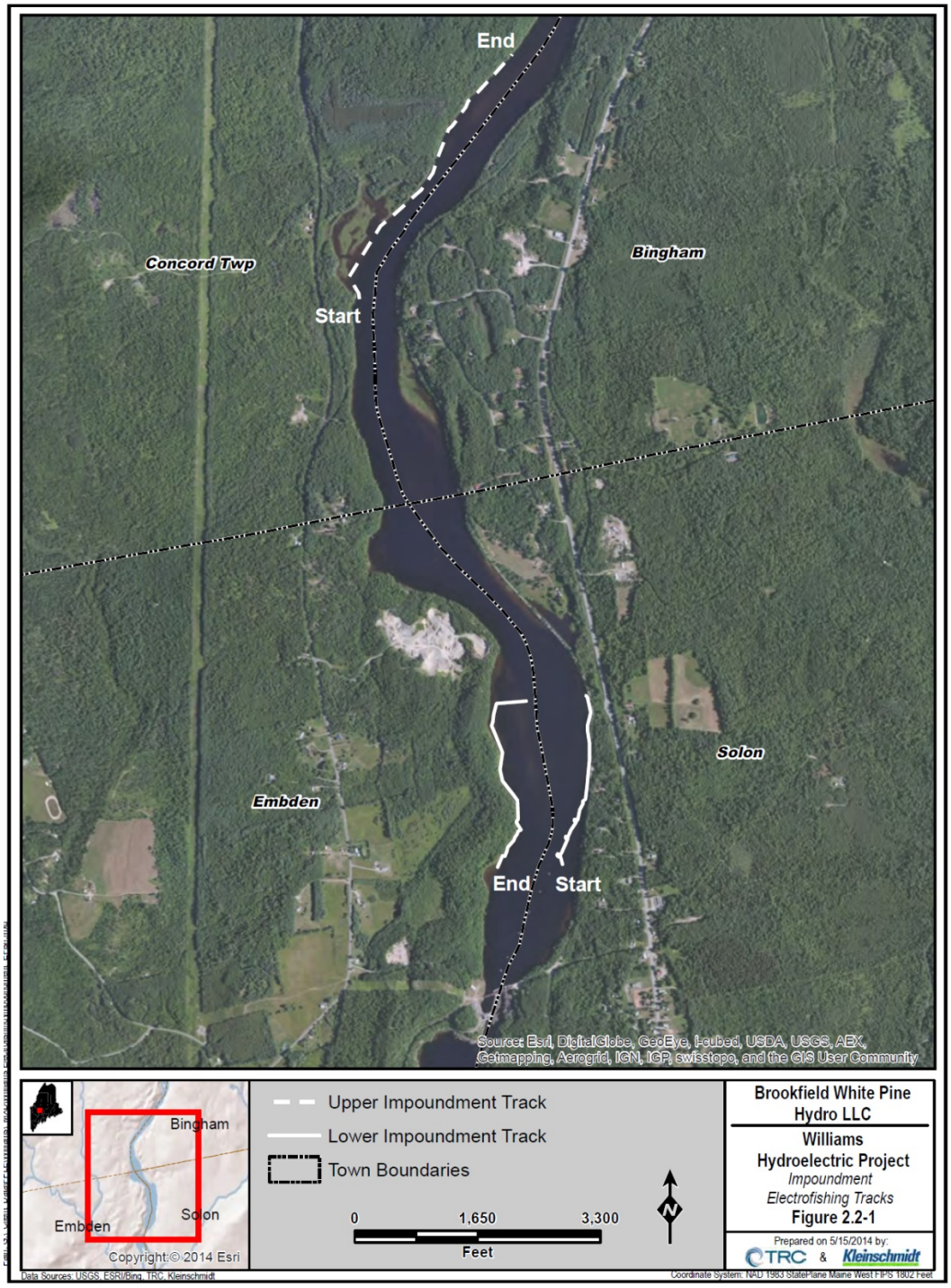

Figure 4. Areas sampled in the impoundment during the electrofishing surveys. The tributaries sampled during the survey are not shown (Source: Figure 2.2-1 from White Pine Hydro's initial study report (ISR) filed June 23, 2014).

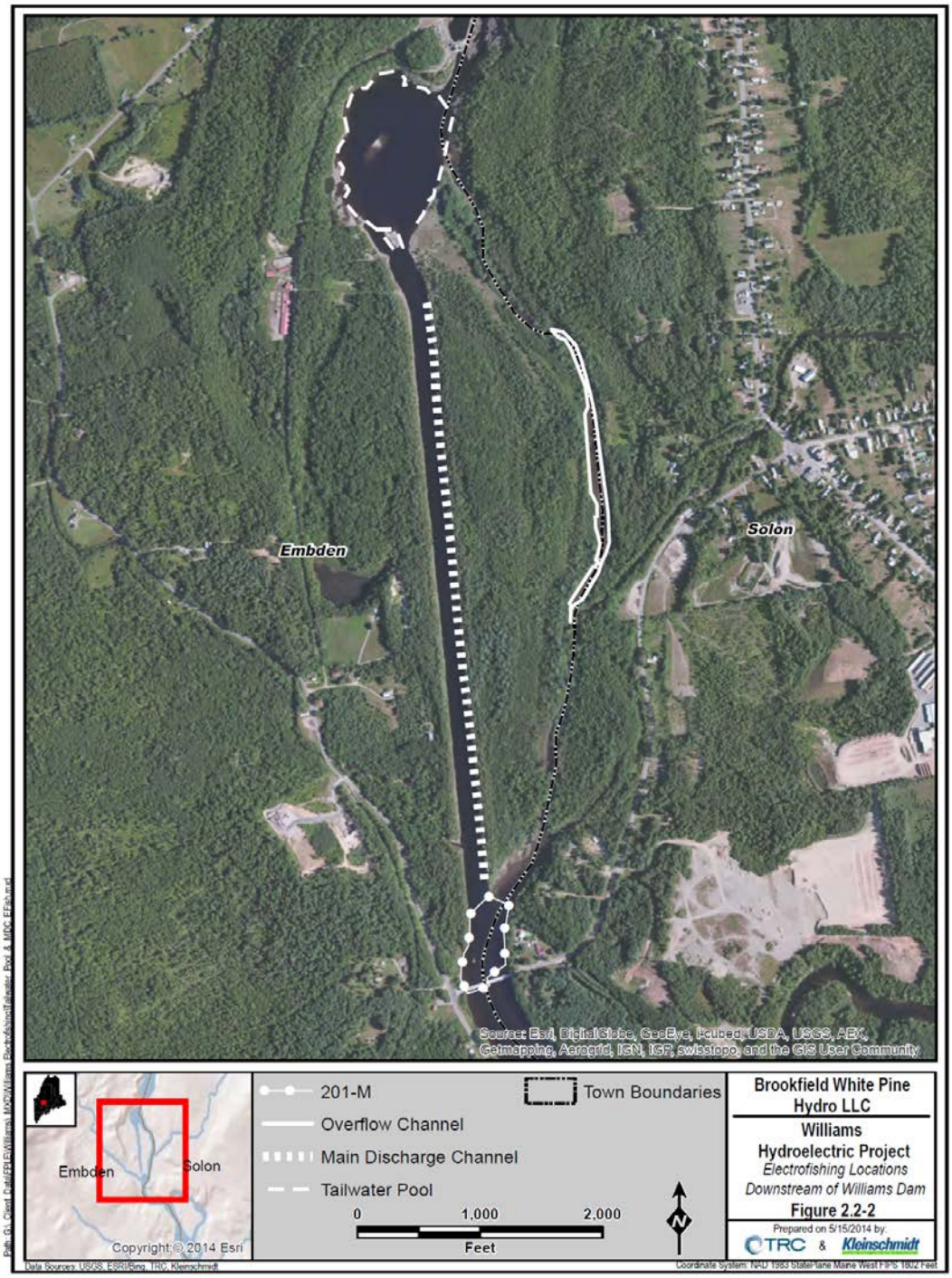

Figure 5. Areas sampled downstream of the project dam during the electrofishing surveys. The tributaries sampled during the survey are not shown (Source: ISR Figure 2.2-2, filed June 23, 2014).

The Kennebec River in the project area is unique because of the presence of smallmouth bass in addition to brook trout, brown trout, rainbow trout, and landlocked salmon (*Salmo salar sebago*). All five species spawn in the project area. Immediately downstream of Williams dam, Maine DIFW maintains the brown trout population and augments the brook trout population by stocking between 1,000 to 3,500 fish each year that are between 8 and 13 inches long. Landlocked salmon spawn in the mainstem Kennebec River downstream of the dam. Smallmouth bass also appear to spawn downstream of the dam based on the presence of small juveniles in the electrofishing surveys. Upstream of the dam, brook trout and rainbow trout spawn in the impoundment tributaries, while smallmouth bass spawn along the shoreline of the impoundment. Maine DIFW does not stock any species between Wyman dam and Williams dam.

American eel

American eel is the only migratory fish species that currently inhabits the project area. American eels are catadromous, which means they spawn in the ocean, specifically in the Sargasso Sea, but spend the majority of their lives in freshwater or estuarine habitats. In New England, juvenile American eels migrate upstream in rivers over an extended period from March through October (Richkus and Whalen, 1999), and adult eels migrate downstream from mid-August to December (Haro et al., 2003; GMCME, 2007). Eels remain in freshwater or estuarine habitats for several years before migrating downstream to the ocean to spawn.

The Williams Project does not have upstream passage facilities for eels, but each of the dams downstream of the Williams Project provides permanent or interim upstream eel passage facilities. White Pine Hydro conducted an upstream eel passage study in 2013 and observed eels attempting to ascend the project dam from mid-July to mid-September. Peak migration activity occurred in mid-August. Nearly all of the observed juvenile eels ascended the dam near the third Tainter gate. White Pine Hydro also reported that juvenile eels appeared to pass through the gate seals. In addition, White Pine Hydro collected two large eels (29.6 and 36.6 inches long) from the impoundment during the salmonid telemetry study, which indicates that eels have successfully migrated upstream past the dam in previous years.

The current license does not require any downstream eel passage measures, and there are no downstream eel passage facilities at the Williams Project. White Pine Hydro tagged and tracked the two large eels collected in the impoundment during the salmonid telemetry study to provide some anecdotal information about downstream eel migration and passage. Both eels died in the project impoundment. However, the 29.6-inch long eel moved downstream and resided near the project dam during September and October 2013 before expiring at the end of October. The timing of this eel's downstream movement is consistent the timing of downstream eel migration documented in other New England rivers.

Atlantic Salmon

Atlantic salmon and landlocked salmon are the same species, but landlocked salmon in Maine are genetically distinct from anadromous Atlantic salmon (Fay et al., 2006). Anadromous Atlantic salmon (*Salmo salar*) in the Kennebec River are listed as endangered under the ESA and are part of the Gulf of Maine Distinct Population Segment. While currently absent from the project area, anadromous Atlantic salmon historically migrated upstream as far as the Kennebec River Gorge in Indian Stream Township (NMFS, 2009a), which is approximately 40 river miles upstream of Williams dam. In 2009, NMFS designated critical habitat for Atlantic salmon in the Kennebec River, but none was identified within the project boundary (NMFS, 2009b). However, the project area contains nearly 15 thousand units of juvenile rearing habitat, which is approximately 11 percent of the juvenile Atlantic salmon habitat available in the Kennebec River watershed.[12]

Anadromous Atlantic salmon typically spend 2 to 3 years in the ocean before returning to their natal rivers to spawn. Approximately 86 percent of adults return after 2 years, about 10 percent (primarily males) return after 1 year, and the remaining 4 percent are repeat spawners or spend 3 years at sea (NMFS, 2009a). From 1967 to 2003, approximately 3 percent of the wild and naturally reared adult anadromous Atlantic salmon returning U.S. rivers were repeat spawners (USASAC, 2004), but these fish have become increasingly rare as the anadromous Atlantic salmon stock has declined (USASAC, 2014).

Anadromous Atlantic salmon spawn in October and November, and the eggs hatch during March and April (Faye et al., 2006). The newly hatched alevins (yolk-sac larvae) remain in the gravel for about six weeks. Alevins emerge from the gravel in mid-May. Juvenile salmon (parr) remain in rivers 1 to 3 years (until approximately 5 inches or greater in length) at which point they develop into smolts and migrate to the ocean in the spring (Fay et al., 2006).

Fay et al. (2006) summarized the habitat requirements for the different life-stages of Atlantic salmon. Atlantic salmon require clean gravel or cobble to spawn, water temperatures ranging from 45 to 50 ºF, an average water velocity of approximately 2 feet per second (fps), and depths ranging from 1 to 4 feet. Parr occupy habitat with instream cover, such as woody debris, water temperatures between 59 and 66 ºF, water velocity ranging from 1 to 3 fps, and depths of 4 to 24 inches. Optimum water temperatures

[12] See Maine DMR's December 5, 2012, letter. A juvenile Atlantic salmon habitat unit is 100 square meters.

during the downstream smolt migration in spring range from 45 to 58 ºF, and temperatures over 66 ºF can be lethal. For adult salmon migrating upstream, optimum water temperatures range from 57 to 73 ºF, and temperatures over 73 ºF can be stressful or lethal.

Historically, an estimated 300 to 500 thousand Atlantic salmon returned to U.S. rivers (Fay et al., 2006). From 1967 to 2014, the number of adults returning to U.S. rivers ranged from approximately 450 to 4,600, with approximately 70 percent of adults returning to the Penobscot River (USASAC, 2012; 2015). Additionally, the majority of returning adults originated from hatcheries as part of restoration programs (USASAC, 2011; 2015; Figure 6).

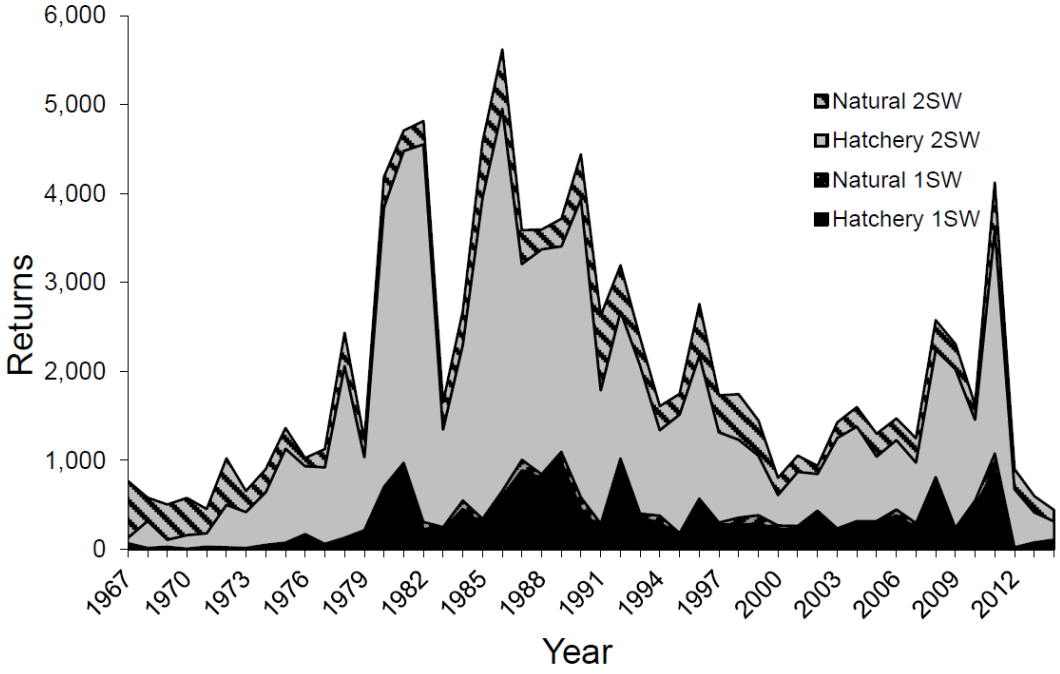

Figure 6. Annual returns of adult Atlantic salmon to U.S. rivers. "Natural" fish were spawned in rivers, and "hatchery" fish were produced in hatcheries and stocked as part of restoration programs. "ISW" and "2SW" indicate how many winters the fish spent in the ocean before returning to spawn (Source: USASAC, 2015).

The number of adult anadromous Atlantic salmon returning to the Kennebec River since 2006 has ranged from 5 to 60 with a mean of 21 (see Table 4). Adult anadromous Atlantic salmon are collected at the trap and haul facility of the furthermost downstream hydropower project on the Kennebec River, the Lockwood Project (FERC Project No. 2574). The salmon are then transported to high-quality spawning habitat in the Sandy River, located approximately 17.5 miles downstream from Williams dam. Spawning and rearing habitat in the Sandy River is considered to be the most biologically important

Table 4. Number of adult Atlantic salmon collected at the Lockwood Project fish lift from 2006 to 2015 (the 2015 data are preliminary) (Source: license application).

