ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE

Colliersville Hydroelectric Project
FERC Project No. 2788-017
New York

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

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ACRONYMS AND ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
BMP	best management practices
certification	water quality certification
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
EA	environmental assessment
ESA	Endangered Species Act
^{o}F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
HPMP	historic properties management plan
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Conservation system
mgd	million gallons per day
mg/L	milligrams per liter
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
New York DEC	New York State Department of Environmental Conservation
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act
PA	Programmatic Agreement
REA	Ready for Environmental Analysis
SD	Scoping Document
SRBC	Susquehanna River Basin Commission
USGS	U.S. Geological Survey

ENVIRONMENTAL ASSESSMENT

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

Colliersville Hydroelectric Project
FERC Project No. 2788-017 – New York

1.0 INTRODUCTION

1.1 APPLICATION

On February 27, 2017, Goodyear Lake Hydro, LLC (Goodyear Lake Hydro) filed an application for a subsequent minor license with the Federal Energy Regulatory Commission (Commission or FERC) to continue operating the 1.4875-megawatt (MW) Colliersville Hydroelectric Project No. 2788 (Colliersville Project or project). The project is located on the Susquehanna River, in the Town of Milford, Otsego County, New York. The Colliersville Project generates an average of 5,985 megawatt-hours (MWh) of energy annually. The 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 Colliersville 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 new license for the project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of, damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

This environmental assessment (EA) has been prepared in compliance with the National Environmental Policy Act of 1969 to assess the environmental and economic effects associated with operation of the project, alternatives to the project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued for the project.

In this EA, we assess the environmental and economic effects of: (a) continued project operation as proposed in the application and as specified in the Colliersville Hydroelectric Project Offer of Settlement[1] (Settlement Agreement) (proposed action); (b) the proposed action with additional or modified measures (staff alternative); (c) the staff alternative with mandatory conditions; and (d) no action. The primary issues associated with relicensing the project are the effects of continuing operation on aquatic species and their habitat, eel passage, vegetation and wildlife, recreation, and cultural resources.

[1] On June 14, 2018, Goodyear Lake Hydro filed the Colliersville Hydroelectric Project Offer of Settlement (Settlement Agreement), on behalf of itself, the U.S. Department of the Interior - Fish and Wildlife Service, the New York State Department of Environmental Conservation, and the Susquehanna River Basin Commission.

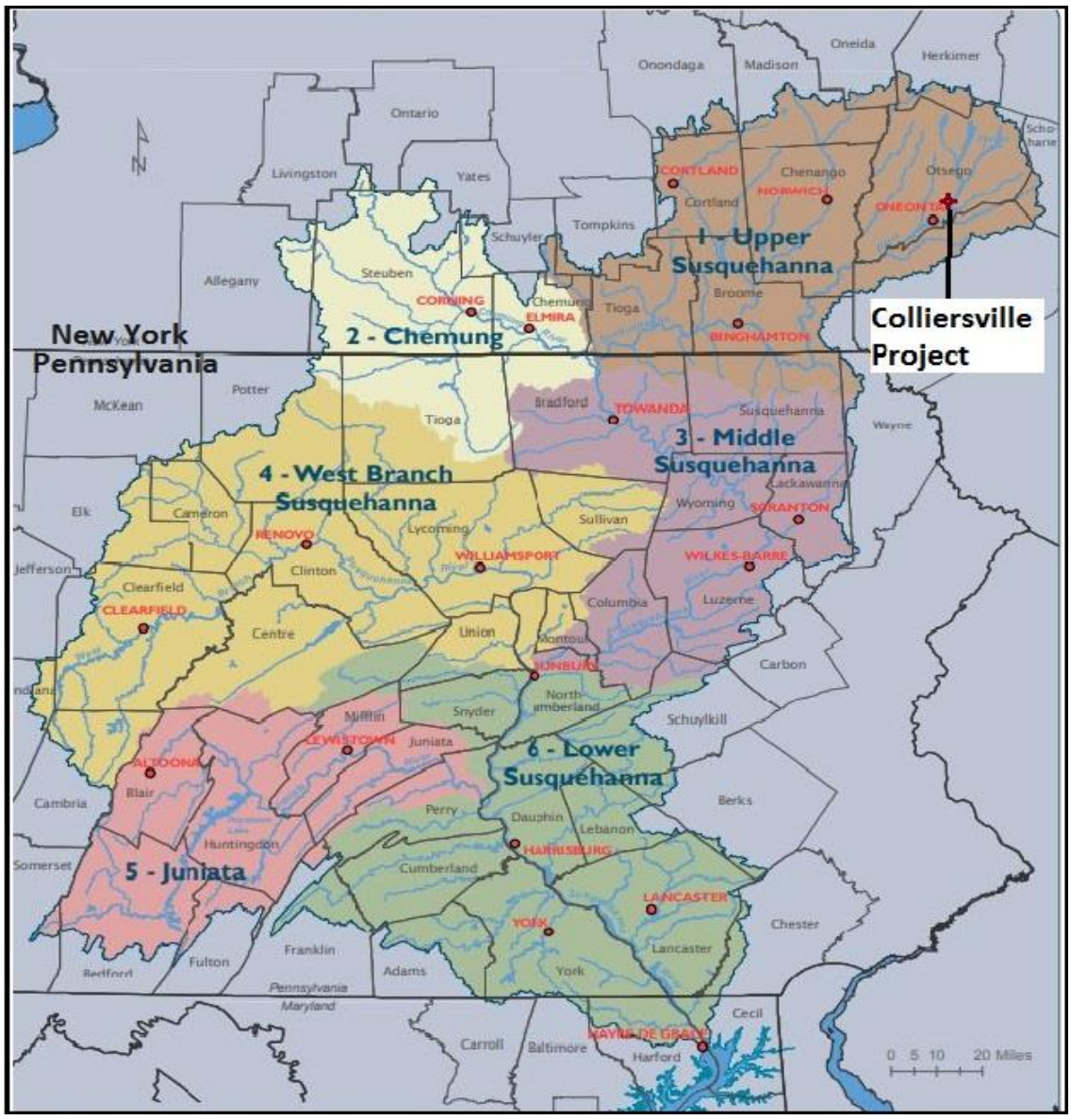

Figure 1: Colliersville Project location in the Susquehanna River Basin (Source: license application, as modified by staff).

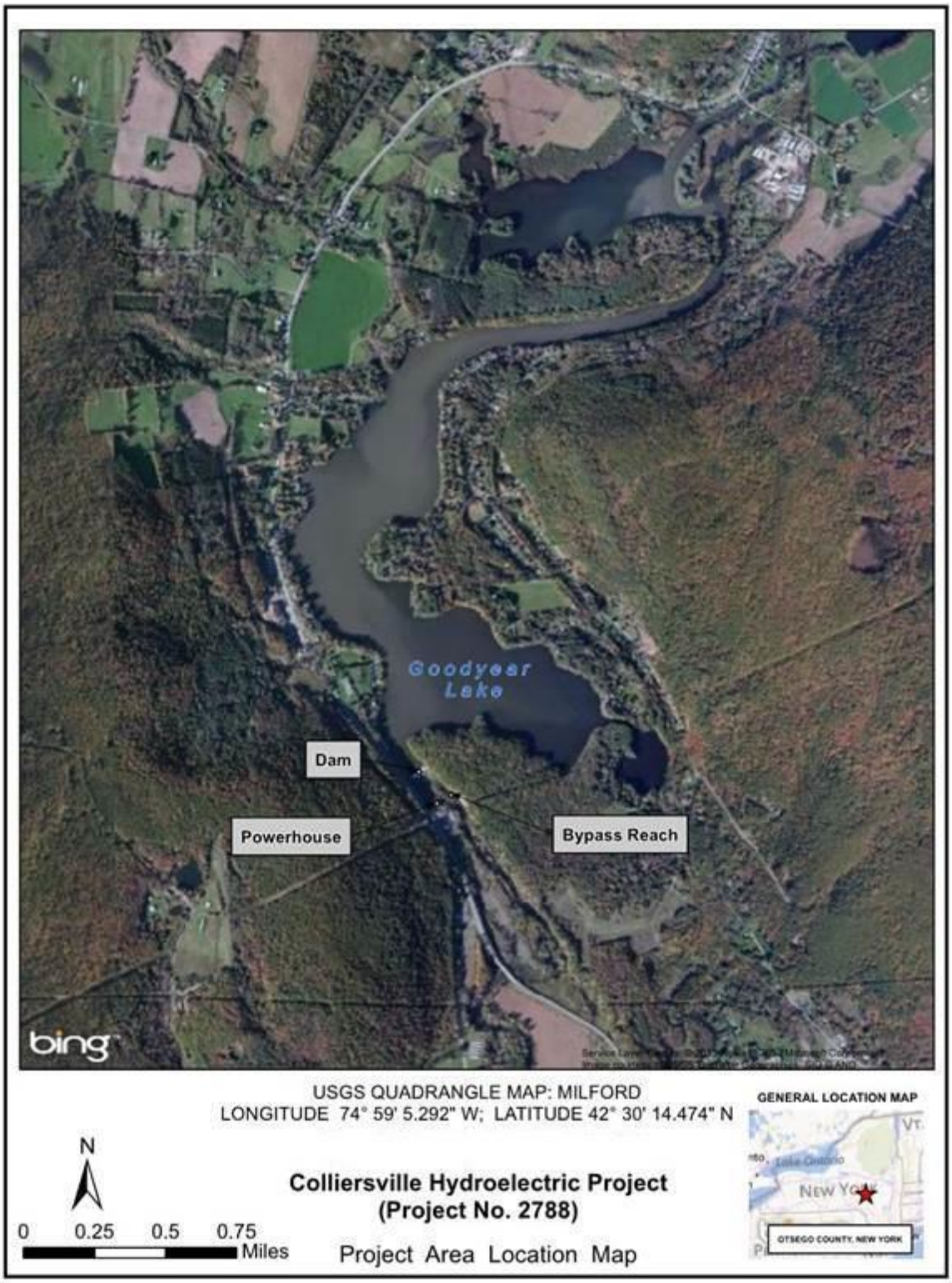

Figure 2: Colliersville Project location and facilities (Source: license application)

1.2.2 Need for Power

The existing Colliersville Project provides hydroelectric generation to meet part of the State of New York's power requirements, resource diversity, and capacity needs. The project has an installed capacity of 1.4875 MW and generates an average of about 5,985 MWh per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Colliersville Project is located in the Northeast Power Coordinating Council (NPCC)-New York region of NERC. According to NERC's 2017 forecast (NERC, 2018), net internal demand is expected to increase from 32,184 MW to 32,504 MW over the period 2018 to 2027. During the same period, summer peak demand in the region is expected to grow at an annual rate of 0.11 percent.

Power generated at the Colliersville Project would help meet a need for power in the NPCC-New York region in both the short- and long-term. The project provides power that displaces generation from non-renewable resources and contributes to a diversified generation mix. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

Any license for the Colliersville Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described in the following sections.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretary of the U.S. Department of Commerce or the Secretary of the U.S. Department of the Interior (Interior). On June 26, 2018, Interior timely filed a preliminary fishway prescription for the project and requested that the Commission include a reservation of authority to prescribe fishways under section 18 in any license issued for the project. Interior's preliminary fishway prescription is consistent with the fishways proposed by Goodyear Lake Hydro, which are summarized in section 2.2.3, *Proposed Environmental Measures*, and included in Appendix A.