Year	Number of Returning Adults
2006	15
2007	16
2008	22
2009	32
2010	5
2011	60
2012	5
2013	7
2014	18
2015	30

habitat for anadromous Atlantic salmon in the Kennebec River (NMFS, 2009c) due to its accessibility and the number of salmon parr produced by successful spawning of transported salmon and from Maine DMR's egg stocking efforts. This transport protocol is used to transport Atlantic salmon upstream past the next three hydropower projects on the Kennebec River (Hydro-Kennebec (FERC Project No. 2611), Shawmut (FERC Project No. 2322), and Weston (FERC Project No. 2325)) because permanent upstream fish passage facilities at these projects have not yet been installed. Atlantic salmon will not have access to the Williams Project area until upstream fish passage facilities are constructed at the Anson and Abenaki (FERC Project No. 2364) Projects, which will be triggered when 226 adult Atlantic salmon reach the Weston Project in a single year.

In addition to the transport of returning adult Atlantic salmon to the Sandy River, Maine DMR has stocked Atlantic salmon eggs or fry in the Sandy River since 2003 (see Table 5). Based on electrofishing surveys conducted in 2012, this egg stocking program produced juvenile densities ranging from 0.6 to 74 young of the year per unit of habitat (unit) and parr densities ranging from 0 to 13.5 parr per unit (Maine DMR, 2012). Maine DMR indicates that the Sandy River stocking program will continue until 2020 when

Table 5. Number of eggs and fry stocked in the Sandy River annually by Maine DMR.

Year	Eggs	Fry
2003	0	39,000
2004	12,000	55,000
2005	18,000	30,000
2006	41,800	6,500
2007	18,000	15,000
2008	245,500	0
2009	166,494	0
2010	599,849	0
2011	859,893	0
2012	920,888	0
2013	691,857	0
2014	1,164,000	0

upstream fish passage facilities will be operational at the Hydro-Kennebec, Shawmut, and Weston Projects.[13] After 2020, Maine DMR anticipates stocking the Kennebec River upstream of the Anson and Abenaki Projects.

Trout and Salmon Movement and Habitat Use

White Pine Hydro conducted a radio telemetry study to document seasonal habitat use and identify spawning locations for salmonids (i.e., brook trout, brown trout, rainbow trout, and landlocked salmon) upstream and downstream of the project dam. Upstream of the dam, White Pine Hydro collected 2 brook trout and 9 rainbow trout on June 19, 2013, and tracked them through October 22, 2013. Both species generally remained in the upstream riverine section of the impoundment and often occupied areas near tributaries

[13] See Maine DMR's September 14, 2015, letter.

that may have provided temperature refuges during the summer months.[14] However, only one tagged brook trout entered a tributary. Additionally, one of the brook trout moved downstream through the Williams powerhouse on June 23, 2013, and was located alive downstream of the Anson Project powerhouse on July 10, 2013. Seven days later, the brook trout's radio tag transmitted a mortality signal.

White Pine Hydro tagged 58 salmonids downstream of the dam during May and June 2013 and tracked them through April 2014. In late June, 37 percent (15 out of 41) of the tagged fish were located in a pool near the Evergreens Campground (approximately 1.75 miles downstream from the Williams powerhouse), and 27 percent (11 of 41) were located in an island complex approximately 2.5 miles downstream from the powerhouse (see Figure 7). From July through November, between 29 to 44 percent of the surviving fish were found primarily in the Evergreens pool with the remainder of the fish spread out relatively evenly among the tailwater pool, main discharge channel, and the pool near the Route 201-A bridge.[15]

Seasonal movements varied among species downstream of the dam. Brown trout primarily occupied the Evergreens pool throughout the study. Brook trout typically moved between the tailwater pool and the Evergreens pool. Landlocked salmon exhibited more variable behavior than either species, moved more frequently, and often traveled greater distances during the study. The majority of salmon occupied the tailwater pool in July, and several returned in November. From August through October, these salmon either occupied the main discharge channel, the Route 201-A bridge pool, the island complex, or moved among these locations. The salmon that did not initially occupy the tailwater pool tended to occupy the Evergreens pool for most of the study period. No tagged fish entered any of the tributaries downstream of the dam, but six salmon remained near the mouth of Martin Stream, which may have provided a temperature refuge, during the summer.

[14] White Pine Hydro placed temperature loggers in the impoundment, main discharge channel, mainstem Kennebec River downstream of the project boundary, and in several tributaries upstream and downstream of the dam. The tributaries tended to be cooler than the impoundment and mainstem after late July.

[15] Between 4 and 10 fish died or left the study area each month, and only 16 tagged fish survived until November. Therefore, the reported percentages represent increasingly smaller numbers of fish.

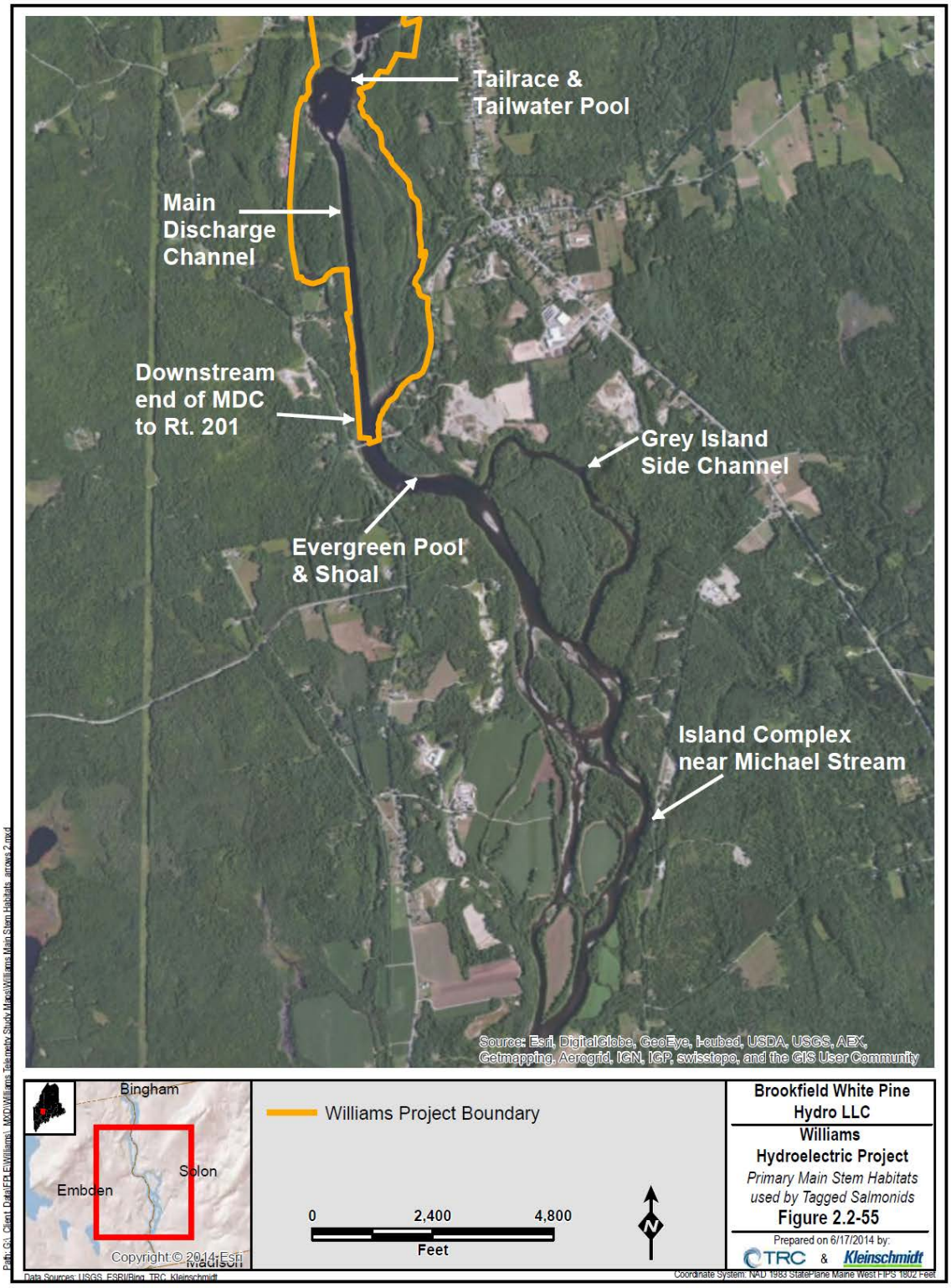

Figure 7. Locations salmonids occupied during the telemetry study (Source: ISR Figure 2.2-55, filed June 23, 2014).

White Pine Hydro conducted spawning habitat assessments and redd counts during downstream boat tracking surveys.[16] During the November 22, 2013, survey, White Pine Hydro documented 14 redds at the downstream end of the tailwater pool, 17 slightly downstream from the Evergreens Campground, 5 in the Grey Island side channel, 13 among the island complex, and 9 in the Dunphy Farm reach (approximately 4 miles downstream of the powerhouse). The redds had a mean depth of 2.1 feet. The water velocity over the redds ranged from 1.4 fps to 2.3 fps with a mean of 1.6 fps. White Pine Hydro did not observe fish spawning on the redds during either survey.

Freshwater Mussels

Ten species of freshwater mussels have been documented in Maine (Swartz and Nedeau, 2007), including three that are state-listed as threatened: brook floater, tidewater mucket, and yellow lampmussel. Five freshwater mussel species have been reported to occur in the project area (see Table 6).

Table 6. Freshwater mussel species reported to occur in the project area (Source: license application, modified by staff).

Common Name	Reported Distribution
Creeper	Fall Brook
Eastern elliptio	Mainstem downstream of Route 201A bridge
Eastern floater	Austin Stream
Eastern pearlshell	Mainstem and Fall Brook
Triangle floater	Mainstem and Fall Brook

In August 2013, White Pine Hydro conducted a mussel survey to document species presence, distribution, and relative abundance within the project impoundment. After an initial reconnaissance survey along the impoundment perimeter, White Pine Hydro visually surveyed 21 transects: 3 transects in the upstream section of the impoundment and 9 transects each in the middle and downstream sections. Only two

[16] During the spawning season, female trout and salmon dig shallow depressions in gravel into which they deposit their eggs. These depressions are called "redds." Salmon often dig their redds in 1 to 4 feet of water, and redds can often be visually identified by a field crew from a boat or while wading.

species, eastern elliptio and triangle floater, were observed during the survey. The relative abundance of eastern elliptio increased from upstream to downstream with a single individual observed in the upstream section and estimated densities ranging up to 2 per square meter in the lower section. White Pine Hydro observed only 15 triangle floaters during the survey, 13 of which were in the downstream section of the impoundment.

Environmental Effects

Upstream Eel Passage

White Pine Hydro proposes to design (in consultation with Interior and Maine DMR) and install an upstream eel passage facility within two years of the effective date of the new license. White Pine Hydro proposes to operate the upstream eel passage facility from June 15 to September 15, each year depending on river flow.

Interior and Maine DMR recommend that White Pine Hydro design upstream eel passage facilities in consultation with Interior and install the facilities within two years of license issuance (Interior 10(j) recommendation #3; Maine DMR 10(j) recommendation #1)). Maine DEP recommends that White Pine Hydro install upstream eel passage facilities but provides no timeline (Maine DEP comment #5).

Staff Analysis

Currently, upstream eel passage facilities exist at all dams downstream of the Williams Project, but no passage facilities are provided for juvenile eels at the Williams Project and any eels reaching Williams dam must climb over or around the project dam. During the eel passage evaluation study, White Pine Hydro documented 556 eels moving over Williams dam, primarily passing through the seal of one of the Tainter gates. While climbing over or around dams is a well-documented behavior for juvenile eels (GMCME, 2007), the climbing ability of eels declines as they grow longer than 4 inches (Legault, 1988). In the ISR, filed June 23, 2014, White Pine Hydro stated that eels observed at Williams dam were between 4 and 8 inches long, suggesting that the existing route past the Tainter gate seal may not be ideal or effective for all eels that reach Williams dam. However, a dedicated upstream eel passage facility at the project would increase upstream passage effectiveness and improve access to at least 26.6 miles of upstream habitat (see Table 7).[17]

[17] Staff estimated distance based only on the distance from Williams dam to Wyman dam, the length of tributary habitat surveyed by White Pine Hydro in 2013, and the lengths of tributaries located between the two projects (Bond, 1955). Staff made no assumptions about the habitat quality for eels in each the waterbodies. Additional

Table 7. Miles of potential habitat available in the Kennebec River upstream of Williams dam and in surveyed tributaries.

Waterbody	Miles of Potential Habitat
Kennebec River from Williams dam upstream to Wyman dam	8.75[1]
Austin Stream	7.30[2]
Jackson Brook	5.00[3]
Joe Foss Brook	2.00[3]
Meadow Brook	1.50[3]
Lily Pond Outlet Stream	1.3[4]
Owen Stream	0.75[4]

[1] Distance to the Wyman dam, which has no upstream eel passage facilities.
[2] Source: Staff analysis of Google Earth imagery based on location of falls described by Bond (1955) as impassable for salmonids.
[3] Source: Bond (1955).
[4] Source: ISR, filed June 23, 2014. White Pine Hydro did not survey the entire length of these tributaries.

As part of its proposal, White Pine Hydro provides a conceptual design for an upstream eel passage ramp that would be installed onto the pier for the Tainter gate where White Pine Hydro observed eels attempting to pass the dam. White Pine Hydro's conceptual design would enhance the attraction of juvenile eels to Tainter gate area by providing a more consistent attraction flow than the current leakage flow. Additionally, the proposed ramp would provide protection from predation and desiccation and would improve the passage effectiveness over current conditions. White Pine Hydro's proposal to develop plans for upstream eel passage facilities in consultation with the fisheries agencies would ensure that the plans include effective design concepts and criteria used

habitat may occur in other tributaries described by, but not surveyed Bond (1995), upstream of the falls in Austin Stream, or upstream of the area surveyed by White Pine Hydro in 2013.

at other dams, while considering the conditions and constraints at the Williams Project. The proposed upstream eel passage facility operation period brackets the time when 99 percent of the juvenile eels White Pine Hydro observed attempted to migrate upstream at the project and is consistent with the operation period of upstream eel passage facilities at downstream dams.

Downstream Eel Passage

White Pine Hydro proposes to implement measures for downstream eel passage. White Pine Hydro proposes to develop these measures in consultation with Maine DMR and Interior.

Interior, Maine DEP, and Maine DMR recommend that White Pine Hydro install downstream eel passage facilities (Interior 10(j) recommendation #3; Maine DMR 10(j) recommendation #1; Maine DEP comment #5). Interior and Maine DMR recommend that White Pine Hydro design downstream eel passage facilities in consultation with Interior.

Staff Analysis

In New England, adult eel out-migration typically occurs from mid-August to December (Haro et al., 2003; GMCME, 2007). Adult eels often move downstream in pulses with large numbers of eels moving during short periods of activity followed by longer periods with relatively little movement (EPRI, 2001). Peak movements often occur at night during periods of increasing river flow (Richkus and Whalen, 1999). Other environmental cues, such as local rain events and moon phase, may also encourage downstream movement of out-migrating eels (EPRI, 2001; Haro et al., 2003).

Under existing project conditions, downstream routes for adult eels migrating through the project area include passing over the spillway when the project spills, through the debris sluice when it is being used, or through the turbines during generation. Data collected at USGS gage no. 01046500 (Bingham gage), located 7 miles upstream of Williams dam, indicate that the project spills 7.8, 4.9, 13.1, 21.2, and 20.4 percent of the time in August, September, October, November, and December, respectively. The license application does not describe the hydraulic capacity or frequency of operation of the debris sluice; therefore, it is unclear how often this route may be available to eels migrating downstream. Regardless, because the turbines have a hydraulic capacity of 5,100 cfs and White Pine Hydro generally passes all river flow through the project turbines when possible, turbine passage is the most likely downstream passage route during the adult eel migration period from August to December.

Previous estimates of survival for adult eels passing through turbines are highly variable and range from 0 percent to 94 percent (EPRI, 2001). Factors that can influence

downstream passage survival include eel size (Richkus and Dixon, 2003) and turbine design (EPRI, 2001). White Pine Hydro conducted a desktop analysis of survival rates of adult eels migrating downstream at seven hydropower projects with similar physical (e.g., amount of head and flow) and turbine (e.g., turbine type, number of blades, and runner diameter) characteristics as the Williams Project and found that 1-hour survival ranged between 57 and 100 percent, with an average of 74 percent survival. Forty-eight hour survival was estimated at four of the projects and ranged from 73 to 77 percent at three of the projects and was 100 percent at the fourth project. However, the 100 percent survival estimates were based on tracking 8 radio-tagged adult eels through the Holyoke Project (FERC Project No. 2004) powerhouse as part of a downstream passage route selection study which was not designed to evaluate survival. This information suggests that turbine passage survival for eels at Williams dam may be about 74 percent.

There are several measures that could be implemented to improve downstream passage survival for eels at the Williams Project, including turbine shutdown; increased spillflows; installation of intake screens; or installation of an eel-specific bypass facility, such as a siphon or airlift.

Nightly shutdowns would fully protect eels migrating downstream through the project area from turbine entrainment injury and mortality, although some injuries and mortalities could occur from the corresponding increase spillway passage. Several hydropower projects in New England and the Mid-Atlantic use temporary shutdowns as a protective measure for eels migrating downstream because the cost of lost generation is less than the cost of building and maintaining permanent downstream eel passage and protection structures. Some projects implement 24-hour shutdowns for the entire migration season, while others only shutdown from dusk to dawn during the period of peak migration based on site-specific monitoring or information from upstream projects (Richkus and Whalen, 1999). The results Haro et al. (2003) presented suggest that timing shutdowns based on site-specific eel monitoring data and environmental conditions could reduce project-related eel mortality while also reducing the cost of lost generation.

The debris sluice and/or the spillway Tainter gates could be used to increase spill during the eel downstream passage period. Because eels tend exhibit greater attraction to bypasses located near the river bottom (Haro et al., 2000; Durif et al., 2003; Brown et al., 2009), it is likely that the spillway gates would be more effective since they have a lower crest elevation than the sluice gate (i.e., 300 feet NGVD vs. 312.5 feet NGVD). However, each of the hydropower projects downstream of the Williams Project uses surface spill combined with other measures to provide interim downstream eel passage, suggesting that a deeper release point may not be critical to providing improved downstream passage survival.[18] Additionally, the sluice gate provides features that may

[18] See NMFS letter filed July 12, 2016.

be a more effective than the spillways during periods of generation because the turbine intake flows may act as an attraction flow for the sluice, whereas the spillway is further from the turbine intakes. While survival rates over the spillway may be higher than turbine passage, it would likely depend upon the gate used for spill because some of the spillway gates would spill onto bedrock, which could cause injury or mortality. The sluice gate discharges into the tailwater pool and would likely provide higher survival than turbine passage.

During the downstream eel migration period, some hydropower projects install 0.75-inch or 1-inch clear spacing trashracks or overlay screens to reduce turbine entrainment of adult eels. The current trashracks at the Williams Project have 3.5-inch clear spacing, which would not be likely to prevent adult eels from passing into the turbines. White Pine Hydro states that American eels would have a low impingement and entrainment risk because the sustained swimming speed of an adult eel exceeds the project's intake velocity; however, we would expect that most eels are passing through the project turbines since this is the primary downstream passage route that is available for most of the August to December period.[19] Installation of new trashracks or overlay screens would likely reduce entrainment, but would require providing downstream passage via another route, such as releasing flows through the debris sluice.

Lastly, while not widely used or tested in the U.S., initial laboratory tests of siphons and airlifts have been promising. Haro et al. (2016a; 2016b) compared the performance of a small (approximately 13 foot tall riser section with an inner diameter of 10 inches) airlift to a siphon system and found no difference in attraction or passage rates, no mortality or injury among test eels for either bypass, and no avoidance of the bypasses after repeated tests. While not widely used at this time, a siphon or airlift could be an effective way to passage eels downstream, either alone or in combination with new trashracks or overlay screens.

Timing of Downstream Eel Passage Implementation

White Pine Hydro proposes to provide downstream eel passage measures within 10 years of implementation of the upstream eel passage measures.

[19] White Pine Hydro states that American eels would have a low impingement and entrainment risk because the sustained swimming speed of an adult eel exceeds the project's intake velocity. However, entrainment appears highly likely because the primary downstream passage route is through the turbines.

Interior and Maine DMR recommend that White Pine Hydro install downstream eel passage facilities within two years of license issuance (Interior 10(j) recommendation #3; Maine DMR 10(j) recommendation #1).

Staff Analysis

Typically, eels begin their downstream migration when they are between 6 and 23 years old (Helfman et al., 1987; Cairns et al., 2005). Interior and Maine DMR indicate that downstream eel passage is necessary within two years of license issuance because eels are currently present upstream of the project, may need downstream passage in the near future, and estimated survival at the project is low. White Pine Hydro indicates that the impact of the Williams Project on the eel population is minimal because the contribution of eels from farther upstream in the watershed to the spawning population is much smaller than the contribution from the estuarine and lower portion of the watershed. White Pine Hydro, therefore, claims that immediate initiation of downstream eel passage measures is unnecessary.

The number of adult eels upstream of the project dam is unknown, but appears to be low based on available data. During the baseline fisheries survey, White Pine Hydro sampled (i.e., electrofished) 1.84 miles of impoundment shoreline and 0.10 mile of habitat in Lily Pond Outlet Stream and Owens Stream during August and September 2013 and did not collect any eels. White Pine Hydro conducted additional electrofishing sampling in June 2013 to collect fish for the telemetry study, and collected two adult eels, but did not report the amount of effort that was required. In 2002, Yoder et al. (2006) electrofished 1.24 miles of shoreline between William and Wyman dams and only collected 4 adult eel and 1 yellow eel. Given the current lack of efficient upstream eel passage at Williams dam and the few adult eels that have been collected upstream of the dam, downstream eel passage measures do not appear immediately necessary at Williams dam.

White Pine Hydro indicates that it would develop downstream passage measures in consultation with the agencies. These measures would need to be approved by the Commission prior to implementation and should be included in a downstream passage plan. In addition to describing any proposed downstream passage measures, the plan could include a proposal for initiating implementation of the measures or activities that would determine when implementation should occur, such as sampling the impoundment and tributaries to estimate the relative abundance of adult eels or based upon a period of time after a threshold number of juvenile eels have ascended the proposed upstream eel passage facilities. Developing a downstream passage plan for American eels would allow White Pine Hydro to establish a schedule for implementation that would be developed in consultation with the agencies.

Eel Passage Effectiveness Studies

Maine DMR recommends that White Pine Hydro develop and conduct passage effectiveness studies for any upstream and downstream eel passage facilities or measures (Maine DMR 10(j) recommendation #1).

Staff Analysis

Upstream and downstream eel passage effectiveness studies would help ensure that any eel passage measures implemented by White Pine Hydro would provide safe, timely, and efficient passage. Passage effectiveness studies typically evaluate factors such as attraction flows, attraction efficiency, passage efficiency, passage delay, and survival rates. If collected, this type of information could help White Pine Hydro modify the design or operation of any fish passage measures and potentially improve upstream or downstream fish passage effectiveness. Additionally, fish passage effectiveness studies could include collection of juvenile eel count data from the upstream fish passage facility, which may provide information that could be used to determine when downstream eel passage facilities or measures may be necessary.

Eel Passage Facility Operation and Maintenance Plans

Maine DMR recommends that White Pine Hydro develop operation and maintenance plans for any upstream and downstream eel passage facilities or measures (Maine DMR 10(j) recommendation #1).

Staff Analysis

Most fish passage facilities require precise operation and routine maintenance to ensure the facilities operate effectively. An operation and maintenance plan would ensure that any eel passage facilities constructed at the project would be operated during the appropriate times of the day and year and with an appropriate conveyance flow. The plan would also ensure that routine cleaning and maintenance, including debris removal, are performed so that the facilities operate as intended.

Ramping Rate

White Pine Hydro does not propose to change project operation.

Interior and Maine DMR recommend that White Pine Hydro reduce powerhouse discharge when reducing generation or spill so that the tailwater elevation decreases by no more than 0.2 feet per hour (fph) (Interior 10(j) recommendation #2; Maine DMR 10(j) recommendation #3).

Staff Analysis

Interior and Maine DMR state that rapid reductions in water level can dewater salmonid redds and strand fish. Interior and Maine DMR indicate that alevins (salmonid yolk-sac larvae), fry, and juveniles are particularly vulnerable to stranding mortality because these life-stages reside in the substrate (i.e., gravel and cobble) in shallow water or use shallow water habitat near the shore and when water levels drop rapidly they can be stranded and die. Interior and Maine DMR base their recommendation on an analysis by Hunter (1992) which reports that water levels the unregulated streams rarely drop faster than 0.2 fph and suggests that water level reductions (ramping rates) of 0.2 fph or less from hydropower projects would likely reduce downstream stranding mortality for salmonids. However, the information in Hunter (1992) was developed for Pacific salmon and other western salmonid species using stream gage data for unregulated streams in Washington State and may not be applicable to eastern salmonid species inhabiting streams in Maine.

Based on hourly tailwater elevation data from 2007 to 2012, project ramping rates when reducing generation or spill (down ramping rates) range from 0.01 fph to 2.89 fph (see Figure 8).[20] The average (i.e., mean) and most common (i.e., mode) down ramping rates were 0.17 fph and 0.10 fph, respectively. Down ramping rates exceeded 0.2 fph 2.55 percent of the time, which primarily occurred when project discharge exceeded the maximum hydraulic capacity of 5,100 cfs.[21] Of the 1,188 observations of down ramping rates greater than 0.2 fph between 2007 and 2012, 44.5 percent occurred between April and June and 19.9 percent occurred during October and November (see Figure 9). The April to June period coincides with the time when brook trout, brown trout, and landlocked Atlantic salmon fry emerge from the gravel and begin feeding and the October/November period coincides with the brook trout, brown trout, and landlocked salmon spawning period.[22]

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[20] White Pine Hydro filed operation data for 2007 to 2012, including tailwater elevations, on April 29, 2016.

[21] Each year of the filed operation data contains missing tailwater elevation data. The reported percentage is based the available data and may underestimate the frequency ramping rates exceeded 0.2 fph.

[22] Migratory Atlantic salmon will not have access to the project area until upstream fish passage facilities are constructed at the Anson and Abenaki Projects, but given the similarity in spawning and nursery habitat preferences, we would expect that the effects of ramping rates on migratory Atlantic salmon would be similar to the effects on landlocked Atlantic salmon.

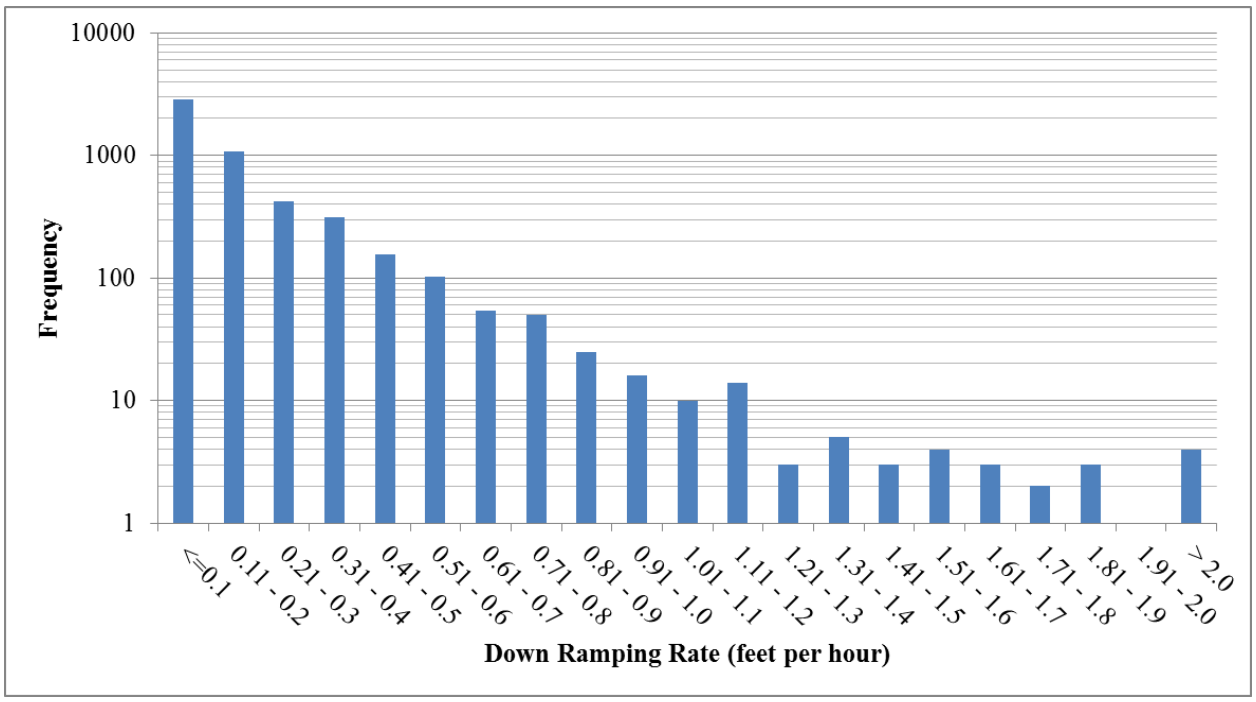

Figure 8. Down ramping rate frequency based on the 2007 through 2012 operation data (Source: staff analysis of project operation data filed April 29, 2016).

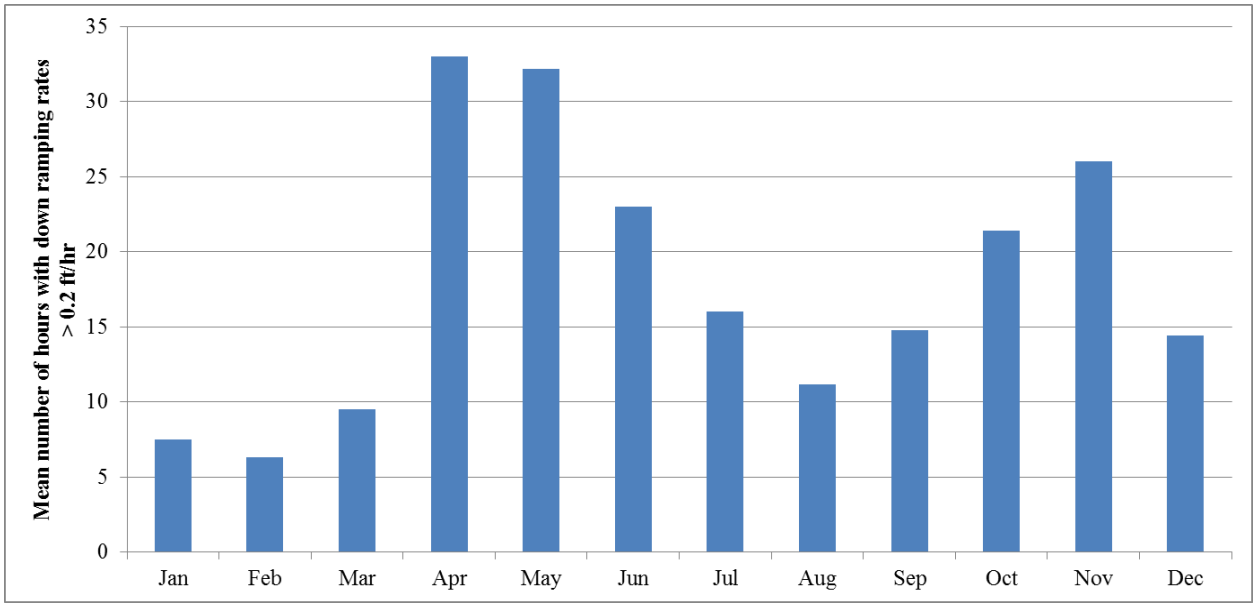

Figure 9. Monthly mean number of times down ramping rates exceeded 0.2 fph based on the 2007 through 2012 operation data. Due to missing data, the mean for July through December was based on data from five years (2008 was excluded) (Source: staff analysis of project operation data filed April 29, 2016).

During the spring, brook trout, brown trout, and landlocked Atlantic salmon fry emerge from the gravel and inhabit shallow areas that are only 2 to 24 inches deep. Because fry are poor swimmers, rapidly decreasing water levels could strand fry in the shallow areas that they inhabit and result in high mortality rates. Limiting the down ramping rate to 0.2 fph or less when fry are present (i.e., during the spring) could reduce stranding and increase fry survival. However, the landlocked salmon population appears to be self-sustaining, and there is no indication that the population is limited by fry survival. In fact, length-at-age data (KVTU, 2014) and low number of legal-sized fish (i.e., fish at least 16 inches long) caught during the 2014 creel survey[23] suggest the landlocked salmon population is stunted and may not benefit from increased fry survival.[24]

The most likely effect of rapid down ramping (i.e., greater than 0.2 fph) in the fall would be exposure or dewatering of brook trout, brown trout, and landlocked Atlantic salmon redds or disruption of spawning behavior. In 2013, White Pine Hydro conducted a redd survey when the project discharge was approximately 1,600 cfs and found 58 redds in depths ranging from 1 to 4 feet. The majority of the redds (53.5 percent) were in the tailout areas of the tailwater pool and the Evergreens pool (see Figure 7).[25] Based on the stage-discharge relationship that White Pine Hydro provided for the tailwater pool and Evergreens pool, the water surface elevation at the required minimum flow of 1,360 cfs would be approximately 4 and 2.4 inches lower, respectively, than at the 1,600 cfs when redd depths were measured.[26] At the minimum flow, the redds that were only 1 foot deep at 1,600 cfs would still be at least 8 inches deep; therefore, dewatering of redds does not appear to be likely in the project area. However, rapidly decreasing flows could disrupt adult salmonid spawning behavior (Hunter, 1992), especially in shallow redds that would only be 8 inches deep at the minimum flow. Therefore, it is possible that limiting down ramping to 0.2 fps or less during the fall would reduce the likelihood of disruptions to spawning behavior and increase spawning success.