1.3.1.2 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and

state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

On June 15, 2018, Interior timely filed recommendations under section 10(j), as summarized in table 7, in section 5.3, *Fish and Wildlife Agency Recommendations.* In section 5.3, we also discuss how we address agency recommendations and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401(a)(1) of the Clean Water Act, a license applicant must obtain either a water quality certification (certification) from the appropriate state pollution control agency verifying that any discharge from a project would comply with applicable provisions of the Clean Water Act, or a waiver of certification by the appropriate state agency. The failure to act on a request for certification within a reasonable period of time, not to exceed one year, after receipt of such request constitutes a waiver.

On June 13, 2018, Goodyear Lake Hydro applied to New York State Department of Environmental Conservation (New York DEC) for a section 401 certification for the Colliersville Project. New York DEC received the application on the same day.[2] New York DEC has not yet acted on the certification request. The certification is due by June 13, 2019.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. On August 29, 2018, Commission staff requested an official species list for the project through the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Conservation (IPaC) system, which indicates that one

[2] The applicant filed a copy of the certification request and receipt of delivery to New York DEC on June 14, 2018.

federally listed species, the threatened northern long-eared bat (*Myotis septentrionalis*), has the potential to occur at the project.[3]

Our analysis of project effects on threatened and endangered species is presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations are included in section 5.1, *Comprehensive Development and Recommended Alternative*. Based on available information, we conclude that relicensing the Colliersville Project, with implementation of the proposed measures in Goodyear Lake Hydro's Northern Long-eared Bat and Bald Eagle Protection Plan (filed as part of the Settlement Agreement), is not likely to adversely affect the northern long-eared bat. By letter filed June 15, 2018, FWS determined that any take that may occur incidental to the Colliersville Project is not prohibited under the final 4(d) rule[4] and that no further ESA coordination or consultation is required.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 United States Code (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 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 6 months of its receipt of the applicant's certification.

In an e-mail dated October 28, 2013, and filed with Goodyear Lake Hydro's license application, the New York State Department of State indicates that the Colliersville Project is not located within New York State's coastal area and that it does not anticipate the need for a consistency review because effects on the coastal area are unlikely.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), 54 U.S.C. § 306108, requires that every federal agency "take into account" how each of

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[3] *See* official species list memorandum, filed August 30, 2018.

[4] On January 14, 2016, FWS issued a final 4(d) rule regarding the northern long-eared bat that prohibits the following activities in areas of the country impacted by white-nose syndrome: incidental take within a hibernation site; tree removal within 0.25 mile of a known, occupied hibernaculum; and cutting or destroying known occupied maternity roost trees, or any other trees within 150 feet of that maternity roost tree, during the pup-rearing season (June 1 through July 31) (FWS, 2016b).

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).

While the Colliersville Project has not been formally evaluated to determine its eligibility for the National Register, it is over 110 years old and its principal facilities appear to retain their integrity in form and function. As such, the project is potentially eligible for listing and, until it has been formally evaluated, should be treated as eligible. Goodyear Lake Hydro's proposed upstream and downstream fish passage facilities, while proposed to be built at previously disturbed locations within the existing project footprint, could alter the characteristics of the project, which could affect an eligible historic property. In addition, although Goodyear Lake Hydro proposes to operate the project in run-of-river mode and, therefore, not affect shoreline resources, maintenance activities, vandalism, and mitigation measures associated with other project resources could cause other adverse effects.

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the operation of the Colliersville Project. The terms of the PA would ensure that Goodyear Lake Hydro addresses and treats any adverse effects to historic properties identified within the Area of Potential Effects (APE) through the development of an historic properties management plan (HPMP).

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [CFR], section 4.38) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, ESA, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. We issued an initial scoping document (SD1) on December 20, 2017. It was noticed in the Federal Register on December 27, 2017. The following entities provided written comments:

Commenting Entity	Date Filed
U.S. Bureau of Indian Affairs	January 12, 2018
FWS	January 19, 2018
Susquehanna River Basin Commission (SRBC)	January 19, 2018
Goodyear Lake Hydro	January 19, 2018
New York DEC	January 24, 2018

A revised scoping document was issued on March 27, 2018.

1.4.2 Interventions

On December 20, 2017, the Commission issued a notice accepting Goodyear Lake Hydro's application for a subsequent minor license for the Colliersville Project. The notice set February 19, 2018, as the deadline for filing motions to intervene and protests and requests for cooperating agency status. The following entities filed notices of intervention or motions to intervene (none in opposition to the project).

Entity	Date Filed
New York DEC	April 28, 2017
SRBC	February 9, 2018
Interior	February 15, 2018

1.4.3 Comments on the License Application

On April 16, 2018, the Commission issued a Ready for Environmental Analysis (REA) notice requesting comments, recommendations, terms and conditions, and prescriptions. On June 14, 2018, Goodyear Lake Hydro filed its Settlement Agreement with the Commission. In order to allow entities sufficient time to review and comment on the REA Notice and Settlement Agreement, the Commission modified the procedural schedule in a June 15, 2018 Notice of Settlement Agreement, Soliciting Comments, and Modification of Procedural Schedule, and set July 5, 2018, as the deadline for comments, recommendations, terms and conditions, and prescriptions. On June 16, 2018, Interior responded. No other entity commented.

Goodyear Lake Hydro filed reply comments on August 17, 2018. In those comments, Goodyear Lake Hydro reiterates that it supports the Settlement Agreement. It also confirms that the proposed protection, mitigation, and enhancement measures provided in the Settlement Agreement supersede those provided in the final license application.

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 to establish baseline environmental conditions for comparison with other alternatives.

2.1.1 Existing Project Facilities and Project Boundary

The Colliersville Project is located on the Susquehanna River in the Town of Milford, Otsego County, New York, and includes project facilities as shown in figure 3.

The Colliersville dam consists of: a 200-foot-long, 35-foot-high, reinforced-concrete, Ambursen-type dam or spillway structure[5] with a crest elevation of 1,150.22 feet;[6] a 50-foot-wide concrete headgate structure located on the west side of the river and adjacent to the spillway, forming the closure with the west bank; and an L-shaped (in plan view), 64-foot-long concrete headwall with 4-foot-high flashboards with one side along the east side of the spillway and the other side parallel to the axis of the dam, and extending approximately 6 to 8 feet above the crest of the dam. The left abutment headwall contains a stepped gabion auxiliary spillway downstream.

The dam impounds Goodyear Lake, a reservoir with a surface area of approximately 364 acres and a gross storage capacity of 7,800 acre-feet at the dam crest elevation of 1,150.22 feet. The reservoir has a maximum depth of 33 feet and an average depth of 14 feet.

The 550-foot-long power canal extends from the headgate structure to the powerhouse. The headgate structure serves as the inlet to the power canal. The canal is 50 feet wide and 12 feet deep at the upstream end (i.e., at the headgate structure), and approximately 100 feet wide and 16 feet deep at its downstream end at the powerhouse. The upstream section of the canal is a raised concrete flume and supported on columns, while the base of the canal near the powerhouse is bedrock over most of its area, except

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[5] A type of "buttress dam" of which the upstream part is a relatively thin flat slab usually made of reinforced concrete. A buttress dam consists of watertight parts supported at intervals on the downstream side by a series of buttresses.

[6] All elevation values are presented in feet above mean sea level, as calculated using the National Geodetic Vertical Datum of 1929.

for a narrow section running parallel to and closest to the river. There are concrete walls on both sides.

The powerhouse is a one-story, reinforced concrete building, 33 feet wide and 103 feet long. It is equipped with trashracks with a clear spacing of 1.5 inches, and houses two turbine-generator units with a total capacity of 1.4875 MW. A bypass flow pipe with a valve is located in the powerhouse that automatically opens when units trip, to maintain a minimum flow downstream of the powerhouse. Water is discharged from the powerhouse and returned to the river through a 300-foot-long by 50- to 60-foot-wide tailrace. The confluence of the tailrace and the bypassed reach is approximately 700 feet below the spillway.

Project power is transmitted through three, approximately 80-foot-long, 4.16-kilovolt underground generator leads that connect the project powerhouse to an adjacent substation owned by the New York State Electric and Gas Corporation.

The existing project boundary of the Colliersville Project encompasses the dam, reservoir, power canal, powerhouse, and canoe portage route. The project boundary is determined using a combination of metes and bounds and contour elevation, and encloses a total of 441 acres. Goodyear Lake Hydro holds title or rights to all lands within the project boundary. There are no project recreation facilities required pursuant to the current license, but Goodyear Lake Hydro owns and maintains a trail on the east side of the project's dam and abutment.

Figure 3: Colliersville Project facilities (Source: Environmental Systems Research Institute and Google Earth, as modified by staff).

2.1.2 Project Safety

The Colliersville Project has been operating for more than 39 years under the existing 1979 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. In addition, the project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review.

As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a subsequent license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term 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 and Environmental Measures

The Colliersville Project is operated in a run-of-river mode, using automatic pond level control, with outflow from the project approximating inflow. Article 27 of the current license requires that the reservoir elevation be maintained at no more than 12 inches below the spillway crest; however, the reservoir is normally maintained at the spillway crest level and has no usable storage capacity. The project is unmanned, but typically visited daily by personnel when the station is generating.

The project has a minimum hydraulic capacity of 75 cubic feet per second (cfs) and a maximum hydraulic capacity of 706 cfs. Flow from Goodyear Lake is diverted into the power canal through the headgate structure and then passes through the powerhouse into the tailrace. Pursuant to Article 27 of the current license, a continuous minimum flow of 20 cfs or inflow to the reservoir, whichever is less, is provided downstream of the project's powerhouse to protect aquatic habitat. When both turbine-generator units are off-line, a valve in the powerhouse automatically opens to maintain the required minimum flow downstream of the powerhouse. When operating, the project diverts flow around a 700-foot-long section (bypassed reach) of the Susquehanna River.

The Colliersville Project experiences substantial seasonal and annual variations in generation based on natural hydrologic conditions in the Upper Susquehanna River Basin. Flows less than the minimum hydraulic capacity (i.e., when the project is offline) are passed over the spillway. During high flows, flows exceeding the maximum hydraulic capacity (706 cfs) are also passed over the spillway. The project is not operated for purposes of flood control.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

As described in the Settlement Agreement, Goodyear Lake Hydro proposes to install new fish passage and protection infrastructure, including up to two American eel ramps for upstream passage, and a downstream fish passage and exclusion structure (trashrack with 0.75-inch clear spacing) that would route fish from the power canal to the upstream end of the bypassed reach.

2.2.2 Proposed Project Operation and Environmental Measures

As described in the Settlement Agreement, Goodyear Lake Hydro proposes the following operation and environmental measures:

Aquatic Resources

- Operate the project in a run-of-river mode and maintain the water surface elevation in the reservoir at no more than 3 inches below the spillway crest to protect aquatic resources (section 3.4.1 of the Settlement Agreement);

- Provide a continuous minimum flow of 20 cfs, or inflow, whichever is less, to the bypassed reach within 5 years of the effective date of any license issued by the Commission to improve water quality and fish habitat in the bypassed reach (section 3.1.1 of the Settlement Agreement);

- Continue to provide a continuous minimum flow of 20 cfs or inflow, whichever is less, downstream of the powerhouse after the effective date of any license issued by the Commission and until the 20-cfs minimum flow can be provided to the bypassed reach, to protect aquatic resources;[7]

- Develop a stream flow and river monitoring plan to ensure compliance with run-of-river operation and verify water levels in the impoundment (section 3.4.1 of the Settlement Agreement);

- Provide a temporary method for upstream American eel passage during the first field season following the effective date of any license issued by the

[7] Although this measure was not included in the Settlement Agreement, we assume Goodyear Lake Hydro intends to maintain the existing 20-cfs minimum flow downstream of the powerhouse as stated in its license application.