[23] See White Pine Hydro's updated study report, filed June 22, 2015.

[24] Fish in a stunted population grow more slowly than expected, which can occur when competition for food is high. Therefore, growth will likely not improve without a reduction in the number of undersized fish.

[25] A pool tailout is a shallow, often gravelly area, located at the downstream part of a pool.

[26] See ISR, filed June 23, 2014.

Minimum Flow

White Pine Hydro proposes to continue to provide a minimum flow of 1,360 cfs, which Interior, Maine DMR, and Maine DEP recommend (Interior 10(j) recommendation #1; Maine DMR 10(j) recommendation #2; Maine DEP comment #5).

Staff Analysis

The agencies recommend a minimum flow of 1,360 cfs based on Interior's aquatic base flow guideline of providing 0.5 cfs per square mile of drainage area (FWS, 1981). Interior analyzed streamflow data from 48 unregulated New England streams, found that the lowest median monthly streamflow occurred in August, and that median August streamflow was approximately equal to 0.5 cfs per square mile of drainage area. Because the aquatic communities in these systems are adapted to the effects of the August low-flow period on water quality and aquatic habitat (e.g., higher temperatures, lower dissolved oxygen, reduced habitat availability), Interior concluded that the median streamflow in August is sufficient to sustain aquatic communities throughout the year.

Direct evaluation of the effects of the proposed and recommended minimum flow on water quality was not possible during the 2013 water quality survey because streamflow exceeded 1,360 cfs throughout the monitoring period. Streamflow in the project area exceeds 1,360 cfs approximately 99.6 percent of the time.[27] Water temperature ranged from 64.8 to 72.9 ºF during the study. However, the highest water temperatures did not occur at the lowest flows and likely reflected seasonal trends in air temperature rather than streamflow.[28] Dissolved oxygen concentrations averaged 7.9 mg/L and exceeded the standards for class A waters (the greater of 7.0 mg/L or 75 percent saturation) at flows of 2,100 and 2,200 cfs (approximately 90 percent exceedance), which were the lowest flows observed during the water quality study. The water temperature and dissolved oxygen data White Pine Hydro collected suggest that water quality in the project area is maintained over a wide range of flows. Based on historical data, the project would release the 1,360 cfs minimum flow less than 1 percent of the time, and we would expected that water temperature and dissolved oxygen would be maintained during these infrequent releases.

Low flows could limit access to tributaries, which may serve as temperature refuges during the summer. Water temperatures in Fall Brook, Martin Stream, and

[27] Based on staff analysis of data collected at USGS gage no. 01046500 (Bingham gage), located 7 miles upstream of Williams dam, from 1971 to 2014.

[28] See Table D3-1 of ISR, filed June 23, 2014.

Michael Stream, located downstream of Williams dam, are consistently lower than mainstem water temperatures from mid-July through December.[29] Bovee (1982) recommended a depth of 0.4 to 0.6 feet to maintain passage for most salmonids. White Pine Hydro assessed access at Fall Brook, Martin Stream, and Michael Stream when streamflow in the Kennebec River was 2,100, 1,600, and 1,560 cfs, respectively. At 2,100 cfs, the depth at the mouth of Fall Brook was 2 feet, and White Pine Hydro indicated it would likely remain accessible at a range of flows. The depth at the mouth of Martin Stream was 1 foot at 1,560 cfs, and would likely decrease by 0.6 feet at 1,360 cfs based on the estimated water surface elevations for a habitat transect located nearby in the project's main discharge channel.[30] The depth at the mouth of Michael Stream was between 0.3 to 0.4 feet and would likely be too shallow for salmonids to access at 1,360 cfs. This information indicates that the 1,360 cfs minimum flow would provide access to two of the three tributaries downstream of Williams dam, but may limit access to Michael Stream. However, because flows would generally be greater than the proposed 1,360 cfs minimum, it is unlikely that the infrequent release of the minimum flow would adversely affect the ability of trout to access any thermal refugia in Michael Stream.

Low flows could also expose or dewater brook trout, brown trout, and landlocked Atlantic salmon redds during the spawning and incubation period (October through May). In November 2013, White Pine Hydro conducted a redd survey when the project discharge was approximately 1,600 cfs and found 58 redds in depths ranging from 1 to 4 feet. The majority of the redds (53.5 percent) were in the tailout areas of the tailwater pool and the Evergreens pool (see Figure 5). Based on the stage-discharge relationship that White Pine Hydro provided for the tailwater pool and Evergreens pool, the water surface elevation at the required minimum flow of 1,360 cfs would be approximately 4 and 2.4 inches lower, respectively, than at the 1,600 cfs when redd depths were measured. At the minimum flow, the redds that were only 1 foot deep at 1,600 cfs would still be at least 8 inches deep. Therefore, the proposed and recommended minimum flow would likely provide sufficient water to protect redds downstream of the powerhouse.

Flow Re-regulation

White Pine Hydro proposes to use impoundment storage between 314 and 320 feet NGVD to re-regulate flow releases from the upstream Wyman Project. None of the

[29] See Figure 2.2-36 of White Pine Hydro's ISR meeting summary, filed July 21, 2014.

[30] See Table 2.2-55 of White Pine Hydro's ISR meeting summary, filed July 21, 2014.

agencies or stakeholders made any recommendations related to flow re-regulation, although Maine DEP stated in its letter filed on July 12, 2016, that the current and proposed impoundment drawdowns do not appear to have any significant adverse impact on aquatic life in the impoundment and meet applicable aquatic life and habitat standards.

Staff Analysis

Impoundment fluctuations at the Williams Project allow White Pine Hydro to re-regulate the peaking flows from the upstream Wyman Project which reduces daily flow variability downstream of the Williams Project (see Figure 3). These re-regulated flows are similar to a natural hydrograph and follow the weekly and seasonal streamflow patterns of the unregulated Carrabassett River, located 9.5 miles downstream of the project dam (see Figure 10). These re-regulated flows reduce the potential for fish stranding and displacement of fish and aquatic macroinvertebrates from suitable habitat in the river downstream of the Williams Project.

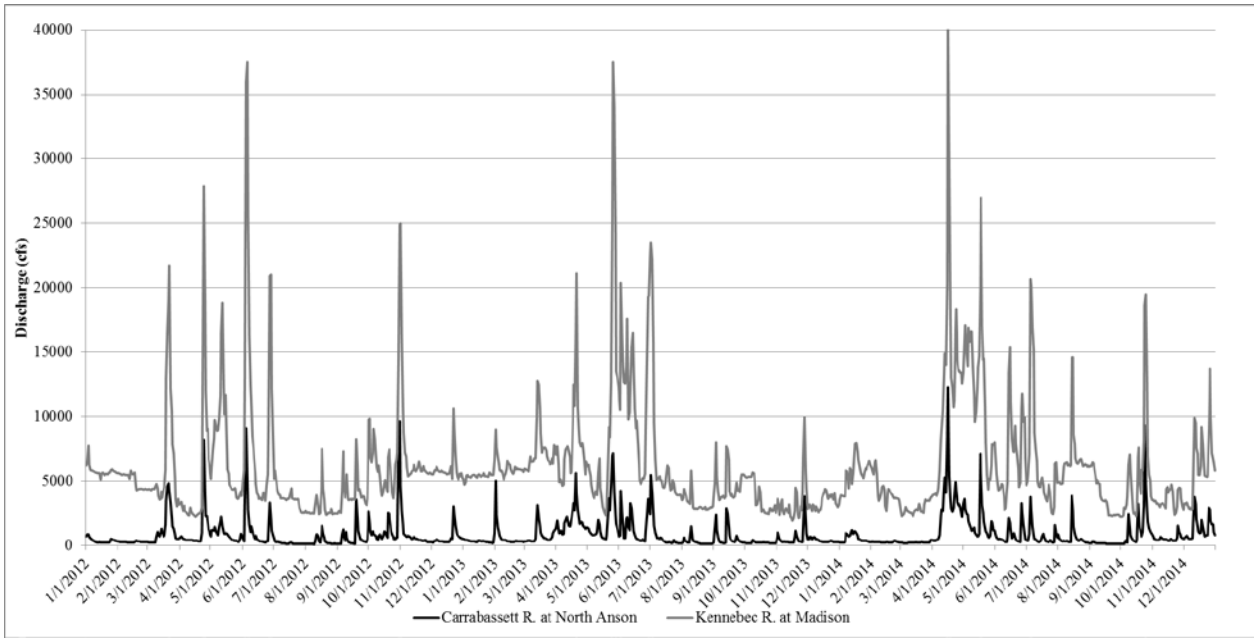

Figure 10. Comparison of re-regulated flow in the Kennebec River at Madison (USGS gage no. 1047150) to unregulated flow in the Carrabassett River (USGS gage no. 1047000) from January 1, 2012, to December 31, 2014.

Impoundment fluctuations can affect aquatic resources by dewatering littoral habitat, including aquatic vegetation, submerged large woody debris, and other habitat used by fish for cover, foraging, and spawning. In the Williams impoundment, smallmouth bass use shallow areas to build nests, deposit and incubate eggs, rear newly hatched fry, and forage. Water level fluctuations during smallmouth bass spawning and the nest-guarding period could adversely affect smallmouth bass spawning success by

dewatering nests or creating shallow conditions that disrupt spawning and nest-guarding behavior.[31] White Pine Hydro surveyed 2.25 miles of shoreline in June 2013 and observed 12 nesting sites located in 3 to 4 feet of water. During the survey, White Pine Hydro documented two nests that were dewatered for approximately 10 hours over two days which likely reduced or eliminated fry production from these two nests. However, smallmouth bass young-of-the-year and juveniles represented 27.1 and 27.6 percent, respectively, of the fish collected in the impoundment during an electrofishing survey that White Pine Hydro conducted during 2013. This information suggests that while some smallmouth bass nests may be adversely affected by impoundment fluctuations, smallmouth bass spawn successfully and survive to the juvenile life-stage under the current and proposed operation.

Maintaining the current re-regulating operation of the Williams Project would result in continuation of existing fluctuations in the impoundment and reduction of flow fluctuations downstream of the project. Because there would be no change in impoundment habitat or downstream habitat, we would expect that this measure would not result in any change in aquatic and fisheries resources in the project area.

Overflow Channel

The overflow channel is located to the east of the main discharge channel and is a former river braid that was orphaned when the main discharge channel was excavated in 1939 (see Figure 11). The overflow channel receives flow from Fall Brook (a tributary to the original river braid) and, as explained below, the Kennebec River when flows exceed 5,500 cfs. White Pine Hydro does not propose any measures for the overflow channel, and no agency or stakeholder made any recommendations related to the overflow channel.

[31] Smallmouth bass spawn at water temperatures between 55 ºF and 70 ºF, which occur from May to July. Males construct a nest in shallow water and guard the eggs and fry for several days after they hatch.

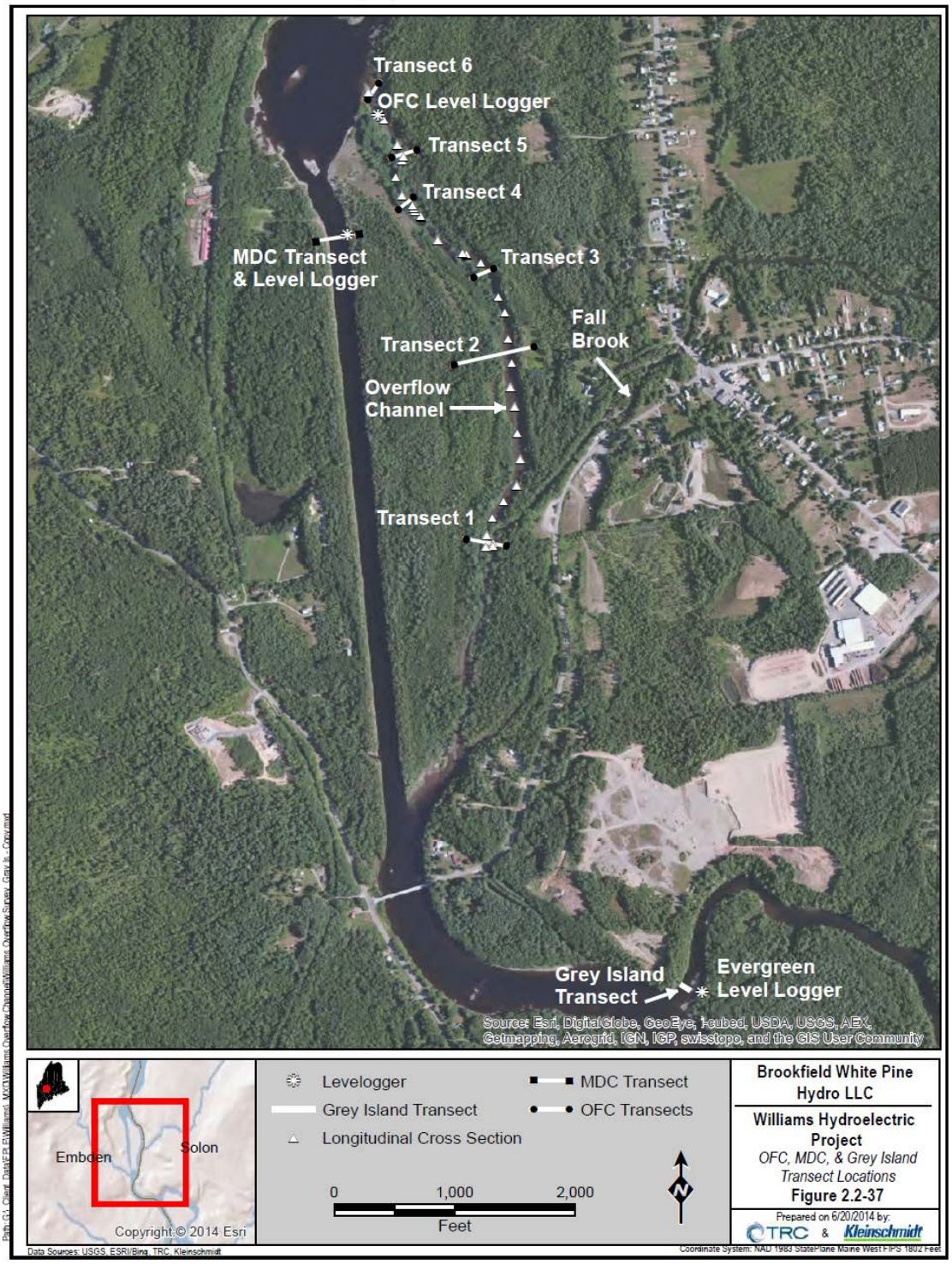

Figure 11. Kennebec River and overflow channel downstream of the Williams Project. The figure shows the transect and centerline streambed elevation (i.e., "longitudinal cross section") measurement locations that White Pine Hydro studied in the overflow channel (Source: ISR Figure 2.2-37, filed June 23, 2014).

Staff Analysis

During scoping, the Kennebec Valley Chapter of Trout Unlimited (KVTU) commented that excavation of the main discharge channel redirected flow away from one of the original river channel braids (i.e., the overflow channel). As a result, there is reduced flow in the overflow channel and the water in the overflow channel flows from south to north.[32] Additionally, KVTU indicated that there is excellent salmonid spawning habitat in the overflow channel, and that trout and salmon would benefit from additional flow into and improved access to the overflow channel. In its December 10, 2012, study request letter, KVTU requested that White Pine Hydro: (1) describe existing habitat in the overflow channel, (2) quantify how flow in the overflow channel varies in relation to Williams Project operational flows, and (3) identify opportunities to enhance flows in this reach and maximize productivity of this habitat.

In September 2013, White Pine Hydro conducted a habitat survey and recorded streambed elevations along the centerline of the overflow channel at all beaver dams, changes in mesohabitat, and hydraulic control points.[33] White Pine Hydro also installed a water level logger near where the overflow channel connects to the tailwater pool to develop a stage-discharge relationship. White Pine Hydro reported that the overflow channel streambed was composed of gravel and cobble, which was moderately embedded in three transects.[34] White Pine Hydro also documented that water from the tailwater pool would not enter the overflow channel at flows less than 5,500 cfs based on the streambed elevation data and stage-discharge relationship. Finally, White Pine Hydro reported that because the maximum hydraulic capacity of the project is 5,100 cfs, it cannot provide 5,500 cfs necessary to provide flow in the overflow channel.

At the July 8, 2014, ISR meeting, KVTU asked if White Pine Hydro could excavate the hydraulic control point in the overflow channel to allow more flow to enter or develop some sort of structure to divert flow from the main discharge channel into the

[32] See the transcript of the November 7, 2012, scoping meeting, issued November 7, 2012.

[33] A hydraulic control point restricts flow between two sections of a stream.

[34] Salmonids spawn in areas with gravel and cobble substrate. Gravel and cobble that are embedded are surrounded by fine sediment, which fills the spaces between the gravel and cobble (i.e., interstitial spaces) and reduces water movement through those spaces. Embedded substrate may not be suitable for spawning and egg incubation because water movement through the interstitial space may not be sufficient to keep the eggs aerated.

overflow channel. White Pine Hydro indicated that lowering the hydraulic control point would require excavating several hundred feet of the streambed and could result in a lower tailwater pool elevation, which could cause cavitation in the turbines. White Pine Hydro also stated that any modification to the main discharge channel that raises the water surface elevation enough to induce flow into the overflow channel would reduce the available head at the dam and negatively affect generation.

As indicated above, KVTU suggested that there is good salmonid spawning habitat in the overflow channel; however, the results of White Pine Hydro's analysis suggests that gravel in the overflow channel is embedded and it would be difficult to add flow to this area. Additionally, the results of the redd count survey conducted in 2013 suggests there is sufficient spawning habitat under the current operating conditions to support a self-sustaining landlocked salmon population downstream of Williams dam. Therefore, while it may be possible to make project modifications that would add flow to the overflow channel, it is not clear that there is a need for additional salmonid spawning habitat or that there would be any benefit from adding flow to the overflow channel.

Cumulative Effects

The Williams Project, in combination with the other existing hydroelectric projects located in the Kennebec River Basin, could cumulatively affect migratory fish species (i.e., alewife, American eels, American shad, blueback herring, Atlantic salmon, Atlantic sturgeon, shortnose sturgeon, and striped bass) and aquatic habitat. Cumulative adverse effects can occur from multiple hydroelectric developments within a river basin and include injuries and mortality from turbine passage and interference with fish movements and migrations. White Pine Hydro's proposal to provide upstream passage for eels would make passage at the dam more efficient and improve access to habitat upstream of the dam. Additionally, White Pine Hydro's proposal to implement downstream eel passage measures would limit entrainment and turbine-related mortality. Therefore, the proposed protection and enhancement measures are likely to be cumulatively beneficial for American eels. Because White Pine Hydro is not proposing to change project operation, continued operation of the project will have no effect on aquatic habitat or migratory fish species other than American eels.

3.3.2 Terrestrial Resources

Affected Environment

The project is located in the Acadian Plains and Hills eco-region (Griffith et. al., 2009) and is part of the Kennebec River Basin. The upper two-thirds of this river basin is primarily hilly, mountainous terrain; while the lower third is characterized by rolling coastal plains. Vegetation in the river basin is primarily northern hardwood, spruce-fir forests to the north, and hemlock and white pine forests to the south. The project area is

predominately forested upland (69 percent) and wetland (26 percent). The remaining project lands (5 percent) are open field, developed land, and maintained lawn.

Approximately 340.7 acres of forested upland are located within the project boundary. Forests in this area are composed of sugar maple (*Acer saccharum*), paper birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), and eastern hemlock (*Tsuga canadensis*), red oak (*Quercus rubra*), white pine (*Pinus strobus*), red maple (*Acer rubrum*), and silver maple (*Acer saccharinum*).

Four invasive botanical species were identified in the project area during 2013 survey efforts: Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*), garlic mustard (*Alliaria petiolate*), and honeysuckle (*Lonicera* sp.). One large community (6.9 acres) of Japanese knotweed was documented near the lower reach of Fall Brook. No other significant communities were found.

Wetland Vegetation

About 127.3 acres of wetland habitat are located within the project boundary. Wetlands in the project area are found along low river banks and on islands within the project area. Wetland types present in the project area include scrub shrub wetlands (39.5 acres), forested wetlands (72.7 acres), and emergent wetlands (15.1 acres).

Scrub shrub wetlands are the most common wetland type within the project boundary. These wetlands mostly occur along the upper limits of emergent wetlands along the impoundment shoreline. Scrub-shrub wetland species include alder (*Alnus incana*), willow (*Salix* spp.), dogwood (*Cornus* spp.), winterberry (*Ilex verticillata*), viburnum (*Viburnum* spp.), Canada bluejoint (*Calamagrostis canadensis*), bulrush (*Schoenoplectus* spp.), sedge (*Carex* ssp.), and woolgrass (*Scirpus cyperinus*).

Forested wetlands within the project boundary are primarily found on the islands, although some narrow bands along the river are also present. Common species include red maple, silver maple, and ash, with an understory of willow, dogwood, viburnum, ostrich fern (*Matteuccia struthiopteris*), sensitive fern (*Onoclea sensibilis*), and poison ivy (*Toxicodendron radicans*).

Emergent wetlands are present along the edge of the impoundment shoreline. Vegetation in these wetlands includes woolgrass, Canada bluejoint, three-way sedge (*Dulichium arundinaceum*), fringed sedge (*Carex crinite*), tussock sedge (*Carex stricta*), St. John's wort (*Hypericum perforatum*), and joe pye weed (*Eutrochium purpureum*).

Wildlife

The project area provides various wildlife habitat, including wooded upland and riparian areas. Mammals common to the project area include white-tailed deer, moose, black bear, Eastern coyote, beaver, muskrat, mink, river otter, and numerous species of squirrel, mouse, vole, and shrew. Numerous birds use the riverine and riparian habitats along the Kennebec River for feeding and nesting habitat, including Canada goose, ducks, common merganser, belted kingfisher, spotted sandpiper, solitary sandpiper, osprey, and common loon (*Gavia immer*).

Five state species of concern, the bald eagle (*Haliaeetus leucocephalus*), yellow warbler (*Dendroica petechia*), eastern kingbird (*Tyrannus tyrannus*), tree swallow (*Tachycineta bicolor*), and great blue heron (*Ardea herodias*) were identified during field surveys in the project area. Additional state listed species and species of concern which were not identified during surveys include Tomah mayfly (*Siphlonisca aerodromia*), spring salamander (*Gyrinophilus porphyriticus*), northern leopard frog (*Rana pipiens*), wood turtle (*Clemmys insculpta*), little brown bat (*Myotis lucifugus*), silver-haired bat (*Lasionycteris noctivagans*), and long-leaved bluet (*Houstonia longifolia*).

Bald eagles and osprey are known to forage in the project area. Field surveys in 2013 and 2014 confirmed the presence of two eagle nests, one of which was active. In addition, one territorial pair of nesting common loons was observed during 2013 and 2014 surveys.

Maine Significant Wildlife Habitat

Three "Significant Wildlife Habitats," as defined by Chapter 335 of the Maine Natural Resource Protection Act,[35] were identified in the general project area: inland waterfowl and wading bird habitat (IWWH), deer wintering areas, and significant vernal pools. Surveys were conducted in 2013 to identify the location of these habitats within the project boundary.

IWWH areas are defined as wetland complexes surrounded by a 250-foot-wide upland zone buffer.[36] Two IWWH areas were identified within the Williams Project boundary. One IWWH located on the impoundment was found to provide moderate

[35] http://www.maine.gov/dep/land/nrpa/

[36] The quality of an IWWH wetland complex is determined by the dominant wetland type, the diversity of wetland types in the complex, the size of the wetland(s), the interspersion of the different types, and the relative amount of open water.

value habitat. The second IWWH is located downstream of the dam and was found to provide low-to-moderate value habitat.

Deer wintering areas are forested areas that provide shelter for deer when deep snow restricts their mobility and food availability. No deer wintering areas were identified in the project boundary, although some are known to occur in the immediate project vicinity.

Significant vernal pools are natural, temporary to semi-permanent bodies of water occurring in shallow depressions that typically fill during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish. Vernal pools provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*A. laterale*), and fairy shrimp (*Eubranchipus* sp.). Two significant vernal pools were identified during 2013 surveys, but both are located outside the proposed project boundary. Four Maine DEP non-significant vernal pools were identified within the project boundary.

Environmental Effects

Wetlands

White Pine Hydro proposes to continue to provide a continuous minimum flow of 1,360 cfs, or inflow, downstream of the dam and maintain the impoundment between 314 and 320 feet NGVD.

Under section 10(j), Interior (recommendation #1) and Maine DMR recommend (recommendation #2) that White Pine Hydro provide a continuous minimum flow of 1,360 cfs, or inflow. Maine DEP recommends (Maine DEP comment #5) that the applicant provide a 1,360 cfs minimum flow and maintain the impoundment level between 314 and 320 feet NGVD.

Staff Analysis

Continued operation of the project to re-regulate the peaking flows from the upstream Wyman Project would result in continued daily fluctuations of the impoundment between 314 feet and 320 feet NGVD. The daily changes in impoundment elevation would continue to result in frequent inundation and dewatering of soils along the project shoreline and would influence the composition and structure of vegetation growing within the fluctuation zone. These effects would generally be limited to a narrow band around the impoundment between 314 and 320 feet NGVD. Daily changes in impoundment elevations from continued fluctuations would have minimal effects on wetland vegetation and riparian habitat that occurs above 320 feet NGVD.

Downstream of the dam, riparian areas would be unchanged by continued release of relatively stable flows under most circumstances and occasional higher flows during floods or high runoff periods. Because wetlands in the project area have adapted to the existing flow releases and no changes to project operation are proposed, no new effects to wetlands or riparian areas downstream of the dam would be expected.

Eagles

During the scoping process, Interior recommended an analysis of the effects of project operation on bald and golden eagles. However, no project effects have been identified and no specific recommendations have been made regarding eagles.

Staff Analysis

Two bald eagle nest sites were confirmed during 2013 and 2014 surveys. Both nesting sites were located in upland areas and are not directly affected by river flow conditions. Because the applicant is not proposing any new facilities or significant operational changes, no expected change in use of the area by eagles would be expected as a result of relicensing.

Common Loons

White Pine Hydro proposes to conduct a 5-year loon monitoring survey to collect additional information about the effect of project operation on loon nesting success.

Staff Analysis

At the Williams impoundment, there is one pair of nesting loons that has been observed. Loon nesting success can be affected by impoundment level fluctuations. In Maine, nest selection occurs during late May and early June, and incubation subsequently follows during mid-June to mid-July. Fluctuating water levels can cause nest failure by flooding or stranding nests, reducing nest accessibility, and increasing vulnerability to predation. Nesting is most successful when water levels do not increase more than 6 inches or decrease more than 1 foot during any 28-day period within the peak nesting season (Evers, 2004). Nesting success can also be influenced by the availability of suitable habitat.

To evaluate the effect of project operation on loon nesting success, White Pine Hydro compiled hourly water level data for the project impoundment during the common loon nesting season (May through August) for 2013 and 2014. During these periods, water level fluctuations of up to 3 feet occurred. In 2013, nesting success was observed for the loon nesting pair; however, nest failure occurred in 2014.

Aquatic Furbearers

During the scoping process, Interior recommended an analysis of the effects of project operation on aquatic furbearers. However, no project effects have been identified and no specific recommendations have been made regarding aquatic furbearers, including mink, beaver, otter, and muskrat.

Staff Analysis

Aquatic furbearers, including beaver and muskrat, are known to be present and construct dens within the project area, both upstream and downstream of the dam. Because these species continue to use the project area under existing conditions and the applicant is not proposing any new facilities or significant operational changes, no expected change in use of the area by aquatic furbearers would be expected as a result of relicensing.

Cumulative Effects

The Williams Project, in combination with the other existing hydroelectric projects located in the Kennebec River Basin, could cumulatively affect wetlands from Williams dam to Merrymeeting Bay. Cumulative adverse effects can occur from changes to water flow patterns, affecting wetland hydrology, soils, and vegetation. Because White Pine Hydro is not proposing to change project operation, continued operation of the project will have no cumulative effect on wetlands.

3.3.3 Threatened and Endangered Species

Affected Environment

Two federally listed threatened species, the Canada lynx (*Lynx canadensis*) and northern long-eared bat (*Myotis septentrionalis*) could occur in Somerset County, Maine. Additionally, the federally endangered Gulf of Maine Distinct Population Segment of anadromous Atlantic salmon (*Salmo salar*) currently occupies Kennebec River.

The Canada lynx is listed as threatened under ESA. It's habitat is widespread throughout northern and western Maine and includes large areas of young, dense stands of spruce and fir approximately 12-30 years old, which have dense understory vegetation that support high densities of snowshoe hares. No critical habitat for this species has been designated within the project area.

The northern long-eared bat is listed as threatened under ESA. Traditional ranges for the Northern long-eared bat include large forested areas in the central and eastern

U.S., as well as the southern and central provinces of Canada. Northern long-eared bat habitat includes large tracts of mature, upland forests and this species typically feeds on moths, flies, and other insects. These bats roost in 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; however, the project is located within the white-nose syndrome buffer zone for the northern long-eared bat.[37]

In January 2016, the U.S. Fish and Wildlife Service (FWS) finalized the 4(d) rule for this species which focuses on preventing effects on bats in hibernacula associated with the spread of white-nose syndrome[38] 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);[39] and (3) avoids clearcuts within 0.25 mile of known, occupied maternity roost trees during the pup season (June 1 – July 31).

A portion of the anadromous Atlantic salmon population is listed as endangered under ESA. The initial listing (issued in 2000) for anadromous Atlantic salmon defined the Gulf of Maine Distinct Population Segment and protected anadromous salmon in the Kennebec River salmon downstream of the former Edwards dam (NMFS, 2000). In 2009, Interior and NMFS expanded protection to include the entire Kennebec River watershed (NMFS, 2009a) and defined the Kennebec River from the confluence of the Carrabassett River (approximately 9.5 miles downstream of Williams dam) downstream to the Atlantic Ocean as critical habitat (NMFS, 2009b). Additionally, NMFS designated the Sandy River (a tributary that enters the Kennebec River) approximately 17.5 miles downstream of Williams dam) as critical habitat. The biology of anadromous Atlantic salmon, as well as the historic range, critical habitat, population trends, and restoration

[37] White-nose syndrome buffer zone encompasses counties within 150 miles of a U.S. county or Canadian district in which white-nose syndrome or the fungus that causes white-nose syndrome is known to have infected bat hibernacula.

[38] 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.

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

efforts for Atlantic salmon in the Kennebec River is discussed in section 3.3.1, *Aquatic Resources*.

Environmental Effects

White Pine Hydro does not propose any measures for the protection of the Canada lynx, northern long-eared bat, or anadromous Atlantic salmon. No agency recommendations were received regarding the Canada lynx or northern long-eared bat. The agencies also do not recommend any measures that would affect the existing population of anadromous Atlantic salmon; however, they do indicate that some of their recommendations could benefit anadromous Atlantic salmon if they have access to the project area in the future.

Staff Analysis

Canada lynx were not observed during 2013 field surveys. Further, because suitable lynx habitat (boreal spruce-fir forest) is not present in the project area, it is unlikely the lynx would be present or that the project would have any impact on this species. Based on this information, we conclude that relicensing the Williams Project with any of the measures considered in this EA would have no effect on the Canada lynx.

No northern long-eared bat hibernacula sites are known to occur in the project vicinity; however, because the project vicinity is largely forested, suitable habitat for summer roosting and foraging activities could be present. Regardless, even if the northern long-eared bat is present in the project vicinity, project operation and maintenance would not affect its habitat or food availability because no significant ground disturbing activities or tree clearing activities are being considered as part of relicensing. Based on this information, we conclude that relicensing the Williams Project with any of the measures considered in this EA would have no effect on the northern long-eared bat.

Anadromous Atlantic salmon currently do not occupy or have access to the project area due to lack of upstream fish passage at several downstream dams. Additionally, the project does not occupy or restrict access to designated critical habitat. Because none of the measures considered in this EA would affect areas that are currently inhabited by anadromous Atlantic salmon, we conclude that relicensing the Williams Project with any of the measures considered in this EA would have no effect on Gulf of Maine Distinct Population segment of Atlantic salmon.

3.3.4 Land Use and Recreation

Affected Environment

Land Use

Land use in the vicinity of the project consists mainly of undeveloped lands, including forests and some agricultural areas, as well as a small amount of commercial and residential development. Privately-owned lands in the project vicinity are regulated by the planning boards of the towns of Bingham, Embden, and Solon. The Maine Land Use Planning Commission (Maine LUPC) regulates lands in Concord Township. The Maine LUPC has included some sections of project lands in Concord Township under Significant Wetland, Flood Prone, or Soils and Geology protection subdistricts. Significant Wetland protection subdistricts cover wetlands of special significance, and generally prohibit developmental activities. Flood Prone protection subdistricts include areas that are in a 100-year floodplain, and allow new construction only by special exemption. Soils and Geology protection subdistricts cover areas that have slopes greater than 60 percent or unstable characteristics from uses or development that could accelerate erosion or sedimentation (Maine LUPC, 2010). Outside of Maine LUPC jurisdiction, municipalities are required to follow the Mandatory Shoreland Zoning Act (MSZA) for all lands within 250 feet of the normal high-water line of any river (Maine LUPC, 2016). Project lands within 250 of the Kennebec River in the towns of Bingham, Embden, and Solon fall under the jurisdiction of the MSZA.

About 1,188.5 acres of land and water lie within the project boundary. Lands within the project boundary are primarily forested or wetlands, except for the developed area immediately surrounding the dam. Aside from recreational activities, project operation and maintenance are the primary activities that occur on project lands. No federal lands exist within or adjacent to the project boundary.