Commission until the installation of seasonal eel ramps to facilitate upstream eel passage is completed (section 3.2.1 of the Settlement Agreement);

- Monitor American eel use of the bypassed reach and tailrace to determine the proper location for seasonal eel ramp(s) (section 3.2.1 of the Settlement Agreement);

- Install up to two seasonal eel ramps within 1 year following completion of the eel monitoring described above to facilitate upstream eel passage (section 3.2.1 of the Settlement Agreement);

- Install a downstream fish passage and exclusion structure within 5 years of the effective date of any license issued by the Commission to facilitate the downstream passage of eel and other resident fish (section 3.2.2 of the Settlement Agreement);

- Evaluate the effectiveness of the new downstream fish passage structure, if requested by Interior, New York DEC, and the SRBC, no sooner than 10 years after the effective date of any license issued by the Commission (section 3.2.2 of the Settlement Agreement);

- Develop a fishway operation and maintenance plan that specifies the timing, location, and operation of all fish passage structures to facilitate passage upstream and downstream of the project (section 3.2.3 of the Settlement Agreement); and

- Establish and contribute a total of $30,000 to a river management fund and provide a representative to a river management fund committee (section 4.1 of the Settlement Agreement).[8]

Terrestrial Resources and Threatened and Endangered Species

- Implement the proposed Invasive Plant Species Management Plan filed with the Settlement Agreement; and

[8] The Settlement Agreement identifies the fund and participation in the river fund management committee as additional commitments that are not to be included in any license issued by the Commission and states that the fund "is not intended for [use by] any of the Parties to carry out any obligations under any FERC license or amendment thereto."

- Implement the proposed Northern Long-eared Bat and Bald Eagle Protection Plan filed with the Settlement Agreement.

Recreation, Land Use, and Aesthetics

- Install fencing and signage associated with the canoe portage route that exists on the east side of the dam (section 3.3.1 of the Settlement Agreement).

2.3 MODIFICATIONS TO APPLICANT'S PROPOSAL – MANDATORY CONDITIONS

2.3.1 Section 18 Prescription

Interior's preliminary section 18 prescription would require Goodyear Lake Hydro to provide upstream and downstream passage for American eel as described above in section 2.2.3, and in sections 3.2.1 and 3.2.2 of the Settlement Agreement. In addition to the specific fish passage measures listed above, Interior requests a reservation of authority to prescribe fishways at the project under section 18 of the FPA during the term of any license issued by the Commission.

2.4 STAFF ALTERNATIVE

Under the staff alternative, the project would include Goodyear Lake Hydro's proposed measures, with the exception of a downstream fish passage effectiveness study, and the following staff-recommended additions or modifications:

- Include measures from the applicant's stream flow and river monitoring plan and procedures to ensure a 20-cfs minimum flow is released from the project within an operation compliance monitoring plan;

- Modify the fishway operation and maintenance plan to include procedures for trial operation and testing known as a "shakedown" period, as well as procedures to verify passage of American eel (upstream and downstream) and other resident fish (downstream only); and

- Develop an HPMP.

2.5 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

We recognize that the Commission is required to include all section 18 fishway prescriptions in any license issued for the project. Therefore, the staff alternative with mandatory conditions includes all the measures included in the staff alternative with the addition of a downstream fish passage effectiveness study.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

We considered one alternative[9] to Goodyear Lake Hydro's proposal, retiring the project, but eliminated it from further analysis because it is not a reasonable alternative in the circumstances of this case.

2.6.1 Retiring the Project

As the Commission has previously held, decommissioning is not a reasonable alternative to relicensing a project in most cases, when appropriate protection, mitigation, and enhancement measures are available.[10] The Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to decommission a project, or there are serious resource concerns that cannot be addressed with appropriate measures, making decommissioning a reasonable alternative.[11] This is consistent with NEPA and the Commission's obligation under section 10(a) of the FPA to issue licenses that balance developmental and environmental interests.

[9] Because sections 14 and 15 of the Federal Power Act were waived in the original license issued for the project, neither issuing a non-power license nor federal takeover are applicable alternatives.

[10] *See, e.g., Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Public Utility District No. 1 of Pend Oreille County*, 112 FERC ¶ 61,055, at P 82 (2005); *Midwest Hydro, Inc.*, 111 FERC ¶ 61,327, at PP 35-38 (2005).

[11] *See, generally, Project Decommissioning at Relicensing; Policy Statement*, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994); *see also City of Tacoma, Washington*, 110 FERC ¶ 61,140 (2005) (finding that unless and until the Commission has a specific decommissioning proposal, any further environmental analysis of the effects of project decommissioning would be both premature and speculative).

Project retirement could be accomplished with or without dam removal.[12] Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions.

No participant has recommended project retirement, and we have no basis for recommending it. The power produced by the Colliersville Project would be lost if the project was retired, and replacement power would need to be found. There also could be significant costs associated with retiring the project's powerhouse and appurtenant facilities.

Project retirement without dam removal would involve retaining the dam and disabling or removing equipment used to generate power. Certain project works could remain in place and could be used for historic or other purposes. This approach would require the State of New York to assume regulatory control and supervision of the remaining facilities. However, no participant has advocated this alternative, nor do we have any basis for recommending it. Removing the dams would be more costly than retiring them in place, and removal could have substantial, negative environmental effects.

[12] In the event that the Commission denies relicensing a project or a licensee decides to surrender an existing project, the Commission must approve a surrender "upon such conditions with respect to the disposition of such works as may be determined by the Commission." 18 C.F.R. § 6.2 (2018). This can include simply shutting down the power operations, removing all or parts of the project (including the dam), or restoring the site to its pre-project condition.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area, with historic and current conditions described first. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.1, *Comprehensive Development and Recommended Alternative*.[13]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Colliersville Project is located at river mile 22.4 on the Susquehanna River in Otsego County, New York. The Susquehanna River originates at the outlet of Otsego Lake near Cooperstown, New York and flows 444 river miles to Havre de Grace, Maryland where the river empties into the Chesapeake Bay. The Susquehanna River Basin encompasses 43 percent of the Chesapeake Bay's drainage area and provides approximately 50 percent of the total freshwater flows to the bay. In total, the river basin contains over 49,000 miles of streams and rivers including the Chemung River (46 miles) West Branch Susquehanna River (228 miles), and the Juniata River (86 miles). The basin drains a total area of approximately 27,510 square miles. The drainage area of the Colliersville Project is approximately 349 square miles or 1.3 percent of the total area of the basin.

The Susquehanna River Basin is composed of six major subbasins. The Colliersville Project is located in the Upper Susquehanna Subbasin, which includes the area from the headwaters to the confluence of the Susquehanna and Chemung rivers near Athens, Pennsylvania. The Upper Susquehanna Subbasin, and more than half of the entire Susquehanna River Basin, lies within the Appalachian Plateau Physiographic Province. This region is characterized by high, flat-topped hills and deep valleys cut by the Susquehanna River and its tributaries. The Upper Susquehanna Subbasin is generally composed of forestland (60 percent) and agricultural land (36 percent) with sparse

[13] Unless noted otherwise, the sources of our information are the pre-application document filed on February 28, 2014, license application filed February 27, 2017, additional information filed by Goodyear Lake Hydro on August 16, 2017, and March 29, 2018, and the Settlement Agreement.

population density and only one large urban center, the City of Binghamton located at the confluence of the Chenango and Susquehanna rivers.

The southern portion of the Susquehanna River Basin lies within the Valley and Ridge, Blue Ridge, and Piedmont provinces. The Valley and Ridge Province is a mountainous region with forested ridges 500 to 1,600 feet above the surrounding agricultural-dominated valleys and covers approximately one-third of the basin. The Blue Ridge and Piedmont provinces within the basin contain lands of relatively lower relief. The low rounded hills and open valleys of the Piedmont allows a denser and more even population distribution compared to the more mountainous parts of the basin.

The Susquehanna River Basin is the second largest drainage east of the Mississippi River and over 700 dams and water diversions exist along its many rivers and streams. The U.S. Army Corps of Engineers constructed and continues to maintain 13 flood control dams throughout the basin, though none are located on the mainstem of the Susquehanna River. Several large hydroelectric dams exist in the basin, and there are four of these dams on the mainstem of the Susquehanna River located more than 360 miles downstream of the Colliersville Project. These projects, listed in order from most-upstream to most-downstream, include York Haven (P-1888), Safe Harbor (P-1025), Holtwood (P-1881), and Conowingo (P-405), all of which are equipped with fish passage facilities.

Non-hydroelectric dams on the mainstem of the Susquehanna River include the Dock Street dam in Harrisburg, Pennsylvania, and the inflatable Adam T. Bower Memorial dam near Sunbury, Pennsylvania. In the Upper Susquehanna River Subbasin, other non-hydroelectric dams on the Susquehanna River downstream from the Colliersville Project include the Southside dam in Oneonta, New York, Oakland dam near Susquehanna, Pennsylvania, and Rock Bottom dam in Binghamton, New York. In addition, the Mill Street dam in Cooperstown, New York, is located approximately 22 miles upstream of the Colliersville Project and less than 1 mile downstream from the outlet of Otsego Lake.

The Susquehanna River Basin has a continental climate, with additional moisture periodically entering the basin from the Gulf of Mexico and the Atlantic Ocean. Average annual precipitation is about 41 inches in the northern part of the basin to 43 inches in the southern part of the basin. In extreme years, more than 50 inches of rainfall has been recorded in various locations throughout the basin and a record total of 73.73 inches of rainfall was recorded at Harrisburg, Pennsylvania in 2011. Average annual temperature in the basin ranges from 47 degrees Fahrenheit (°F) in the northern part of the basin to 50 °F in the southern part. Extremes of 107 °F and -39 °F have been recorded in the basin (SRBC, 2013). Temperature near the Colliersville Project, at the City of Oneonta, ranges from an average low of 11 °F to an average high of 30 °F in January, the coldest month, and 55 to 78 °F in July, the warmest month (U.S. Climate Data, 2018).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

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

Based on our review of the license applications and agency and public comments, we identified water quantity and quality and American eel as resources that may be cumulatively affected by the proposed operation and maintenance of the Colliersville Project.

3.2.1 Geographic Scope

Our geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of the proposed action's effect on the resources, and contributing effects from other hydropower and non-hydropower activities within the Susquehanna River Basin.

The geographic scope for water quantity and quality includes the Susquehanna River Basin upstream of the Colliersville Project to the confluence with the Chenango River, located approximately 100 miles downstream of the Colliersville Project. We chose this geographic scope because the operation of the Colliersville Project, in combination with other developments and land use within the Susquehanna River Basin, may cumulatively effect water quantity and quality in this reach of the Susquehanna River. Potential project effects on water resources attenuate downstream of the project and would be indiscernible downstream of the confluence with the Chenango River.