Recreation Facilities

White Pine Hydro owns and operates four formal public recreation sites within the project boundary (see Figure 12), including: (1) the multi-use parking area at the south end of the impoundment with space for about 10 vehicles, (2) the concrete boat launch on the lower east side of the impoundment, (3) the canoe portage trail from the impoundment to the tailwater, and (4) the gravel angler access and parking area on the east side of the tailwater with parking for about two vehicles. In addition to the formal recreation sites, there are eight informal sites, including: (1) three bank fishing areas on the east shore of the impoundment accessible from the Kennebec Valley Trail, (2) a bank fishing area on the west shore of the impoundment on private land that is accessible from Route 16, (3) a gravel boat launch on the west shore of the impoundment that is also accessible from Route 16, (4) a system of trails branching from the angler parking area to

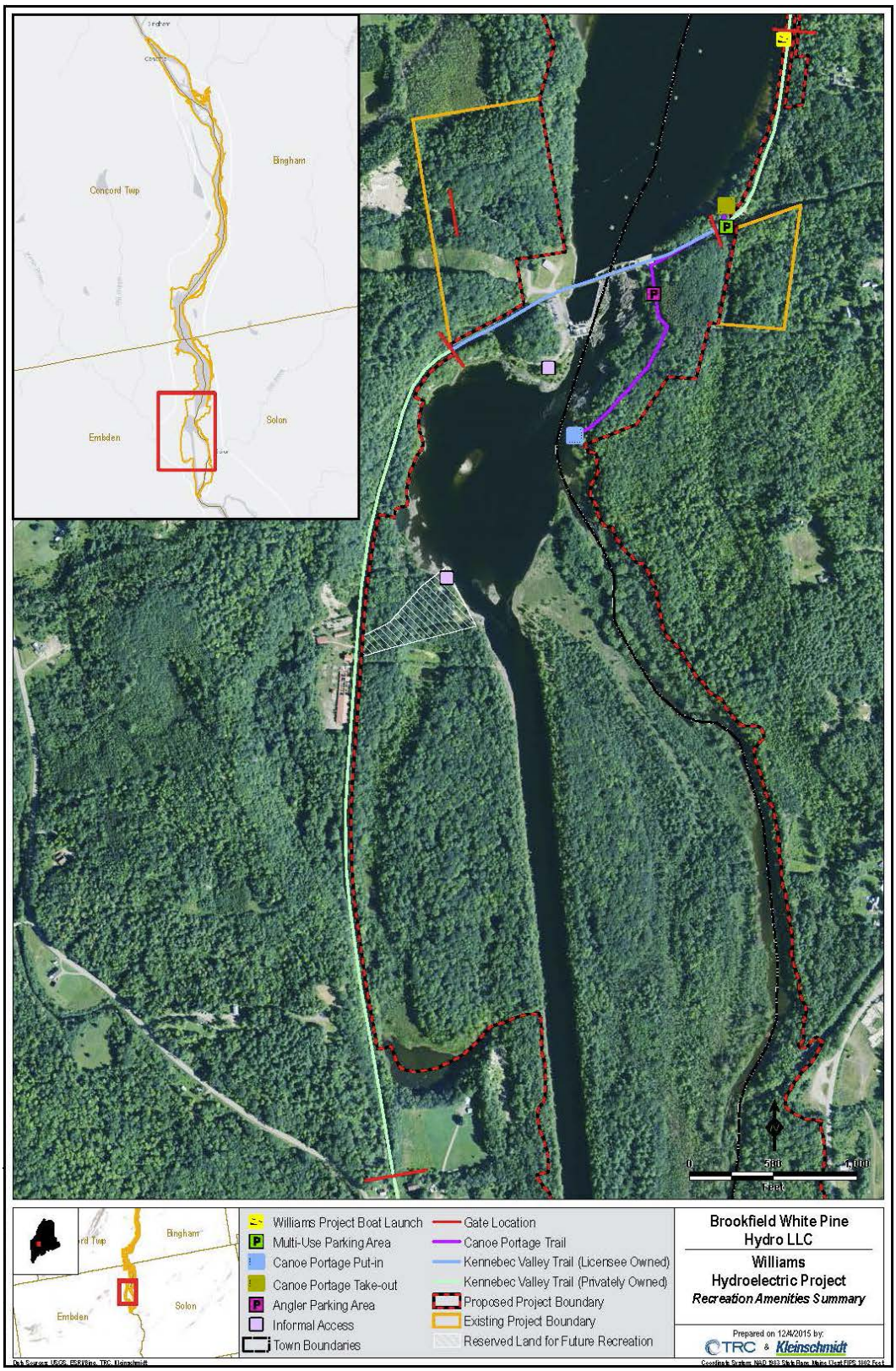

Figure 12. Recreation sites at the Williams Project (Source: license application).

the Kennebec River, (5) a bank fishing area located immediately downstream of the project powerhouse, and (6) a gravel boat launch on the west shore of the tailwater area accessible via the Kennebec Valley Trail.

The Kennebec Valley Trail is a 14.6-mile-long multi-use trail built upon a former railbed along the Kennebec River from Anson to Bingham. The trail crosses the Williams Project boundary and goes over an old railroad bridge near the dam. White Pine Hydro owns the 0.3-mile section of the trail that pass through the project boundary, although it is leased to the Town of Bingham. The lease allows for public use of the trail, and requires that the Town of Bingham maintain it. The Kennebec Valley Trail is closed to automobile use to the west of the project, but automobiles are allowed on the eastern shore portion of the trail and can be used to access informal recreation areas located just off the trail. The trail is used for walking/hiking/jogging, bicycle riding, and all-terrain vehicle use in the summer. In winter, it is maintained as a snowmobile trail.

Project Access

The project vicinity provides a variety of opportunities for public recreation. Angler access to project waters is available at each of the four project recreation sites. Boating access to the impoundment is available at the concrete boat ramp on the east side of the impoundment, and at the informal boat ramp on the west side of the impoundment. Both are suitable for motorized and non-motorized watercraft. Non-motorized water craft can be launched into the impoundment or tailwater at either end of the formal canoe portage trail that is accessible from a formal parking area, and from a carry-in launch located just upstream of the Route 201A bridge outside of the project boundary. Access for motorized watercraft to the tailwater area is limited. The informal gravel tailwater boat launch is within the project boundary but is only accessible via the Kennebec Valley Trail, which is not open to automobiles. The only other access to the tailwater area for motorized watercraft is from a ramp at the privately-owned Evergreens Campground, located approximately 1.6 miles downstream from the tailwater pool. The Evergreens Campground currently allows use of the boat ramp for a $5 fee.

Recreational Use

White Pine Hydro filed a FERC Form 80 Recreation Report in 2015. According to the report, the project had approximately 16,410 annual recreation visits. Use at the concrete boat launch is estimated to be at about 30 percent capacity, the multi-use parking area was at 65 percent capacity, and the canoe portage and angler parking area were used at 5 and 10 percent, respectively.

The primary activity observed at the project is walking/hiking/jogging. Other popular activities include ATV riding, fishing, boating, picnicking, and bike riding. In

winter, the primary recreational activity is snowmobile use along the Kennebec Valley Trail.

Environmental Effects

Modification of Project Boundary

White Pine Hydro is proposing to reduce its project boundary by removing 375.5 acres of land and water that are not needed for project operation and maintenance. This reduction would remove about 331 acres of land and water that is upstream from the northern extent of the Williams impoundment, as well as remove several small parcels of land that White Pine Hydro suggests are not necessary for project operation or natural, recreational, or cultural resource protection. About 20.2 acres are located in three parcels along the eastern shore of the impoundment, and one 20.3-acre parcel is located just northwest of the dam on the western shore of the impoundment. The new project boundary would consist of 813 acres of land and water.

Staff Analysis

White Pine Hydro's proposal would remove approximately one third of the existing project lands and waters from the project boundary. The lands and waters proposed for removal are primarily forested lands and a segment of the Kennebec River that are not affected by project operation and not needed for project purposes; therefore, their removal would not result in a change in the project's effect on environmental, recreational, or cultural resources. Removal of these lands would create a new project boundary that would cover the area needed for project operation and maintenance and would eliminate other lands and waters that are not needed for project purposes. Sensitive wetlands and geologic areas in Concord Township, as well as all lands close to the water, which would be removed from the project boundary would continue to be regulated by Maine LUPC.

Recreation Facilities Management Plan

White Pine Hydro proposes to develop an RFMP to address management and operation of existing project recreation sites. The plan would also include measures to evaluate the need for additional access or improvements to existing recreation facilities.

Staff Analysis

Implementing an RFMP would help to protect current recreation facilities at the project by ensuring that facilities are properly maintained and that recreation use is monitored.

Access to Tailwater Area

White Pine Hydro is proposing to reserve project lands for continued and future recreational access to the tailwater pool, support discussions for limited vehicular access along the section of the Kennebec Valley Trail west of the project that is currently closed to vehicular traffic, and improve the existing informal non-motorized boat launch on the western shore of the tailwater to allow launching of driftboats or small motorized boats if vehicular access is granted. White Pine Hydro is also proposing to monitor use and availability of the Evergreens Campground boat launch.

Interior (10(a) recommendation #1) and Maine DIFW recommend that White Pine Hydro ensure reasonable guaranteed boating access to the project tailwater. Interior recommends that White Pine Hydro develop an access plan in consultation with Interior and Maine state agencies, and that the plan should include: (1) routes for access, (2) the mechanism guaranteeing public access, (3) any associated fees and their basis, and (4) the posting of notices informing the public of available access routes.

Staff Analysis

Existing recreational access to the Williams Project is currently adequate for the existing level of use the project receives, and there is no information to indicate that existing access facilities may become unavailable in the future.

As indicated above, the tailwater area can currently be accessed with non-motorized boats from the tailwater canoe launch on the east shore of the tailwater. Because the tailwater canoe put-in and associated portage trail and parking area are within the project boundary, hand-carry watercraft have guaranteed access to the tailwater area at this time. However, the only way to access the tailwater with motorized boats is from the Evergreens Campground boat launch that is 1.6 miles downstream. While there is also no indication that the Evergreens Campground will be closing or restricting boating access during the term of a new license, the distance downstream makes it a somewhat inconvenient location for accessing the tailwater and it requires a $5 fee. Investigating other ways to access the tailwater with motorized boats, as proposed by White Pine Hydro, could result in more convenient tailwater access for motorized boats. White Pine Hydro cannot construct a boat ramp along the east or west sides of the tailwater because that shoreline has high, steep, and rocky sides that would complicate road construction. Access from the west side would be more feasible, however it would likely require use of the existing Kennebec Valley Trail, which currently prohibits vehicle use. White Pine Hydro's proposal to discuss use of this trail for access could result in an agreement that allows limited vehicular use for improved boat access to the tailwater.

Developing a tailwater access plan, as recommended by the agencies, could improve tailwater boat access and ensure guaranteed access during any license term. However, because there is reasonable tailwater access at this time and options for creating new tailwater boating access are currently limited, it may be more appropriate to modify the RFMP to require White Pine Hydro to monitor tailwater use and explore options for improved access, if or when it is determined to be needed.

Improvements to Canoe Portage Trail

White Pine Hydro proposes to improve the canoe portage trail by placing gravel over part of the existing earthen path.

Staff Analysis

Improving the canoe portage trail with gravel would provide a safer footing and more durable surface. The gravel would also protect tree roots along the trail from potential damage.

Access Signage

White Pine Hydro proposes to install safety signage along the portage trail and along the powerhouse access road to discourage users from accessing the river in the powerhouse and tailrace areas. White Pine Hydro is not proposing any other new signage regarding recreational access within the project boundary.

As part of its 10(a) recommendation #1, Interior recommends the posting of notices informing the public of available access routes.

Staff Analysis

Safety signage would likely discourage recreationists from using dangerous areas such as the near the powerhouse discharge and along steep rip-rapped banks.

There is currently no signage at the project that describes the location of recreational sites or how to reach them. Posting notices or signage describing project recreational access sites would help to inform the public of recreation opportunities and access to different locations around the project.

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 project includes: (1) lands enclosed by the project boundary; and (2) lands or properties outside the project boundary that may be affected by project-related activities.

Historical Background

The Kennebec Band of the Abenaki Nation was dominant in the upper Kennebec Valley at the time of European contact (Allen, 1849). Their principal village was Norridgewock, which was located about 20 river miles downstream of the site of the Williams Project at Caratunk Falls. Caratunk Falls was an important landmark for the Kennebec Band, and they viewed it as a dividing line between tribal territories (Whitney, 1887). The Kennebec River corridor was an important travel and trade corridor for the Abenaki Nation as it formed part of the route between the Gulf of Maine and the St. Lawrence River.

During the colonial era, the Kennebec Valley was only sparsely settled by Europeans, with the French moving into the valley from the north and the British from the south. In 1669, pressure from disease and conflict from English settlements closer to the coast forced the Abenaki Nation to begin migrating north to Quebec to be closer to their French allies. The Abenaki Nation raided many English settlements in Maine during King Philip's War (1675-1678), and many settlers fled as a result. Conflicts between natives and settlers continued as local skirmishes that were often part of larger colonial wars between the English and French, including King William's War (1688-1697) and Queen Anne's War (1702-1713) (Maine Historical Society, 2010).

Norridgewock had been the location of a French Jesuit mission since 1646 (Brown, 1879). The leader of this mission, Father Sebastien Rale, incited the Kennebec Tribe against the encroaching English. This resulted in a series of raids against English settlements along the Kennebec River, including the burning of Brunswick. The English responded by attacking Norridgewock in 1724 and killing Father Rale and dozens of Kennebec. The surviving Kennebec fled the area for the St. Lawrence River Valley, and French influence over the Kennebec Valley waned (Kidd, 2002). The Penobscot Nation is the only Federally-recognized Abenaki tribe remaining in Maine, and they have indicated that they have an interest in cultural resources in the Kennebec Valley.

Settlement was light in the upper Kennebec Valley during the remainder of the 18th Century. In 1775, Benedict Arnold led a 1,100-man military expedition up the Kennebec River in a failed attempt to attack the British at Quebec. Parts of the expedition camped at what is now the Evergreens Campground just south of the project boundary (Behman, 1987). The expedition passed through what is now the Williams Project area, and campsites may have been made on shoreline that is now part of the project boundary.

The first permanent European settlement began in the region in the late 1700s, with the population increasing steadily afterwards. Residents of the upper Kennebec Valley found themselves closer to the markets of Quebec City than to Boston, and trade was oriented up the Kennebec Valley to the St. Lawrence Valley as in pre-colonial days. In 1817, Massachusetts began construction of a road between the region and Canada, which would later be known as the Old Canada Road. Route 201 near the project roughly follows the route of this old road. The road was also a source of immigration, with an estimated 500,000 French Canadians later travelling it to reach employment in the factories of New England (Tobyne, 2013). The Old Canada Road was made obsolete by the construction of the Somerset Railroad, which reached Solon in 1889 and Bingham in 1890. In 1911, the Somerset Railroad was incorporated into the Maine Central Railroad, which existed until 1981 (MacDougall, 2000). The old railroad bridge that crosses the Williams Project was constructed in 1912 to carry the Maine Central Railroad over the Kennebec River.

The historical economy of the upper Kennebec Valley was varied, with farming and logging being the primary industries. The river served as an important transportation route for wood products, with massive log drives occurring annually until 1976 (Harlow, 2016). Ten remaining wood-and-rock piers that form a diagonal line across the southern end of the Williams impoundment were used as log booms to guide logs during log drives.

The first dam at Caratunk Falls was constructed in 1889 and turbines were installed at this site in 1910. The Williams dam replaced the first dam. It was built from 1937 to 1939, and had one generator operating in 1939 and another added in 1950.

Archaeological and Historic Resources

At the time it filed its PAD, White Pine Hydro had documented 18 pre-European contact archeological sites within the Williams Project APE. One of these sites, the Carratunk site, was already listed on the National Register. In consultation with the Maine SHPO, White Pine Hydro conducted Phase I and Phase II archeological surveys for precontact Native American properties during the application pre-filing period. White Pine Hydro performed surveys on ten of the 18 previously-reported sites, and determined

that six of that ten were eligible for the National Register. A previously-unknown precontact site was discovered during the survey and determined eligible for the National Register as well.

Prior to relicensing, the Benedict Arnold Trail to Quebec Historic District, which is partially located in the APE and is listed in the National Register, was the only post-contact site known to exist in the APE. White Pine conducted Phase I and Phase II archeological surveys, identified four areas of interest, and determined one site (a 19th Century homestead location) to be eligible for the National Register.

White Pine Hydro also conducted a historic architecture survey and found three architectural resources eligible for the National Register: the Williams hydroelectric facility, the Kennebec River log drive piers in the project impoundment, and the Maine Central Railroad bridge over the project. In a letter dated March 24, 2015, the Maine SHPO indicated that these three archeological and historic properties are the only post-contact properties in the APE eligible for listing in the National Register. The Maine SHPO further stated that the project relicensing will have no effect on these eligible properties, as well as the listed Benedict Arnold trail, because White Pine Hydro is not proposing any measures that would alter any historic properties in the project area. The Maine SHPO's finding, however, is conditional on White Pine Hydro developing and implementing an HPMP to protect the historic resources throughout the term of the license.