The geographic scope for American eel includes the entire Susquehanna River Basin. We chose this geographic scope because the operation and maintenance of the Colliersville Project, in combination with other dams and hydroelectric projects (described in section 3.1, *General Description of the River Basin*) in the Susquehanna River Basin, may cumulatively affect American eel migration and habitat access.

3.2.2 Temporal Scope

The temporal scope of our cumulative effects analysis in the EA will include a discussion of past, present, and reasonably foreseeable future actions and their effects on water quantity and quality and American eel. Based on the potential term of any license issued, the temporal scope will look 30 to 50 years into the future, concentrating on the

effects on the resources from reasonably foreseeable future actions. The historical discussion will, by necessity, be limited to the amount of available information for each resource. The quality and quantity of information, however, diminishes as we analyze resources further away in time from the present. We identified the present resource conditions based on the license application, agency comments, comprehensive plans, and publically available information as cited herein.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the site-specific and cumulative environmental issues. Finally, we present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

Only the resources that have the potential to be affected are addressed in this EA. Based on this, we have determined that aquatic resources, terrestrial resources, recreation, and cultural resources may be affected by the proposed action and action alternatives. In SD1, we identified that geology and soil resources, including soil stability and sediment transport, may be affected as a result of construction and operation of the downstream fishway. However, Goodyear Lake Hydro proposes to construct the fishway in the upstream end of the power canal. The power canal is an elevated concrete flume with no soils near its base at the upstream end of the canal and it draws water from the top 6 feet of the reservoir where little suspended sediment would occur. As such, the proposed construction and operation of the downstream fishway would not likely affect geology and soil resources at the project. Therefore, geology and soil resources are not discussed in the EA.

3.3.1 Aquatic Resources

3.3.1.1 Affected Environment

Water Quantity

As described above in section 3.1, the drainage area of the Colliersville Project is 349 square miles and makes up a small portion (1.3 percent) of the Susquehanna River Basin. Eight tributaries empty into Goodyear Lake, and Spring Brook (7.3 miles long) is the largest. The majority of flow through the Colliersville Project is a direct result of the annual hydrologic cycle. The lowest flow period occurs during the summer and early fall, July through October, and higher flows occur during the wetter winter months and during the spring runoff. There is no active stream gage at the Colliersville Project, but table 1 shows monthly and annual flow estimates at the Colliersville Project that were calculated using the ratio of the drainage area at the project to the drainage area of the

U.S. Geological Survey Gage No. 01500500 on the Susquehanna River at Unadilla, New York.

Table 1: Estimated mean, minimum, maximum, 10 percent, and 90 percent exceedance flows for the Colliersville Project from January 1991 to October 2016 (Source: license application, as modified by staff).

Month	Mean Flow (cfs)	Minimum Flow (cfs)	Maximum Flow (cfs)	10 Percent Exceedance (cfs)	90 Percent Exceedance (cfs)
January	918	174	7,321	1,736	276
February	568	149	3,497	1,101	193
March	1,174	114	6,930	2,570	314
April	1,500	310	6,362	2,985	540
May	681	127	3,909	1,400	231
June	473	52	11,266	1,008	125
July	384	44	4,585	942	66
August	294	30	3,369	595	49
September	330	24	9,631	668	48
October	382	38	3,312	944	64
November	675	63	2,559	1,297	168
December	831	232	3,241	1,428	347
Annual	700	24	11,266	1,545	106

The Colliersville Project impounds Goodyear Lake, a reservoir with a surface area of approximately 364 acres at a normal maximum reservoir elevation of 1,150.22 feet. Goodyear Lake has a maximum depth of 33 feet, an average depth of 14 feet, and an estimated gross storage capacity of 7,800 acre-feet. Pursuant to the existing license, Goodyear Lake Hydro must maintain the reservoir elevation at no more than 12 inches below the spillway crest. However, this provision is rarely used and Goodyear Lake Hydro typically maintains the reservoir elevation at the spillway crest unless flows are over the hydraulic capacity of the powerhouse. As such, the project has no usable storage capacity and operates in run-of-river mode, where outflow from the project approximates inflow to the reservoir. The project operates between a minimum hydraulic capacity of 75 cfs to maximum hydraulic capacity 706 cfs, spilling flow in excess of 706 cfs over the dam. Flows less than 75 cfs are also spilled over the dam.

When flows are within the hydraulic capacity of the project, water is diverted through the power canal and powerhouse, resulting in a 700-foot-long bypassed reach between the dam and the tailrace of the powerhouse. The bypassed reach has no

minimum flow requirement but a small amount of leakage flow and upwelling of groundwater provide enough water to maintain some aquatic habitat.

Downstream of the powerhouse, Goodyear Lake Hydro must maintain a minimum flow of 20 cfs in accordance with its existing license. Typically this flow requirement is exceeded by generation flows and/or flows spilled over the dam. If reservoir levels are below the spillway crest and the turbines trip offline, a valve within the powerhouse automatically opens and releases 20 cfs through a pipe into the tailrace.

Water Withdrawals

Four surface water withdrawals from the Susquehanna River are located in the vicinity of the project. Upstream of the project, the Village of Cooperstown maintains a water withdrawal for public water supply at the outlet of Otsego Lake. The Village withdraws an average of 0.48 million gallons per day (mgd), but has withdrawn as much as 0.98 mgd. The Cooperstown Dreams Park, a youth baseball complex located 11 river miles upstream of the project, maintains a recreational surface water withdrawal that averages 0.05 mgd with a maximum of 0.15 mgd. Cobleskill Stone Products maintains a maximum water withdrawal of 0.4 mgd approximately 3.5 miles downstream of the project at its Broe Pit facility. Farther downstream, the City of Oneonta maintains a groundwater and surface water withdrawal with a maximum limit of 2.2 mgd.

Water Discharges

The Village of Cooperstown Wastewater Treatment Facility, located upstream of the project, has the capacity to discharge 0.52 mgd (NYSERDA, 2007). The City of Oneonta Wastewater Treatment Plant, located approximately 8 miles downstream of the project, has the capacity to discharge 4.0 mgd (Oneonta, 2018).

Water Quality

Numerous groups, including New York DEC, SRBC, and the State University of New York College at Oneonta (SUNY Oneonta) have collected a variety of water quality data in Goodyear Lake, the Susquehanna River, and nearby streams in the local watershed. Most of this data has been collected in the last two decades, but some information is available from as early as the 1930s. Based on this historical data, water quality in the vicinity of the project has always been adequate to maintain fish and other aquatic resources.

Goodyear Lake is a naturally eutrophic, or highly productive, reservoir and dense algal blooms have always occurred. Seasonal stratification of the lake is well documented and dissolved oxygen concentrations in deep water (deeper than 18 feet) during the summer are typically too low to sustain fish. Nutrient loading (i.e., the amount of nutrients entering the water over a selected period of time), likely from a combination

of agricultural activity, public wastewater discharges, and private septic discharges, has contributed to some water quality impacts within and downstream of Goodyear Lake. In addition, some mercury contamination, likely from atmospheric deposition, has been identified in fish from Goodyear Lake.

Macroinvertebrates have also been used to characterize water quality in the vicinity of the project. Macroinvertebrates vary in their ability to tolerate environmental stress and, as such, are used to assess water quality. New York DEC evaluated benthic macroinvertebrates in the Susquehanna River approximately 0.75 mile downstream of the project on three occasions in the 1990s using a biological assessment profile,[14] and determined water quality in this portion of the Susquehanna was "slightly impacted." In 2003, New York DEC evaluated the macroinvertebrate community in the Susquehanna River at Oneonta and Unadilla, New York, and determined that water quality at these locations was "non-impacted" (Bode et al., 2004).

In 2004, New York DEC conducted similar macroinvertebrate evaluations upstream of the project on the Susquehanna River, immediately downstream of the Oaks Creek confluence (approximately 4 miles downstream from Otsego Lake), and determined that water quality was "slightly impacted" and "fully supported" aquatic life (New York DEC, 2009). Additional water quality and macroinvertebrate monitoring completed at several sites within the basin upstream of the project in 1998, 2007, and 2013 indicates that water quality is generally good and has improved slightly in recent decades (Campbell, 2014).

Currently, water quality within the New York State portion of the Susquehanna River Basin generally ranges from satisfactory to very good. The Colliersville Project is located within a segment of the Susquehanna River that extends from the New York-Pennsylvania state line south of Windsor, New York to Otsego Lake and is classified as Class B Fresh Surface Waters by the State of New York. The best uses of Class B waters are primary and secondary contact recreation, fishing, and fish propagation and survival. The dissolved oxygen concentration for Class B non-trout waters must not be less than a daily average of 5.0 milligrams per liter (mg/L) or 4.0 mg/L at any time.

Water Quality Monitoring

In support of its license application, Goodyear Lake Hydro conducted a water quality study that included continuous dissolved oxygen (July 30 through October 1) and

[14] The biological assessment profile is a standardized multimetric index that New York DEC uses to evaluate water quality. There are a total of four descriptive water quality impact categories including non-impacted, slightly impacted, moderately impacted, and severely impacted.

temperature (June 1 through October 31) monitoring of the project's reservoir, bypassed reach, tailrace, and Susquehanna River downstream of the project in 2015. In addition, discrete water quality data (water temperature, dissolved oxygen concentration, pH, and specific conductance) were collected in conjunction with other studies. Furthermore, Goodyear Lake Hydro conducted a macroinvertebrate study to assist in evaluating project impacts on water quality.

Dissolved Oxygen

Continuous monitoring showed that dissolved oxygen concentrations typically met or exceeded the levels stipulated by New York State's water quality standards within the impoundment, tailrace, and downstream of the project. In the tailrace, dissolved oxygen levels were consistently between 5.0 mg/L and 8.0 mg/L with little diurnal variability. In the Susquehanna River approximately 1.2 miles downstream of the project, dissolved oxygen levels typically ranged from 5.0 mg/L to 10.0 mg/L. Dissolved oxygen concentrations in the impoundment (at a depth of 10 feet) occasionally fell below 4.0 mg/L and approached 0.0 mg/L on a few dates in late August to mid-September. In the bypassed reach, dissolved oxygen levels frequently fell below those levels stipulated by the state standards throughout the study period and were usually below 4.0 mg/L from late August to late September. Discrete dissolved oxygen data collected throughout the summer were consistent with the continuous data described above.

Other Water Quality Parameters

Goodyear Lake Hydro continuously monitored temperature within and downstream of the project boundary at the same sites as described above. All locations showed similar temperature results with the warmest period occurring in the month of August with temperatures around 75 °F at all sites. Diurnal variation was less pronounced in the impoundment, tailrace, and pool immediately downstream of the dam. In the bypassed reach and river downstream of the project, temperature varied approximately 5 to 10 °F per day. Discrete measurements of pH met the numeric values stipulated by the state standards and ranged from 7.37 to 8.48, and specific conductance was typically between 244 to 291 microsiemens per centimeter, which is consistent with historical measurements collected upstream of the project (Angell, 2017).

Macroinvertebrates

Goodyear Lake Hydro collected macroinvertebrates using a semi-quantitative kick-net method commonly used by New York DEC. Samples were collected within the bypassed reach (site 1), an area immediately downstream of the tailrace (site 2), and a site approximately 0.8 mile downstream from the project (site 3). In general, species richness was relatively low and there were few pollutant-intolerant taxa observed at each site. The macroinvertebrate communities were unbalanced across taxa with site 1 being dominated by sowbugs and scuds; whereas sites 2 and 3 were dominated by flatworms.

Macroinvertebrates from site 2 were evaluated using New York DEC's biological assessment profile, which indicated that water quality was moderately to severely impacted. However, biologists noted that zebra mussels were abundant at the sites, especially sites 1 and 2, which may have affected the macroinvertebrate community. Site 3 had the greatest species richness, including a greater number of pollution-intolerant species.

Aquatic Habitat

Impoundment

As described above, Goodyear Lake is 364 acres and has an average depth of 14 feet. The reservoir is approximately 2 miles long and the total shoreline length is about 10.2 miles (Stroonsnyder, 2017). The land adjacent to Goodyear Lake is a mosaic of residential development, agricultural fields, and woodlands. Trees and underlying shrubs dominate the shoreline and large boulders and exposed bedrock are uncommon. The northern portion of the reservoir consists of a low sloping littoral zone with shallow water habitat, while steeper banks and deep water habitat is characteristic of the southern portion of the reservoir.

While some streambank erosion may be natural, uncontrolled livestock access to streams and other agricultural activities have exacerbated erosion in some areas upstream of Goodyear Lake. As a result, sediment has been transported to and deposited in Goodyear Lake, which may have filled in some areas of the reservoir. The northern end of the reservoir is characterized by fine substrate, has a muddy littoral zone, and a high density of vegetation. In the southern end of the reservoir, the littoral zone is rocky with some aquatic macrophytes growing near shore.

Bypassed Reach and Tailrace

Goodyear Lake Hydro conducted a bypass and base flow study from 2015 to 2016. The study included mesohabitat mapping of the bypassed reach and a general characterization of habitat in the project's tailrace and river downstream of the project to its confluence with Schenevus Creek, approximately 1.8 miles downstream.

The bypassed reach mostly consists of pool and glide habitat with large substrate. A large pool exists immediately below the dam, which then steps down into a second pool. This pool transitions into shallow glide habitat before entering a third pool, the lower pool, which meets the tailrace of the project. When the project is operating, flow from the powerhouse has a backwater effect on the lower pool in the bypassed reach. Bedrock, boulders, and cobbles are common throughout the bypassed reach and zebra mussels are abundant in all habitat types. A map and photos of different habitats within the bypassed reach is available in Appendix B of the license application.

When the powerhouse is operating at its minimum hydraulic capacity, flow in the tailrace is about 75 cfs. At this flow, water depth in the tailrace ranges from 2 to 5 feet, and nearly the entire channel width is wetted. Substrate in the tailrace is dominated by bedrock shards, cobbles, and some gravel. The banks of the tailrace are stable and consist of hard substrates with scrub-shrub vegetation.

Susquehanna River Downstream of Project

At the confluence of the bypassed reach and tailrace, the river forms a large run ranging from 2 to 4 feet deep. Substrates at the confluence of the bypassed reach and tailrace consist primarily of bedrock, loose shards of bedrock, and mixed cobble, gravel and finer substrates. Zebra mussels also form a dominant feature of the substrate at this location. The mainstem of the Susquehanna River to Schenevus Creek is best described as a slow meandering river with several run-riffle-pool complexes. Sand and silt are more abundant in this section of the river relative to the bypassed reach. Finer substrates along with cobbles, boulders, and zebra mussels dominate the substrate in this reach. Large woody debris is also present throughout the reach.

Fishery Resources

The Susquehanna River once supported large numbers of migratory fish, including American shad, blueback herring, alewife, hickory shad, striped bass, Atlantic sturgeon, shortnose sturgeon, and American eel. Historically, American shad and blueback herring ranged at least as far upstream as Binghamton, New York, though most species of migratory fish utilized habitat farther downstream in the basin. American eel was once common throughout the Susquehanna River Basin, but are now considered to be a depleted stock (SRAFRC, 2010; SRAFRC, 2013).

Migratory fish stocks in the Susquehanna River have been severely impacted by human activities, especially dam building. Migratory fish populations declined in the late 1800s and early 1900s because of the construction of canal feeder dams (no longer present), overfishing, water pollution, and eventually the construction of the four major hydroelectric dams on the lower Susquehanna River. In 1928, the 95-foot-high Conowingo dam was constructed without fish passage facilities 10 river miles upstream from the Chesapeake Bay. Conowingo dam became the downstream-most obstruction to upstream fish migration on the river (FERC, 2015a).

Beginning in the 1950s, resource agencies implemented a program to restore access for migratory fish to the upper Susquehanna River Basin; however, this effort focused on American shad (SRBC, 2013). In 1972, a trap and truck facility (the west fish lift) was constructed at Conowingo dam. In 1991, a permanent fish lift (east fish lift) was constructed at the Conowingo Project, followed by new fish lifts at the Safe Harbor and Holtwood projects in 1997. In addition, the York Haven Project east channel vertical slot fishway became operational in 2000 (FERC, 2015a). Improvements to the fish lift at

Holtwood dam were completed in 2013 (FERC, 2015a) and a nature-like fishway is currently being designed for the York Haven Project, with construction anticipated in 2020.[15] As a result of the modifications at the four major dams downstream of Harrisburg, Pennsylvania, the lower Susquehanna River and much of the Juniata River have been opened to migratory fish passage. Other recreational dams and older hydroelectric dams located between the Colliersville Project and York Haven may slow upstream migration of American eel and other fishes, but these smaller dams are not complete barriers to fish migration. In addition, the removal of small dams on tributary streams and modifications of other small dams for fish passage are other actions that have taken place throughout the basin (SRBC, 2013).

American Eel

American eel, a catadromous species,[16] spends most of its life in fresh or brackish water before migrating to the Sargasso Sea to spawn. Once they hatch, ribbon-like larval eels are transported throughout the eastern seaboard via ocean currents. By the time the year-long journey to the coast is over, larvae have matured into the "glass eel" phase, are completely transparent, have developed fins, and have taken on the overall shape of the adults. After swimming into continental waters, the glass eels mature into "elvers," at which time they take on a greenish brown to gray pigmentation and grow beyond 10 centimeters (cm) in length. Elvers migrate upstream into estuarine and riverine environments, where they develop into "yellow eels." Yellow eels have a yellowish green to olive coloration and will typically remain in this stage for 3 to 20 years before reaching the final stage of maturity. Some yellow eels may stay within a discrete home range, but others migrate upstream where there may be fewer eels, less competition, and greater opportunity for eel growth. Yellow eels typically move upstream at night, with peak migration usually occurring during the summer months. Eels may begin reaching sexual maturity at 25 cm in length and become darker on the dorsal side and silvery or white on the ventral side. This "silver eel" stage continues to grow as they complete their sexual maturation with males reaching 40 cm and females reaching 150 cm in length. Silver eels migrate downstream in the fall and winter months and return to their spawning grounds where they die after spawning is complete (Reily and Minkkinen, 2016; Shepard, 2015).

Juvenile American eels were intermittently collected below Conowingo dam by the Pennsylvania Fish and Boat Commission and transported upstream between 1936 and

[15] August 30, 2018 letter, filed by York Haven Power Company, LLC, under P-1888 providing a status update on the nature-like fishway.

[16] A catadromous fish spends most of its life in freshwater and migrates to saltwater to spawn.

1980. Approximately 17 million immature eels were transported, including both elvers and yellow phase eels (SRAFRC, 2010). From 2005 to 2016, the FWS collected over 800,000 American eel elvers at the base of Conowingo dam and distributed them at more than 40 locations throughout the basin. The closest stocking site to the Colliersville Project was located upstream of the confluence with the Chemung River (Reily and Minkkinen, 2016). Since 2016, Exelon Generation Company, LLC, (Exelon) the licensee of the Conowingo Project, has continued to collect American eel and release these fish upstream of the Conowingo Project. This program will continue through at least 2030, after which a new volitional eel passage structure could be installed at the Conowingo Project. If a volitional eel passage structure is constructed, the eel trap and transport program could continue, though Exelon would not conduct the program (FERC, 2015b). In 2017, Exelon stocked over 100,000 eels in the Susquehanna River upstream of the York Haven Project, near Goldsboro, Pennsylvania (Exelon, 2018).

In its comments on SD1, New York DEC indicated that no eels are currently stocked in New York, but that future stocking efforts are being considered. New York DEC also acknowledged that eels are reaching New York waters as a result of the recent eel stocking efforts in Pennsylvania and confirmed that its staff has collected eels at the base of the Colliersville Project. In its preliminary section 18 fishway prescription, Interior noted that stocking efforts in 2018 would include transporting juvenile eels to the Great Bend, Pennsylvania portion of the Susquehanna River, approximately 85 miles downstream of the project.

In support of its license application, Goodyear Lake Hydro conducted a fish survey downstream of the project in late summer/early fall of 2015 and documented the presence of four American eels, with one individual in the tailrace and three eels in the bypassed reach. In July of 2018, interns conducting a fisheries survey of the Susquehanna River upstream of the project near the base of Mill Street dam collected a single 12-inch-long American eel (SUNY, 2018). In 1935 and 1980, New York DEC collected American eel during routine fish surveys in Goodyear Lake.

Fish Community

Susquehanna River

From its origin at Otsego Lake down to where it first enters Pennsylvania near Great Bend, Pennsylvania, the Susquehanna River fishery is dominated primarily by smallmouth bass and walleye along with rock bass. Yellow perch, sunfish, and bullhead are also present but generally not in great numbers. The fishery downstream of Great

Bend is more diverse and muskellunge, tiger muskellunge,[17] and channel catfish, along with the species mentioned above, are much more common, particularly downstream of the junction with the Chenango River (New York DEC, 2018a).

Upstream of Goodyear Lake, SUNY Oneonta surveyed the fish assemblage at three locations in the Susquehanna River via electrofishing in 2009. A total of 22 fish species, of which 10 cyprinid species were collected, including longnose dace, the most abundant species observed during the survey. Rock bass, pumpkinseed, and largemouth bass were abundant below the Mill Street dam, but few smallmouth bass and no walleye were collected.

Downstream of the project, Goodyear Lake Hydro electroshocked (backpack or boat) 13 segments of the Susquehanna River between the base of the dam and the confluence with Schenevus Creek in 2015. A total of 27 resident species were collected, with 23 resident species collected within the bypassed reach. Similar to SUNY Oneonta's survey results, a variety of fish, including many cyprinid species, were present downstream of the project. The most common species collected downstream of the project included white sucker, fallfish, yellow perch, common shiner, tessellated darter, smallmouth bass, and various sunfish species. Smallmouth bass and rock bass were the most widely distributed game species and were documented at nearly every survey location. Few largemouth bass were observed throughout the study area, and walleye were documented in the bypassed reach pool immediately below the dam. Overall, the fish community is diverse in the project area with an abundance of both game and forage species. Furthermore, all size classes of most game species were observed, indicating successful recruitment is occurring downstream of the project.

Goodyear Lake Hydro also conducted visual walleye spawning surveys in the project's tailrace and bypassed reach on three dates in middle to late March 2016. Four walleye were observed in the bypassed reach on one occasion, suggesting that walleye may spawn in the bypassed reach. Survey conditions were not ideal on the other dates because of high flows and poor water clarity.