Environment Effects

White Pine Hydro does not propose any changes to Williams dam or any changes to the operation of the project that would affect archeological sites.

White Pine Hydro proposes to develop an HPMP that would ensure that appropriate consultation occurs prior to any activity that could affect the historic properties in the APE. The HPMP would describe the protection of the historic properties that have been listed or determined to be eligible for listing in the National Register, and would include provisions to address any historic properties discovered during the license term. The HPMP would be prepared in consultation with the Maine SHPO.

Staff Analysis

Relicensing the project is not likely to have an effect on the historic properties that are eligible for[40] or listed[41] on the National Register because the project would only involve new construction for eel passage facilities which would not occur near or affect any of the known historic sites (listed, eligible, or otherwise). Because there are no known historic properties in the APE that require protection, development and implementation of an HPMP would not be necessary.

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 Maine 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 Maine 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.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the Kennebec River for hydropower purposes to see what effects various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the

[40] Six precontact sites and four postcontact sites (18th Century homestead, the Williams hydroelectric facility, the log drive piers, and the Maine Central Railroad bridge).

[41] The precontact Carratunk site and the Benedict Arnold Trail.

economics of a hydropower project, as articulated in *Mead Corp*.,[42] 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., operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost for the project. If the difference between the cost of alternative power and total project cost is positive, the project helps to produce 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 helps to produce 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 8 summarizes the assumptions and economic information we use in our analysis for the project. This information was provided by White Pine Hydro in its license application or estimated by staff. We find that the values provided by White Pine Hydro are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs, net investment, estimated future capital investment required to maintain and extend the life of facilities, relicensing costs, normal operation and maintenance cost, and Commission fees.

[42] See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

Table 8. Parameters for economic analysis of the Williams Project (Source: White Pine Hydro and staff).

Parameters	Values (2016 dollars)	Sources
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Escalation rate	0 percent	Staff
Alternative energy value	$41.26/MWh [a]	Independent System Operator (ISO)New England
Federal tax rate	34 percent	Staff
local tax rate	8.93 percent	Staff
Interest rate	12 percent	White Pine Hydro
Discount rate	12 percent [b]	Staff
Net remaining investment	$9,146,000 [c]	White Pine Hydro
Annual operation and maintenance cost	$1,466,000 [d]	White Pine Hydro

[a] Based on an average of the average monthly energy value for the past year (September 2015 to August 2016) obtained from the ISO New England at http://www.iso-ne.com.
[b] Assumed by staff to be the same as the interest rate.
[c] Based on White Pine Hydro's remaining undepreciated net investment and cost to develop the license application for the project in 2016 dollars.
[d] Based on White Pine Hydro's estimated costs of annual operation and maintenance for the project in 2016 dollars.

4.2 COMPARISON OF ALTERNATIVES

Table 9 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: no-action, the applicant's proposal, and the staff alternative.

Table 9. Summary of the annual cost of alternative power and annual project cost for the three alternatives for the Williams Project (Source: staff).

	No Action	**White Pine Hydro's Proposal**	**Staff Alternative**
Installed capacity (megawatts)	13	13	13
Annual generation (MWh)	96,731	95,805[a]	95,548 [a]
Annual cost of alternative power ($ and $/MWh)	$3,991,121 41.26	$3,952,914 41.26	$3,942,310 41.26
Annual project cost ($ and $/MWh)	$3,556,590 36.77	$3,623,200 37.82	$3,624,340 37.93
Difference between the cost of alternative power and project cost ($ and $/MWh)	$433,380 4.48	$329,710 3.44	$317,970 3.33

[a] Based on the estimated average annual energy loss for shutting down the project's turbines at night from September 15 through November 15 to facilitate downstream eel passage over the existing spillway and/or through the existing sluiceway, starting 7 years (staff alternative) and 12 years (White Pine Hydro proposal), respectively, after any license is issued.

4.2.1 No-Action Alternative

Under the no-action alternative, the project would continue to operate as it does now. The project would have an installed capacity of 13 MW, and generate an average of 96,731 MWh of electricity annually. The average annual cost of alternative power would be $3,991,121, or about $41.26/MWh. The average annual project cost would be $3,556,590, or about $ 36.77/MWh. Overall, the project would produce power at a cost that is $433,380, or $4.48 /MWh, less than the cost of alternative power.

4.2.2 White Pine Hydro's Proposal

White Pine Hydro proposes to: (1) continue the existing store-and-release mode of operation and maintain the impoundment water surface between 314 and 320 feet NGVD at all times to re-regulate peaking discharge from the upstream Wyman Project to protect downstream aquatic habitat; (2) continue to provide a continuous minimum flow of 1,360 cfs, or inflow, whichever is less, from the project to protect downstream fish and

aquatic resources; and (3) develop a plan for monitoring compliance with project operation, including any minimum flows and impoundment level requirements.

White Pine Hydro also proposes to: (1) install a permanent upstream eel passage facility within two years of the effective date of the new license and operate the facility from June 15 to September 15 each year; (2) develop measures to provide downstream eel passage protection within 10 years of installing the upstream eel passage facility; (3) develop a plan to monitor the effects of project operation on nesting loons in the impoundment; (4) continue to maintain and provide public access to existing recreation sites at the project; (5) preserve project lands for continued and future recreational access to the tailwater pool and explore options for improving boat access to the tailwater pool; (6) improve the existing canoe portage trail with gravel and install safety signs; (7) develop a RFMP with measures for maintaining recreation facilities and evaluating the need for additional access or for improvements to existing recreation facilities; (8) monitor use and availability of the Evergreens Campground boat launch; (9) develop an HPMP for the protection of cultural resources; and (10) remove 375.5 acres of land and water from the existing project boundary that do not serve a project purpose.

The project would have an installed capacity of 13 MW, and generate an average of 95,805 MWh of electricity annually. The average annual cost of alternative power would be $3,952,914, or about $41.26/MWh. The average annual project cost would be $3,623,200, or about $37.82/MWh. Overall, the project would produce power at a cost that is $329,710, or $3.44/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

Table 10 shows the staff recommended additions and modifications to White Pine Hydro's proposed environmental protection and enhancement measures and the estimated cost of each. Based on a total installed capacity of 13 MW and an average annual generation of 95,548 MWh, the cost of alternative power would be $3,942,310, or about $41.26/MWh. The average annual project cost would be $3,624,340, or about 37.93/MWh. Overall, the project would produce power at a cost that is $317,970, or about 3.33/MWh, less than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 10. Cost of environmental mitigation and enhancement measures considered in assessing the effects of operating the Williams Project (Source: staff).

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost [a]	Levelized annual cost [b]
General				
Continue the existing store-and-release mode of operation and maintain the impoundment water surface between 314 and 320 feet NGVD at all times to re-regulate peaking discharge from the upstream Wyman Project to protect downstream aquatic habitat.	White Pine Hydro, Staff	$0	$0	$0 [c]
Notify Interior if an amendment or appeal of any fish and wildlife-related license conditions or extension of time are filed.	Interior	$0	$0	$0
Aquatic Resources				
Continue to provide a continuous minimum flow of 1,360 cfs, or inflow, whichever is less, from the project to protect downstream fish and aquatic resources.	White Pine Hydro, Maine DMR, Interior, Staff	$0	$0	$0 [c]

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost [a]	Levelized annual cost [b]
Limit down ramping to a rate of 0.2 fph, as measured immediately downstream of the dam to prevent stranding of fish, downstream of the powerhouse.	Maine DMR, Interior	$0	$0	$0 [c]
Develop an operation monitoring plan.	White Pine Hydro, Staff	$5,000	$5,000	$4,190
Install a permanent upstream eel passage facility within two years of the effective date of the new license and operate the facility from June 15 to September 15 each year.	White Pine Hydro, Maine DMR, Interior, Staff	$166,000	$10,000	$31,550
Develop measures to provide downstream eel passage protection within 10 years of installing the upstream eel passage facility.	White Pine Hydro	$5,000	$38,207 [d] (926 MWh energy loss)	$38,930
Install downstream eel passage facilities within 2 years of effective date of new license.	Maine DMR, Interior	$5,000	$59,414 [d] (1,440 MWh energy loss)	$60,140
Develop a plan to manage downstream eel passage.	Staff	$5,000	$48,811 [d] (1,183 MWh of energy loss)	$49,530

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost [a]	Levelized annual cost [b]
Develop an eel passage evaluation plan with upstream and downstream eel passage effectiveness studies.	Maine DMR, Staff	$36,000	$0	$5,190
Develop an eel passage facility operation and maintenance plan for the upstream and downstream eel passage facilities.	Maine DMR, Staff	$5,000	$0	$720
Terrestrial Resources				
Develop a common loon monitoring plan.	White Pine Hydro, Staff	$75,000	$0	$10,810
Recreation and Land Use Resources				
Remove 375.5 acres of land and water from the existing project boundary that do not serve a project purpose.	White Pine Hydro, Staff	$5,000		$660 [e]
Continue to maintain and provide public access to existing recreation sites at the project.	White Pine Hydro, Staff	$0	$0	$0
Preserve project lands for continued and future recreational access to the tailwater pool and explore options for improving boat access to the tailwater pool.	White Pine Hydro, Staff	$0	$0	$0

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost [a]	Levelized annual cost [b]
Improve the existing canoe portage trail with gravel and install safety signs.	White Pine Hydro, Staff	$20,000	$0	$2,880
Install and maintain signage for the recreation site locations and access at formal project recreation sites.	Interior, Staff	$1,000	$100	$210
Develop a RFMP.	White Pine Hydro, Staff	$25,000	$10,000	$10,540
Monitor use and availability of the Evergreens Campground boat launch.	White Pine Hydro, Staff	$0	$0	$0 [f]
Develop and implement a tailwater access plan to ensure access to the project lands and waters for recreation and other uses.	Interior, Maine DIFW	$80,000	$500	$11,880 [g]
Modify the RFMP to include monitoring of public access at project.	Staff	$1,000	$100	$210

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost [a]	Levelized annual cost [b]
Cultural Resources				
Develop an HPMP.	White Pine Hydro	$5,000	$7,500	$5,920
Notify Commission and Maine SHPO if previously unidentified archaeological or cultural artifacts are encountered during project construction.	Staff	$0	$0	$0
Consult with Maine SHPO prior to making changes to project operation or facilities.	Staff	$0	$0	$0

[a] Annual costs typically include operational and maintenance costs and any other costs which occur on a yearly basis.
[b] All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing all costs.
[c] Under existing operation, the project exceeds the recommended down ramping rate (0.2 fph) only 2.55 percent of the time and 99.4 percent of down ramping rates greater than 0.2 fph occurred when project discharge exceeded the project's maximum hydraulic capacity of the powerhouse; therefore, we assume this measure would not have a significant effect on project generation and cost.
[d] We assume no cost for constructing any new facilities at this time. Instead, we assume it would cost $5,000 to develop a plan to provide downstream eel passage plus the cost of the estimated average annual energy loss for shutting down the project's turbines at night from September 15 through November 15 to facilitate downstream eel passage over the existing spillway and/or through the existing sluiceway, starting 2 years (Interior and Maine DMR), 7 years (staff), and 12 years (White Pine Hydro), respectively after license issuance.
[e] We assume the cost for this measure is included in the cost of the license application.
[f] White Pine Hydro indicates that this measure will be conducted as part of the FERC Form 80 efforts; therefore, we assume the cost of the measure is included in the project's annual operation and maintenance cost shown above in Table 8.
[g] Based on the estimated capital cost of developing the plan, which may require the acquisition of access rights and construction of a boat ramp facility at additional costs.

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 license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on the project and our review of the environmental and economic effects of the proposed project and project alternatives, we selected the staff alternative as the preferred alternative. We recommend this alternative because: (1) issuing a major license for the project would allow White Pine Hydro to continue to operate its project as a dependable source of electrical energy; (2) the 13 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 and recommended measures would protect and enhance fish and wildlife resources and would improve public recreation opportunities at the project.

In the following section, we make recommendations as to which environmental measures proposed by White Pine Hydro or recommended by agencies or other entities should be included in any license issued for the project. In addition to White Pine Hydro's proposed environmental measures listed below, we recommend seven additional staff-recommended environmental measures to be included in any license issued for the project.

Measures Proposed by White Pine Hydro

Based on our environmental analysis of White Pine Hydro's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by White Pine Hydro 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.

To protect or enhance aquatic habitat, fish, wildlife habitat, and recreation at the project, White Pine Hydro proposes to:

- Continue the existing store-and-release mode of operation and maintain the impoundment water surface between 314 and 320 feet NGVD at all times to re-regulate peaking discharge from the upstream Wyman Project to protect downstream aquatic habitat.
- Continue to provide a continuous minimum flow of 1,360 cfs, or inflow, whichever is less, from the project to protect downstream fish and aquatic resources.
- Install a permanent upstream eel passage facility within two years of the effective date of the new license and operate the facility from June 15 to September 15 each year.
- Develop a plan for monitoring compliance with project operation, including any minimum flows and impoundment level requirements.
- Develop a plan to monitor the effects of project operation on nesting loons in the impoundment.
- Continue to maintain and provide public access to existing recreation sites at the project.
- Preserve project lands for continued and future recreational access to the tailwater pool and explore options for improving boat access to the tailwater pool.
- Improve the existing canoe portage trail with gravel and install safety signs.
- Develop a RFMP with measures for maintaining recreation facilities and evaluating the need for additional access or for improvements to existing recreation facilities.
- Monitor use and availability of the Evergreens Campground boat launch.
- Remove 375.5 acres of land and water from the existing project boundary that do not serve a project purpose.

5.1.1 Additional Measures Recommended by Staff

We recommend White Pine Hydro's proposed measures above and the additional staff-recommended measures listed below for any license issued for the White Pine Project. The additional staff-recommended measures include the following: (1) develop a downstream eel passage plan that identifies the criteria for identifying when downstream eel passage would be provided; (2) develop an upstream and downstream eel passage evaluation plan; (3) develop an upstream and downstream eel passage facility operation and maintenance plan; (4) modify the proposed RFMP to include the installation and maintenance of signs showing the locations of project recreational access sites; (5) modify the proposed RFMP to include monitoring of public access at the project, including the use and availability of the Evergreens Campground boat launch; (6) notify the Commission and the Maine SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities; and (7) consult with the Maine SHPO if previously unidentified cultural

resources are discovered during the course of constructing, maintaining, or operating the project works or other facilities.

Below, we discuss our additional staff-recommended measures.

Downstream Eel Passage Plan

White Pine Hydro proposes to implement downstream American eel passage measures within 10 years of installing an upstream eel passage facility. Interior (10(j) recommendation #3) and Maine DMR (10(j) recommendation #1) recommend that White Pine Hydro install downstream eel passage facilities within two years of license issuance.).

While there is general agreement that downstream eel passage will be needed, there are no clear proposals for the method for providing downstream passage or any agreement on the timing of when it should be provided. Therefore, we recommend that White Pine Hydro develop a downstream eel management plan in consultation with the agencies. The plan would identify a method for providing downstream eel passage protection and would identify either a specific date for providing downstream passage or describe monitoring or trigger numbers (e.g., number of adult eels collected upstream of the dam or number of juvenile eels using the upstream passage facility) to determine when downstream passage would be provided. Developing a downstream passage plan for American eels would allow White Pine Hydro to establish a schedule for implementation that would be developed in consultation with the agencies. The plan would ensure that any downstream passage measures for adult American eels would be implemented based on biological information relevant to the project area and would ensure that safe, timely, and efficient passage is provided in a timely manner. We conclude that developing and implementing this plan would be worth the estimated annual cost of $49,530 and recommend that any license issued for the project include a requirement for a downstream eel passage plan.

Eel Passage Evaluation Plan

Maine DMR (10(j) recommendation #1) recommends that White Pine Hydro conduct effectiveness studies for any upstream and downstream eel passage facilities or measures. The performance of any new measures or facilities for upstream or downstream eel passage would be unknown. Conducting upstream and downstream eel passage effectiveness studies, in consultation with Interior, NMFS, and Maine DMR, would establish the effectiveness of any new facilities or measures and would be worth the estimated annual cost of $5,190. Therefore, we recommend that any license issued for the Williams Project require White Pine Hydro to prepare an eel passage evaluation plan.

Eel Passage Facility Operation and Maintenance Plan

Maine DMR (10(j) recommendation #1) recommends that White Pine Hydro develop an operation and maintenance plan for any upstream and downstream eel passage facilities or measures. An eel passage facility operation and maintenance plan would ensure that the eel passage facilities are operated and maintained in a consistent and effective manner and would: (a) define the operating periods for providing upstream and downstream eel passage; (b) establish the dates and procedures for placement, removal, and storage of any upstream eel passage facilities and any equipment associated with downstream eel passage, if installed seasonally; (c) establish operational flow requirements for any upstream and downstream eel passage facilities; and (d) address maintenance during migration periods, including debris removal. Therefore, to ensure that any new eel passage facilities are operated in a safe and effective manner, we recommended development and implementation of an eel passage facility operation and maintenance plan, in consultation with Interior, NMFS, and Maine DMR. We conclude that this plan would be worth the estimated levelized annual cost of $720 and recommend that any license issued for the Williams Project require White Pine Hydro to develop an eel passage facility operation and maintenance plan.