Goodyear Lake

Goodyear Lake is a popular warm water fishery and supports fair to good numbers and desirable size classes of various game fish, including walleye, largemouth bass,

[17] A tiger muskellunge is the hybrid offspring of a muskellunge (*Esox masquinongy*) and a northern pike (*Esox lucius*).

smallmouth bass, bluegill, and yellow perch. Historically, New York DEC stocked Goodyear Lake with various game fish, but no stocking has occurred since 1961.

New York DEC surveyed the fish community in Goodyear Lake using a variety of methodologies (electrofishing, gill netting, trap netting, seining, and angling) on six occasions since 1935 with the latest surveys in 1980 and 2004. In 2013, staff from SUNY Oneonta conducted an additional boat electrofishing fish survey of Goodyear Lake (Stroonsnyder, 2017). Table 2 identifies all fish species collected during the surveys.

Table 2: Fish species collected in Goodyear Lake by New York DEC (1935-2004) and SUNY Oneonta (2013) (Source: license application, as modified by staff).

Common Name	Scientific Name	1935	1961	1970	1980	2004	2013
American eel	*Anguilla rostrata*	X			X		
Alewife	*Alosa pseudoharengus*					X	
Lake whitefish	*Coregonus clupeaformis*		X				
Common carp	*Cyprinus carpio*	X		X	X	X	X
Cutlips minnow	*Exoglossum maxillingua*	X					
Common shiner	*Luxilus cornutus*	X					
River chub	*Nocomis micropogan*	X					
Emerald shiner	*Notropis atherinoides*						X
Golden shiner	*Notemigonus crysoleucas*	X	X		X	X	X
Comely shiner	*Notropis anoenus*	X					
Spottail shiner	*Notropis hudsonius*	X				X	X
Bluntnose minnow	*Pimephales notatus*	X			X	X	
Eastern blacknose dace	*Rhinichthys atratulus*	X					
Longnose dace	*Rhinichthys cataractae*	X					
Creek chub	*Semotilus atromaculatus*	X					
Fallfish	*Semotilus corporalis*	X					
White sucker	*Catostomus commersoni*	X	X	X	X	X	X
Creek chubsucker	*Erimyson oblongus*	X			X		
Northern hogsucker	*Hypentilium nigricans*	X	X		X	X	
Shorthead redhorse	*Moxostoma macrolepidotum*	X	X		X	X	X
Yellow bullhead	*Ameiurus natalis*		X		X		X
Brown bullhead	*Ameiurus nebulosus*	X	X		X	X	X
Chain pickerel	*Esox niger*	X		X	X	X	X
Banded killifish	*Fundulus diaphanus*	X					

Mottled sculpin	*Cottus bairdii*	*X*					
Rock bass	*Ambloplites rupestris*	*X*	*X*		*X*	*X*	*X*
Redbreast sunfish	*Lepomis auritus*	*X*	*X*		*X*	*X*	*X*
Pumpkinseed	*Lepomis gibbosus*	*X*	*X*	*X*	*X*	*X*	*X*
Bluegill	*Lepomis macrochirus*	*X*	*X*	*X*	*X*	*X*	*X*
Smallmouth bass	*Micropterus dolomieu*	*X*	*X*	*X*	*X*	*X*	*X*
Largemouth bass	*Micropteris salmoides*	*X*	*X*	*X*	*X*	*X*	*X*
Black crappie	*Pomoxis nigromaculatus*	*X*	*X*		*X*	*X*	*X*
Tesselated darter	*Etheostoma olmstedi*	*X*			*X*	*X*	*X*
Yellow perch	*Perca flavescens*	*X*	*X*	*X*	*X*	*X*	*X*
Walleye	*Sander vitreus*	*X*	*X*	*X*	*X*	*X*	*X*

While fewer species were detected in more recent surveys compared to the survey in 1935, differences in survey methodology and sampling effort are likely responsible for differences in species because these species were documented in the recent surveys upstream and downstream of Goodyear Lake. Alewife were introduced into Lake Otsego in 1986, and were documented in Goodyear Lake in 2001. One goal of the 2004 survey was to provide an initial estimate of the alewife population in Goodyear Lake so that future studies could track their population. Only four alewife were collected in 2004 and no alewife were collected in 2013.

Macroinvertebrates and Mussels

Macroinvertebrates are an important component of aquatic ecosystems. Not only are they an important food resource for fish, but macroinvertebrates are also important to a variety of instream processes, such as the breakdown of organic matter, and are useful as water quality indicators. Typically, a diverse, well-balanced macroinvertebrate community is indicative of a healthy stream ecosystem.

As described previously, Goodyear Lake Hydro conducted macroinvertebrate surveys in the bypassed reach (site 1), immediately downstream of the tailrace (site 2), and 0.8 mile downstream of the project (site 3). Goodyear Lake Hydro collected three samples per site and examined the community using standard indices. Sites 1 and 2 were similar with 9 to 13 total taxa with only 1 or 2 EPT taxa[18] present in each sample. At site 3, 17 to 20 taxa were documented with 5 to 6 EPT taxa present in each sample. A

[18] EPT taxa include mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddis flies (Trichoptera). These are considered mostly clean-water organisms and their presence is associated with good water quality.

single species (sowbugs or scuds) dominated 91 to 94 percent of the samples at sites 1 and 2, while flatworms dominated between 60 and 80 percent of the samples at site 3.

Goodyear Lake Hydro also conducted qualitative timed searches (1 to 2 hours per site) for mussels downstream of the project, including the entire bypassed reach, immediately downstream of the tailrace, and three other locations between the project and the confluence with Schenevus Creek. The survey documented the presence of invasive zebra mussels in such high density that in some areas zebra mussel shells formed a majority of the river substrate. No live native freshwater mussels were documented at any of the survey sites, although one relict shell of the creeper mussel and one shell of the eastern lampmussel were observed.

The presence of zebra mussels in Goodyear Lake was first documented in the summer of 2004. Zebra mussels likely colonized Goodyear Lake and the Susquehanna River downstream of the project through the passive transport of veligers (larval zebra mussels) from Canadargo Lake, which connects to the Susquehanna River via Oaks Creek. Zebra mussels were first documented in Canadargo Lake in 2002 (Stroonsnyder, 2017).

3.3.1.2 Environmental Effects

Project Operation and Water Levels

Under its current license, Goodyear Lake Hydro must maintain the water surface elevation in the reservoir at no more than 12 inches below the dam spillway crest. In section 3.4.1 of the Settlement Agreement, Goodyear Lake Hydro proposes to operate the project in a run-of-river mode and maintain the water surface elevation in the reservoir at no more than 3 inches below the spillway crest. Under the Settlement Agreement, the run-of-river operation and target water levels in the impoundment may be curtailed or suspended by the licensee,[19] but must be reported to Interior, New York DEC, and the SRBC within 5 business days and FERC within 10 business days.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed mode of operation and management of water levels in the reservoir. Interior's 10(j) recommendation, filed on June 15, 2018, would require run-of-river operation and maintenance of water levels in the reservoir at no more than 3 inches below the dam spillway crest as described in the Settlement Agreement.

[19] Project operation may be altered for short periods upon mutual agreement with New York DEC or in response to an operating emergency.

Our Analysis

As discussed previously, Goodyear Lake Hydro currently operates the project in a run-of-river mode and typically maintains water levels in the reservoir at the spillway crest using an automatic pond level control system. The existing control system usually maintains reservoir levels within 1 inch of the spillway crest and will automatically trip the units offline when water levels in the reservoir fall more than 3 inches below the spillway crest. When the units trip offline, a valve in the minimum flow pipe opens to release the minimum flow requirement of 20 cfs downstream of the powerhouse while the reservoir refills to its crest.

On occasion, Goodyear Lake Hydro may have drawn down the reservoir more than 3 inches as a result of operating emergencies or maintenance, but Goodyear Lake Hydro has always maintained water levels at no more than 12 inches below the spillway crest. For example, in the summer of 2017, the automatic pond level control malfunctioned and Goodyear Lake Hydro operated the project in manual mode for several weeks with its staff starting one generator in the morning and stopping it at night, likely resulting in lower than normal water levels. As the reservoir refilled, only the 20-cfs minimum flow was released until spill occurred at the dam, which resulted in peaking discharge notable on downstream U.S. Geological Survey (USGS) gages for approximately 100 miles.

If the units trip offline or are manually shutdown, maintaining water levels within 3 inches of the spillway crest at all times would minimize downstream effects on water quantity because the project reservoir would refill quickly and spill would occur sooner relative to the existing license requirement. At 3 inches below the spillway crest, we estimate that the reservoir would refill in less than 3 hours at median flows during the summer, which would reduce discharge variability, minimize dewatering of aquatic habitat, and protect aquatic species in the Susquehanna River downstream of the project. In the reservoir, continued maintenance of water levels near the spillway crest would protect fish species, such as sunfish that build nests and spawn in shallow near-shore habitat.

Minimum Flows Downstream of the Project

Under its current license, Goodyear Lake Hydro must release a continuous minimum flow of at least 20 cfs, or inflow to the project if less, into the project's tailrace with no minimum flow requirement in the bypassed reach. In section 3.1.1 of the Settlement Agreement, Goodyear Lake Hydro proposes to release a continuous minimum flow of 20 cfs, or inflow to the project if less, to the bypassed reach within 5 years of the effective date of any license issued by the Commission. Goodyear Lake Hydro would provide the bypassed reach flow through the downstream fish passage structure, or through other means as determined in consultation with Interior, New York DEC, and SRBC. Under the Settlement Agreement, flow in the bypassed reach may be curtailed or

suspended by the licensee,[20] but must be reported to Interior, New York DEC, and the SRBC within 5 business days and FERC within 10 business days. In its license application, Goodyear Lake Hydro proposes to maintain the existing minimum flow releases to the project's tailrace until it develops a mechanism to release the minimum flow to the bypassed reach.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed minimum flow in the bypassed reach. Interior's 10(j) recommendation would require a 20-cfs minimum flow in the bypassed reach as described in the Settlement Agreement.

Our Analysis

In order to evaluate potential minimum flows in the bypassed reach, staff from Interior, New York DEC, SRBC, Goodyear Lake Hydro, and HDR Engineering Inc., observed two flows in the bypassed reach, approximately 1.5 cfs and 27 cfs. Goodyear Lake Hydro collected depth, velocity, and water quality data at three cross-sectional transects in the bypassed reach and photographed the bypassed reach at each transect for each flow. In addition, flow observations at approximately 7 cfs were observed and photographed.

As described previously, the bypassed reach is wetted at all times as a result of leakage from the project and upwelling in the pool immediately below the dam. Flows of 1.5 cfs are likely similar to existing leakage/upwelling flows as spill over the dam was extremely minimal during this test flow. At 7 cfs, habitat conditions in the bypassed reach appear to marginally increase wetted width and depth. At 27 cfs, the transect data, and photographs indicate a substantial increase in wetted width, depth, and riverine habitat for aquatic species in the bypassed reach. On average, wetted width increased by 15.3 feet and maximum depth increased by 0.67 foot relative to the 1.5-cfs flow.

Goodyear Lake Hydro's continuous water quality data from the bypassed reach show large diel swings in dissolved oxygen levels and temperature, and dissolved oxygen levels frequently dipped below 4.0 mg/L and sometimes approached 0.0 mg/L, which could kill fish and harm other aquatic species in the bypassed reach. During the bypassed reach flow study, discrete measurements showed dissolved oxygen concentrations increased throughout the day, reaching 12.45 mg/L (175 percent saturation) at transect 3 near the tailrace when the 1.5-cfs flow was observed. During the 27-cfs flow, dissolved oxygen levels were relatively constant at all three transects throughout the day, around 11.5 mg/L and 120 percent saturation. Thus, it appears that a bypassed reach flow similar

[20] Flow releases may be altered for short periods upon mutual agreement with New York DEC or in response to an operating emergency.

to 27 cfs would eliminate the large diel swings in oxygen concentration and ensure suitable water quality for aquatic species.

Considering the observations above, a constant 20-cfs minimum flow in the bypassed reach would substantially increase aquatic habitat quantity and quality for both fish and macroinvertebrates. If walleye or other species utilize the reach for spawning, a 20-cfs flow would likely ensure the spawning sites stay watered during egg development. In addition, a 20-cfs flow would provide suitable water quality and flow to facilitate both upstream and downstream movement of fish within the bypassed reach. Providing a 20-cfs flow within 5 years would allow Goodyear Lake Hydro to consult with stakeholders and evaluate alternative designs for delivering the flow to the bypassed reach (e.g., through a downstream fish passage device or other mechanism). If the downstream fish passage structure is not suitable to provide the proposed minimum flow in the bypassed reach, final design, operation, and maintenance procedures for any alternative mechanism could be provided to the Commission to ensure the proposed minimum flow would be maintained.

Until a mechanism to release a minimum flow into the bypassed reach is developed, Goodyear Lake Hydro would continue to provide a minimum of 20 cfs, or inflow into the project, whichever is less, downstream of the powerhouse. After the 20-cfs flow is provided through the bypassed reach, the 300-foot-long tailrace would remain watered in the event the units trip offline because the tailrace is much deeper than the adjoining bypassed reach and river downstream of the powerhouse. In addition, the 20-cfs flow through the bypassed reach would have a backwater effect within the tailrace. No entity has expressed concern over the 20-cfs minimum flow downstream of the project, and the data collected in the bypassed reach suggests that this flow would be adequate to maintain aquatic resources downstream of the powerhouse.

Stream Flow and River Monitoring Plan

Goodyear Lake Hydro proposes to develop a stream flow and river monitoring plan to ensure compliance with run-of-river operation and verify water levels in the reservoir. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed plan. Interior's 10(j) recommendation would require a stream flow and water level monitoring plan as described in the Settlement Agreement.

Our Analysis

The Settlement Agreement does not identify any flow monitoring needs downstream of the project, but it does identify measures for monitoring water levels in the impoundment and ensuring compliance with run-of-river operation as part of a stream flow and river monitoring plan. The USGS Gage No. 01500500 at Unadilla, New York is approximately 25 miles downstream and should be adequate to monitor flow

conditions downstream of the project. Furthermore, ensuring compliance with run-of-river operation and proposed reservoir levels would in-turn protect downstream aquatic resources. Therefore, an operation compliance monitoring plan that includes a detailed description of the automatic pond level control system, normal project operation, manual project operation, procedures during operating emergencies, procedures to ensure minimum flows are maintained in the bypassed reach and downstream of the project, and water level monitoring and reporting of operational deviations would ensure reservoir levels are maintained and any project-related effects on flow and aquatic habitat within and downstream of the project area are minimized.

Fish Passage and Protection

Upstream Passage of American Eel

The project's dam is likely a barrier to the upstream migration of American eel throughout most of the year. Therefore, Goodyear Lake Hydro proposes a suite of upstream eel passage measures, as described in section 3.2.1 of the Settlement Agreement. Specifically, Goodyear Lake Hydro proposes to provide temporary upstream passage for eel during the first field season following the effective date of any license issued by the Commission. Temporary upstream passage would be achieved through the deployment of up to three eel ramps or traps downstream of the dam within 10 days of ice out, or April 1, whichever is later, through November 30. In addition, Goodyear Lake Hydro proposes to monitor and evaluate eel use of the bypassed reach and tailrace for 2 years following the establishment of the 20-cfs bypassed reach flow to identify potential locations for a seasonal eel ramp(s). Upon completion of the eel monitoring, Goodyear Lake Hydro would install and operate up to two seasonal eel ramps.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed upstream eel passage measures. Interior's preliminary section 18 fishway prescription, filed on June 15, 2018, would require the upstream eel passage measures proposed by Goodyear Lake Hydro in the Settlement Agreement.

Our Analysis

Currently, American eel are able to ascend the 35-foot-high spillway or climb around the dam on the east side because eel were documented in Goodyear Lake and the Susquehanna River upstream of the project. However, the conditions under which upstream eel passage occurs are unknown and may be dependent on spill or rain events. Developing a means of seasonal upstream passage for American eel would improve access to Goodyear Lake, the Susquehanna River upstream of the project, and various other streams located upstream of the project. In total, upstream eel passage would improve access to approximately 22 miles of mainstem Susquehanna River habitat and numerous tributaries.

It is unclear how many eels migrate upstream to the Colliersville Project or what preferred migration route(s) exist at the base of the project. Goodyear Lake Hydro's proposed temporary passage measures would allow any American eel to pass upstream of the project until the upstream eel passage evaluation can be completed. Trapping eels and transporting them upstream of the dam would also provide important information about the location and number of eels attempting to migrate upstream of the Colliersville Project. Temporary eel ramps could potentially provide similar information but would require monitoring to determine the actual number of eels utilizing the structures. Information such as the timing, number, and size of eels transported upstream could be reported annually and used to refine the eel passage measures.

Implementing temporary eel passage measures 10 days after ice out, or April 1, whichever is later, through November 30 would allow Goodyear Lake Hydro to identify when the upstream eel migration occurs at the project. The timing of upstream eel migration can vary depending on various factors including, latitude, position in the watershed, water temperature, and precipitation events, but upstream elver and yellow eel migration is most common at night in May through July. Therefore, the timing of the temporary eel passage measures could be adjusted after consultation with Interior, New York DEC, and the SRBC as eel passage information is collected.

Considering that eels may be drawn to the tailrace or any flow discharged into the bypassed reach, a habitat use and passage evaluation would help identify potential passage routes and locations for seasonal eel ramps. A minimum flow of 20 cfs in the bypassed reach could affect eel habitat use, route selection, and design/location of any seasonal eel ramps. Thus, conducting the upstream passage evaluation after any minimum flows are established in the bypassed reach would be the most efficient strategy to evaluate upstream eel passage options. The upstream passage monitoring should continue to utilize eel ramps and/or temporary ramps to determine the best areas to install seasonal eel ramps and inform the final design and operation of seasonal eel ramps. Developing the monitoring and final design plans for upstream eel passage after consultation with the agencies would likely ensure that information is collected to design and operate seasonal eel ramp(s).

Downstream Fish Passage

The existing downstream passage routes for fish are through the powerhouse, where fish may suffer injury and mortality due to blade strikes, or over the spillway when flow exceeds the capacity of the powerhouse. As such, in section 3.2.2 of the Settlement Agreement, Goodyear Lake Hydro proposes to install a downstream fish passage and exclusion structure in the power canal to facilitate the downstream movement of American eel and resident fish. The proposed design of the downstream fishway would meet applicable criteria from FWS's 2017 *Fish Passage Engineering Design Criteria Manual* (Design Criteria Manual), including a trashrack with 0.75-inch clear bar spacing that would guide fish that enter the power canal to a low-level outlet that would discharge

into the upstream end of the bypassed reach. The proposed outlet would have a discharge capacity of 20 cfs to fulfill the proposed minimum flow discussed above. Goodyear Lake Hydro proposes to install the structure within 5 years of the effective date of any license issued by the Commission.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish passage measures. Interior's preliminary section 18 fishway prescription would require the downstream fish passage measures proposed by Goodyear Lake Hydro in the Settlement Agreement.

Our Analysis

In support of its license application, Goodyear Lake Hydro conducted a desktop entrainment study to estimate entrainment rates for 18 target species of fish and provided existing data on mortality rates for fish entrained through the Ossberger cross-flow turbines. Goodyear Lake Hydro calculated a maximum intake velocity of 1.55 feet per second, which is low enough to allow most species and life stages to escape impingement and entrainment at the project. Considering the species-specific body width scaling factors for the target species and the 1.5-inch clear spacing of the existing trashrack, most adult game fish between 9 and 12 inches long would not be entrained at the project.

Goodyear Lake Hydro estimates that alewife would be the most commonly entrained fish due to winter cold stress. Game fish with the highest entrainment rates were bluegill, rock bass, and yellow perch. All size classes of American eel would also be able to pass through the existing trashrack. Results of an experimental entrainment mortality study conducted at the Colliersville Project in the early 1980s indicate that entrainment mortality for the Ossberger turbines ranged from 15 percent for 3.5-inch fish to over 70 percent for 11-inch fish. Silver American eels range in size from 14 to 40 inches or greater and would likely be subject to very high mortality if entrained through the project.

Providing a safe pathway for downstream fish passage would protect silver phase American eel and other resident species from the high mortality rates associated with passing through the project's turbines. Although the proposed design of the fishway lacks detail, FWS's Design Criteria Manual includes standards for trashrack angle, velocities at the trashrack and fish conveyance structure, conveyance dimensions, and plunge pool depth that should ensure safe downstream passage of American eel and other resident species. A trashrack with 0.75-inch spacing should prevent all silver phase American eel and most other adult resident species from entering the powerhouse.

Therefore, a 20-cfs outflow from the power canal should be sufficient to attract fish that are moving downstream.

American eel seem to prefer a low-level outlet; however, a low-level outlet is not necessary to pass eels downstream of hydroelectric projects. Water depth in the power canal is approximately 6 feet deep at the upstream end and eel would likely search for and find an outlet at any level in the power canal, assuming the 0.75-inch trashrack provides sufficient guidance towards the outlet. In addition, silver phase American eel tend to follow the dominant downstream flow and could pass downstream over the existing spillway if the flow was directed over the spillway during the downstream eel migration (i.e., nightly project shutdowns in the fall). Developing final design plans for downstream fish passage after consultation with the agencies would ensure that passage criteria for eels are incorporated into the design.

The abundance of eels upstream of the project is unknown, but presence of American eel has been confirmed as recently as July 2018. In addition, any upstream eel passage measures would likely increase the number of eels upstream of the project. Because eels develop over several years before maturing into the silver phase and migrating downstream to the ocean, implementation of any downstream fish passage measures within 5 years of license issuance would provide sufficient protection to American eels.

Downstream Fish Passage Effectiveness Testing

In section 3.2.2 of the Settlement Agreement, Goodyear Lake Hydro proposes to evaluate the effectiveness of any new downstream fish passage structure, if requested by Interior, New York DEC, and the SRBC, no sooner than 10 years after the effective date of any license issued by the Commission. Effectiveness testing would consist of one study event focused on evaluating the successful downstream passage of American eel.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish passage measures. Interior's preliminary section 18 fishway prescription would require downstream eel passage effectiveness testing as proposed by Goodyear Lake Hydro in the Settlement Agreement.

Our Analysis

Passage effectiveness studies may take many forms, including video observation, sample collection, hydro-acoustics, telemetry, or passive integrated transponder studies. A passage effectiveness study typically evaluates factors such as attraction flows, attraction efficiency, passage efficiency, passage delay, and survival rates. As stated in FWS's Design Criteria Manual, efficiency testing is typically evaluated quantitatively through a site-specific framework, and performance standards are generally informed by

state and federal agencies with expertise in the life history requirements of the region's fish populations.