Project Access Signage

White Pine Hydro proposes to install safety signage along the portage trail and along the powerhouse access road as part of its RFMP. The signs would discourage users from accessing the river in the powerhouse and tailrace areas. White Pine Hydro is not proposing any other new signage regarding recreational access within the project boundary.

Interior (10(a) recommendation #1) recommends the posting of notices informing the public of available access routes.

Safety signage along the canoe portage route would likely discourage recreationists from using dangerous areas. Posting signage describing access to the project would help to inform the public of recreation opportunities and access to different sites around the project. Signs such as these are common in other similar areas in Maine where access to dispersed recreation sites can be confusing. For these reasons, we conclude that installing safety and access signage would be worth the $210 annual cost and we recommend that any license issued for the Williams project require White Pine Hydro to modify its proposed RFMP to include these measures.

Guaranteed Access to Tailwater Area

White Pine Hydro is proposing to reserve project lands for continued and future recreational access to the tailwater pool, support discussions for limited vehicular access

along the section of the Kennebec Valley Trail west of the project that is currently closed to vehicular traffic, and improve the existing informal non-motorized boat launch to support the launching of driftboats or small motorized boats if vehicular access is granted. White Pine Hydro is also proposing to monitor use and availability of the Evergreens Campground.

Interior (10(a) recommendation #1) and Maine DIFW recommend that White Pine Hydro ensure reasonable guaranteed boating access to the project tailwater. Interior recommends that White Pine Hydro develop an access plan in consultation with Interior and Maine state agencies.

Existing recreational access to the Williams project is currently adequate for the existing level of use the project receives, and there is no information to indicate that existing access facilities may become unavailable in the future.

The tailwater area can currently be accessed with non-motorized boats from the tailwater canoe launch on the east shore of the tailwater. Because the tailwater canoe put-in and associated portage trail and parking area are within the project boundary, hand-carry watercraft have guaranteed access to the tailwater area at this time. However, the only way to access the tailwater with motorized boats is from the Evergreens Campground boat launch that is 1.6 miles downstream. While there is also no indication that the Evergreens Campground will be closing or restricting boating access during the term of the new license, the distance downstream makes it a somewhat inconvenient location for accessing the tailwater and it requires a $5 fee. Investigating other ways to access the tailwater with motorized boats, as proposed by White Pine Hydro, could result in more convenient tailwater access for motorized boats. White Pine Hydro cannot construct a boat ramp along the east or west sides of the tailwater because that shoreline has high, steep, and rocky sides that would complicate road construction. Access from the west side would be more feasible, however it would likely require use of the existing Kennebec Valley Trail, which currently prohibits vehicle use. White Pine Hydro's proposal to discuss use of this trail for access could result in an agreement that allows limited vehicular use for improved boat access to the tailwater.

Developing a tailwater access plan, as recommended by the agencies, could improve tailwater boat access and ensure public access during any license term. However, there is reasonable tailwater access at this time and options for creating new tailwater boating access are currently limited. Therefore, to ensure that access to project lands and waters, including the tailwater pool, remain available during the license term, we recommend that White Pine Hydro modify the RFMP to monitor availability of project recreation access and report any restrictions to access to project lands and waters during the license term. This would include monitoring the availability of the Evergreens Campground boat launch for accessing the tailwater pool with motorized boats.

5.1.2 Measures Not Recommended

Ramping Rate

Interior (10(j) recommendation #2) and Maine DMR (10(j) recommendation #3) recommend a down ramping rate of no more than 0.2 fph to prevent stranding of fish, particularly juvenile salmonids, downstream of the powerhouse.

Based on 5 years of operation data, the mean down ramping rate is 0.17 fph, and the project only exceeds the recommended down ramping rate 2.55 percent of the time. Additionally, 99.4 percent of down ramping rates greater than 0.2 fph occurred when project discharge exceeded the project's maximum hydraulic capacity, at which point the project cannot control the rate of down ramping. Nothing in the record indicates current down ramping operation negatively affects the salmonid population downstream of the powerhouse. In fact, the current abundance of landlocked Atlantic salmon and brown trout appears to cause reduced growth rates for both species. Therefore, while restricting the down ramping rate to 0.2 fph could provide some additional protection to juvenile salmonids, current project operation does not appear to adversely affect the salmonid population, and we do not recommend including a down ramping rate restriction as part of any license that is issued to White Pine Hydro for the Williams Project.

Notification of Future Amendments to Project

Interior (10(a) recommendation #2) recommends that the applicant 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.

For significant amendments related to fish and wildlife resources, the Commission's regulations require a licensee to consult with Interior while preparing the amendment application.[43] 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.[44] Because existing Commission regulations and services allow Interior to be informed of amendments, appeals, and requests for

[43] 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).

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

extensions of time, we do not recommend this measure be included in any license that is issued to White Pine Hydro for the Williams Project.

Historic Properties Management Plan

White Pine Hydro proposes to develop an HPMP that would address the protection of historic properties that were identified as being listed or eligible for listing in the National Register, and would include provisions to address any historic properties discovered during the license term. Relicensing the project is not likely to have an effect on the historic properties that are eligible for or listed on the National Register. Because there are no known historic properties in the APE that require protection, we do not recommend that this measure be included in any license that is issued to White Pine Hydro for the Williams Project.

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, to ensure that any previously-unknown cultural resources are adequately protected, we recommend that White Pine Hydro notify the Commission and the Maine 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, White Pine Hydro 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, White Pine Hydro 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 White Pine Hydro consult with the Maine SHPO prior to conducting any maintenance activities that do not require Commission approval but could affect cultural resources.

5.1.3 Conclusion

Based on our review of the agency and public comments filed on the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the Williams Project, as proposed by White Pine Hydro with the additional staff-recommended measures, would be best adapted to a plan for improving the Kennebec River Basin.

5.2 UNAVOIDABLE ADVERSE IMPACTS

Most adult fish could avoid involuntary entrainment, but entrainment of some small fish could still occur. Similarly, some entrainment mortality could occur for adult American eels migrating downstream until permanent downstream eel passage measures are implemented. Additionally, the nests of fish species that spawn in shallow water, such as smallmouth bass and pumpkinseed sunfish, could be dewatered by the proposed impoundment fluctuations.

5.3 SUMMARY OF SECTION 10(j) 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 May 13, 2016, notice accepting the application to relicense the project and soliciting motions to intervene, protests, comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions, Interior and Maine DMR each filed three section 10(j) recommendations for the project on July 12, 2016. Table 11 lists the recommendations filed pursuant to section 10(j), and indicates whether the recommendations are included under the staff alternative. Staff found all recommendations to be within the scope of 10(j), but did not recommend adopting one recommendation and part of a second one.

Section 5.1.2, *Measures Not Recommended*, discusses the reasons we do not recommend adopting measures which we have determined are within the scope of section 10(j).

Table 11. Analysis of fish and wildlife agency recommendations for the Williams Project.

Recommendation	Agency	Within scope of section 10(j)?	Levelized Annual Cost	Recommend Adopting?
To protect aquatic habitat, release an instantaneous minimum flow of 1,360 cfs from Williams dam, as measured immediately downstream.	Interior, Maine DMR	Yes	$0	Yes
Down ramping rates shall be limited to 0.2 fph, as measured immediately downstream.	Interior, Maine DMR	Yes	$0	No
Interior and Maine DMR recommend that White Pine Hydro design upstream and downstream passage facilities for American eel, and install facilities within two years of license issuance. As part of this measure, Maine DMR also recommend upstream and downstream eel passage effectiveness studies and an operation and maintenance plan for upstream and downstream eel passage facilities.	Interior, Maine DMR	Yes	$31,550 (upstream) and $60,140 (downstream)	Yes, for upstream eel passage, upstream and downstream eel passage effectiveness studies, and operation and maintenance plans for upstream and downstream eel passage facilities. No, for downstream eel passage timing.

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 or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 19 qualifying comprehensive plans that are applicable to the Williams Project, located in Maine. No inconsistencies were found.

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6.0 FINDING OF NO SIGNIFICANT IMPACT

If the Williams Project is issued a new license as proposed with the additional staff-recommended measures, the project would continue to operate while providing enhancements to aquatic and terrestrial resources, improvements to recreation facilities, and protection of cultural and historic resources in the project area.

Based on our independent analysis, we find that the issuance of a license for the Williams Project, with additional staff-recommended environmental measures, 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 draft license articles for staff-recommended measures:

Draft Article 001. *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 the provisions of the Commission's regulations in effect from time to time, to reimburse the United States for the cost of administration of Part 1 of the Federal Power Act. The authorized installed capacity for that purpose is 13 megawatts.

Draft Article 002. *Exhibit Drawings.* Within 45 days of the effective date of this license, as directed below, the licensee must file two sets of the approved exhibit drawings and geographic information system (GIS) data in electronic file format on compact disks with the Secretary of the Commission, ATTN: OEP/DHAC.

(a) 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-2335-1001 through P-2335-1010) 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 file extension in the following format [P-2335-1001, G-1, Project Boundary, MM-DD-YYYY.TIF]. 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

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 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.

(b) The 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-2335, boundary polygon/or point data, MM-DD-YYYY.SHP]. The data must be accompanied by a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., Universal Transverse Mercator, 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-2335, project boundary metadata, MM-DD-YYYY.TXT].

Draft Article 003. *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 004. *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 005. *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 consult with the Commission's Division of 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 006. *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 007. *Cofferdam and Deep Excavation Construction Drawings*. Should construction require cofferdams or deep excavations, the licensee must: (1) 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

shall 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 008. *As-built Drawings.* Within 90 days of completion of construction of the facilities authorized by this license, including a new upstream eelway, the licensee must file for Commission approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built. A courtesy copy must be filed with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, the Director, D2SI, and the Director, Division of Hydropower Administration and Compliance.

Draft Article 009. *Project Operation*. The licensee must operate the Williams Project as follows:

(a) maintain the impoundment elevation between 314 and 320 feet National Geodetic Vertical Datum 1929 year-round; and

(b) release a continuous minimum flow of 1,360 cubic feet per second, or inflow, whichever is less, from the impoundment at all times.

Water surface elevations and minimum flow releases may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon agreement among the licensee, the Maine Department of Environmental Protection, the Maine Department of Marine Resources, and the U.S. Department of the Interior. If water surface elevations or minimum flow releases are so modified, the licensee must notify the Commission and the agencies as soon as possible, but no later than 10 days after each such incident.

Draft Article 010. *Operation Monitoring Plan*. Within six months of the effective date of this license, the licensee must file with the Commission, for approval, an Operation Monitoring Plan for the project. The plan must include:

(a) a description of how project facilities will be operated to comply with the requirements specified in Draft Article 009;

(b) a description of how project operation will be monitored to document compliance with the operational requirements specified in Draft Article 009, including descriptions of the mechanisms and structures (*i.e.*, type and exact locations of all flow and impoundment elevation monitoring equipment and gages) to be used, and procedures for maintaining and calibrating monitoring equipment;

(c) the methods and frequency for reporting monitoring data to the Commission, the Maine Department of Environmental Protection (Maine DEP), the Maine Department

of Marine Resources (Maine DMR), and the U.S. Department of the Interior (Interior); and

(d) an implementation schedule.

The licensee must include with the plan, documentation of consultation with Maine DEP, Maine DMR, and Interior; 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. The licensee must not begin implementing the plan until the Commission approves the plan. Upon Commission approval, the licensee must implement the plan, including any changes the Commission required.

Draft Article 011. *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 Secretaries of the Interior or Commerce pursuant to section 18 of the Federal Power Act.

Draft Article 012. *Upstream Eel Passage Plan*. Within six months of the effective date of this license, the licensee must file for Commission approval, an upstream eel passage plan that provides for the construction of an upstream eelway at Williams dam. The purpose of the plan is to provide safe, timely, and effective upstream eel passage at the Williams Hydroelectric Project.

The plan must include, but not necessarily be limited to detailed design drawings and other design criteria for the upstream eelway and a schedule for installing and operating the facility within 2 years of license issuance.

The licensee must prepare the plan after consultation with Maine Department of Environmental Protection, Maine Department of Marine Resources, U.S. Department of the Interior, and National Marine Fisheries Service. 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. 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 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 013. *Downstream Eel Passage Plan*. Within six months of the effective date of this license, the licensee must file with the Commission, for approval, a plan for the selection and implementation of downstream eel passage measures at Williams dam. The plan must include, but not necessarily be limited to, descriptions of:

(a) measures that will be implemented to provide safe and effective downstream passage for American eels;

(b) calculations or methods for timing implementation of downstream eel passage measures, such as a establishing a specific number of years after collecting a target number of juvenile eels using the upstream eelway or collecting a target number of adult eels at the dam or from upstream habitat; and

(c) a schedule for any construction associated with the downstream eel passage measures.

The licensee must prepare the plan after consultation with the Maine Department of Environmental Protection, Maine Department of Marine Resources, U.S. Department of the Interior, and the National Marine Fisheries Service. The licensee must include with the plan documentation of consultation, including 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 and schedule. 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 014. *Upstream and Downstream Eel Passage Facility Operation and Maintenance Plan.* Within nine months of the effective date of this license, the licensee must file with the Commission, for approval, a plan describing the proposed

long-term operation and maintenance of any passage facilities required by Articles 011 and 012. The plan must also include, but not necessarily be limited to:

(a) annual operation schedules for each facility, including descriptions of operating flows and any annual startup and shutdown procedures;

(b) descriptions of maintenance procedures for each passage facility, including cleaning and inspection schedules and debris removal and disposal; and

(c) a detailed description of the procedures for reporting to the Commission any failure to operate the eel passage facilities or measures as described by the plan.

The licensee must prepare the plan after consultation with the Maine Department of Environmental Protection, Maine Department of Marine Resources, U.S. Department of the Interior, and National Marine Fisheries Service. The licensee must include with the plan, documentation of consultation, including 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 and schedule. 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 015. *Upstream and Downstream Eel Passage Evaluation Plan*. Within nine months of the effective date of this license, the licensee must file with the Commission, for approval, a plan to assess the effectiveness of any fish passage facilities or measures required by Articles 011 and 012.

The plan must include, but not be limited to:

(a) a detailed description of the methods that will be used to determine the effectiveness of the eel passage facilities;

(b) a description of how the results will be evaluated, summarized, and reported to the Commission and consulting agencies listed below; and

(c) an implementation schedule.

The licensee must prepare the plan after consultation with the Maine Department of Environmental Protection, Maine Department of Marine Resources, U.S. Department of the Interior, and the National Marine Fisheries Service. The licensee must include with the plan documentation of consultation, including 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 and schedule. 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 016. *Loon Monitoring Plan.* Within six months of the effective date of this license, the licensee must file for Commission approval a Loon Monitoring Plan for the Williams Project.

The plan must include, but need not be limited to:

(a) a description of the methods and schedule for monitoring loon nesting in the project impoundment;

(b) a description of the methods for analyzing and reporting monitoring data;

(c) a schedule for meeting with Maine DIFW and Interior to review loon monitoring efforts at the Williams Project; and

(d) a schedule for filing any monitoring reports summarizing loon nesting activities with Interior, Maine DIFW, and the Commission for review. The initial monitoring report must include, but not be limited to, a summary of the results of the first five years of monitoring and any agency recommendations.

The licensee must prepare the plan after consultation with U.S. Department of the Interior and Maine Department of Inland Fisheries and Wildlife. The licensee must include with the plan documentation of consultation, copies of comments and recommendations to 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 the plan with the Commission. If the licensee does

not adopt a recommendation, the filing must include the licensee's reasons based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 017. *Canoe Portage Trail Improvements.* Within one year of the effective date of this license, the licensee must use gravel to cover the sections of the canoe portage trail where roots are exposed or where foot travel could be difficult.

Draft Article 018. *Recreation Facilities Management Plan*. Within one year of the effective date of this license, the licensee must file a Recreation Facilities Management Plan (RFMP) for Commission approval. The RFMP must include: (a) designs for recreation access signs that that clearly show access routes to project recreation sites, describe the amenities available at each site, and indicate where the signs will be installed; (b) designs and locations for installing safety signs along the portage trail and along the powerhouse access road which describe potential powerhouse and tailrace hazards; and (c) provisions for monitoring recreational access to the project, including the availability of motorized boating access from Evergreens Campground, and measures for reporting any changes or restrictions in access to the Commission, U.S. Department of the Interior (Interior), and the Maine Department of Inland Fisheries and Wildlife (Maine DIFW) as soon as they occur.

The licensee must prepare the plan after consultation with Interior and Maine DIFW. The licensee must include with the plan documentation of consultation, copies of comments and recommendations to 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 the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 019. *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 Maine Historic Preservation Commission (Maine 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 Maine 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 Maine 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 020. *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 Maine 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 Maine 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 Maine 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 021. *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-kiloVolts 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.