No party to the Settlement Agreement has identified a specific study framework or performance standard(s) that would be used to evaluate the "successful downstream passage of American eel." Instead, the settlement parties would develop an effectiveness study plan post-licensing, if requested by Interior, New York DEC, and the Susquehanna River Basin. Therefore, there is no basis for assessing the benefits of effectiveness testing for eel passage and it is unclear under what conditions an effectiveness study would be requested.

The settlement parties agree that any downstream passage structure would meet applicable criteria from the FWS's Design Criteria Manual. Because any downstream passage structure would be designed, operated, and maintained in accordance with proven fish passage standards and operating procedures, there is no apparent benefit to conducting an effectiveness study. However, confirming any downstream passage structure functions in accordance with its design to pass American eel and other resident fish downstream of the project would benefit fish attempting to migrate downstream. A fishway operation and maintenance plan (discussed below) could include measures to confirm that a downstream passage structure facilitates the passage of eels and other species downstream of the project.

Fishway Operation and Maintenance

In order to ensure proper operation of the proposed fishways described above, Goodyear Lake Hydro proposes to develop a fishway operation and maintenance plan within 4 years of any license issued by the Commission (section 3.2.3 of the Settlement Agreement). The plan would include a description of the project and fisheries, an implementation schedule for the fishways, and operation and maintenance procedures. The plan would also include a requirement for annual assessment and reporting of fishway operation, including a summary of any operational deviations, and newly available fisheries data, including passage data from any eel transport operations, the 2-year eel habitat use monitoring, and the results of any downstream passage effectiveness study. Under the Settlement Agreement, fish passage may be curtailed or suspended by the licensee,[21] but must be reported to Interior, New York DEC, and the SRBC within 5 business days and to FERC within 10 business days.

As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish

[21] Fish passage may be altered for short periods upon mutual agreement with New York DEC or in response to an operating emergency.

passage measures. Interior's preliminary section 18 fishway prescription would require the downstream eel passage measures proposed by Goodyear Lake Hydro in the Settlement Agreement.

Our Analysis

To maintain the effectiveness of fish passage facilities, fishways need to be properly operated and maintained. Most fishways require routine maintenance to ensure the fishways operate effectively. An operation and maintenance plan would ensure that permanent or seasonal fishways constructed at the project would be operated during the appropriate times of the day and year, and with an appropriate conveyance flow. In addition, the plan would ensure that routine cleaning and maintenance, including debris removal, are performed so that the fishways operate as intended. In order to ensure the fishways operate as designed, the plan could also include: (1) specific procedures for trial operation, testing, and hydraulic optimization otherwise known as a "shakedown" period; (2) procedures to confirm passage of American eel (upstream and downstream) and other resident fish (downstream only); and (3) an annual report that contains an assessment of fishway operation, including operational deviations. Reporting the results of any temporary upstream eel passage measures and the upstream passage monitoring could be included independently of a fishway operation and maintenance plan as discussed above.

3.3.1.3 Cumulative Effects on Aquatic Resources

Water Quantity

As discussed in section 3.3.1.2, *Project Operation and Water Levels,* the project has the potential to temporarily reduce flow downstream of the project to the minimum flow of 20 cfs under some circumstances, such as the units tripping offline when the reservoir level is below the spillway crest. The effect of releasing only the minimum flow can be observable for approximately 100 miles downstream of the project. However, Goodyear Lake Hydro proposes to maintain water levels at no more than 3 inches below the spillway crest, which would reduce the duration of any minimum flow releases.

Water withdrawals and discharges also have the potential to affect the quantity of flow in the Susquehanna River, but these facilities near the project have very small capacities relative to the normal flow and the minimum 20-cfs flow released from the project. In the vicinity of the project, the City of Oneonta, located 7 miles downstream, maintains the largest water withdrawal of up to 2.2 mgd, equivalent to an average daily flow of 1.75 cfs.

No large withdrawals, out-of-basin diversions, or other developments that could affect flow in the Susquehanna River exist near the project, and water withdrawals near

the project are too small to have a meaningful effect on water quantity, even when discharge from the project is 20 cfs. Furthermore, local wastewater discharges would replace much of the water that is withdrawn from the river. In conclusion, the project may occasionally reduce flow in the Susquehanna River, but this effect, in combination with water withdrawals and discharges in the region, would not result in cumulative effects on water quantity in the Susquehanna River.

Water Quality

As described above in section 3.3.1.1, *Affected Environment, Water Quality,* historical data and recent information collected by Goodyear Lake Hydro and others indicate that water quality in the reservoir and downstream of the project is generally good and supports all species and life stages of aquatic life. During the summer, dissolved oxygen can approach zero in the deeper parts of Goodyear Lake, but dissolved oxygen levels in water discharged from the powerhouse are typically greater than 5.0 mg/L and always greater than 4.0 mg/L.

The addition of a minimum 20-cfs flow in the bypassed reach would improve water quality for aquatic species in this area, and the maintenance of a minimum 20-cfs flow downstream of the project would protect water quality downstream of the project, at least in the short term. With increasing distance from the project, a 20-cfs flow may be susceptible to greater warming and lower dissolved oxygen levels compared to normal flows. Maintaining water levels at no more than 3 inches below the spillway crest would ensure that spill occurs quickly, run-of-river flow is restored, and that water quality is sufficient for aquatic life downstream of the dam.

Continued nutrient loading from upstream sources will continue to cause/exacerbate eutrophic conditions (e.g., algal blooms, high productivity) in Goodyear Lake, potentially affecting dissolved oxygen levels downstream of the project. Maintenance of the minimum flow and reservoir level so that spill occurs quickly during operating emergencies should ensure water quality is maintained downstream of the project, even if nutrient levels spike as a result of upstream inputs. Therefore, relicensing the Colliersville Project with the proposed measures described above, in combination with ongoing nutrient inputs upstream of the project, would result in an overall positive cumulative effect on water quality downstream of the project.

American Eel Migration

As described above in section 3.3.1.1, *Affected Environment, Fishery Resources,* efforts to restore American eel in the Susquehanna River are ongoing and hundreds of thousands of eels have been stocked in the basin throughout Pennsylvania. Providing a means of temporary upstream passage at the project would allow eels that arrive at the project to access additional habitat upstream of the project's dam. This effort, coupled with an upstream eel passage evaluation, would help to identify the appropriate operation

and timing of seasonal eel ramps that would facilitate upstream passage during the migration season. Developing a downstream fishway that meets FWS's design criteria would likely prevent entrainment of American eel through the powerhouse and avoid injury and mortality associated with passage through the turbines. As such, the relicensing of the Colliersville Project with the proposed measures described above, together with ongoing fish passage measures and/or specific American eel restoration efforts at the York Haven, Safe Harbor, Holtwood, and Conowingo projects, would result in an overall positive cumulative effect on American eel migration and habitat access in the Susquehanna River Basin.

3.3.2 Terrestrial Resources

3.3.2.1 Affected Environment

The Colliersville Project is located within the Glaciated Low Allegheny Plateau ecoregion, characterized by glacially smoothed terrain, flat hilltops, and wide stream valleys (Bryce et al., 2010). Goodyear Lake is located within one of several north-and-south trending glacial through-valleys that occur within the region (Fetterman, 2001).

Upland habitat within the project boundary has been modified by residential and agricultural development. Two major forest community types, as defined in Edinger et al. (2014), occur at the project: floodplain forest (silver maple, sycamore, ashes, oaks, hickories, and other species occurring along river floodplains) and successional northern hardwoods (typically mixed forests of aspen, poplar, birch, black cherry, red maple and ash species). The project boundary encompasses approximately 441 acres, including open water and wetland habitat (370 acres), floodplain forest (35 acres), agricultural land (15 acres), and northern hardwood forest (approximately 5 acres). In addition, residential development and project facilities occupy approximately 15 acres and 1.5 acres of the project boundary, respectively.

Wetlands

Goodyear Lake Hydro identified approximately 735 acres of National Wetlands Inventory (NWI) mapped wetlands within the Colliersville Project area. Wetland habitat present in the vicinity of the project is primarily represented by Goodyear Lake, classified as impounded, permanently flooded, lacustrine habitat with an unconsolidated bottom (L1UBHh; 688.6 acres). Other wetland habitat within the northern portion of the project area includes various palustrine forested (PF01E; 4.3 acres), scrub-shrub (PSS1E; 31.7 acres), and emergent (PEM1A and PEM1E; 10.4 acres) wetlands. Approximately 140 acres of wetlands within this area are also classified by New York DEC as a state-regulated freshwater wetland (MI-21).

Invasive Species

As noted in the license application, 119 species of terrestrial and aquatic invasive plant species are present within Otsego County. Terrestrial invasive plant species include bush honeysuckle species, multiflora rose, Japanese knotweed, Japanese stiltgrass, and tree-of-heaven. Terrestrial invasive species identified by the Catskill Region Invasive Species Partnership as management priorities include mile-a-minute vine, giant hogweed, Asiatic bittersweet, Norway maple, and pale swallow-wort, all of which have been observed within Otsego County.

Aquatic invasive plant species that occur within Goodyear Lake include Eurasian milfoil, purple loosestrife, water chestnut, and curly leaf pondweed (Yoo et al., 2013). A water chestnut manual eradication effort has been routinely conducted at Goodyear Lake by the Otsego County Conservation Association.[22]

Wildlife

Wildlife species expected to use habitat available at the project include species tolerant of human development and activity (i.e., raccoon, Virginia opossum, eastern cottontail rabbit, gray fox, gray squirrel, and numerous passerine bird species), game species such as white-tailed deer, and species that would use Goodyear Lake and surrounding wetland habitat (i.e., various amphibian and waterfowl species, muskrat, and beaver). Based on extensive forested habitat surrounding the project, mammals including black bear, bobcat, and coyote may also occur as transients within the project boundary.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, which prohibit the "take" of eagle eggs, nests, and offspring, and can also include substantially disturbing normal breeding and feeding activities, except as permitted by regulation. Bald eagles are listed as a threatened species in New York State and are protected under New York State law.

Bald eagles typically forage over water and other open habitats. Bald eagles nest in mature trees and snags and on cliffs, rocks, and artificial structures, generally within 1 mile of water. Nesting activity occurs from January through August.

In a January 26, 2017 letter included in the license application, FWS states that a known, occupied bald eagle nest was located in proximity to the project. As noted in

[22] *See* http://occainfo.org/aquatic-invasive-species-2/.

Goodyear Lake Hydro's August 16, 2017 additional information response, it was aware of a bald eagle nest north of the project boundary along New York State Route 28, but understood that the nest was subsequently lost during a storm. Additional data indicates the presence of bald eagle adults within the project boundary during the breeding season, and an immature bald eagle 1 mile south of Colliersville dam.[23] Since bald eagle breeding activity within New York State has been expanding since the 1980s, and suitable bald eagle breeding habitat exists within the project boundary, it is conceivable for bald eagles to nest within the project area during the term of any license that may be issued for the project.

3.3.2.2 Environmental Effects

In SD2, Commission staff identified the effects of continued project operation and maintenance on upland, wetland, and riparian habitats and associated wildlife, and the state-listed threatened bald eagle, as resource issues. SD2 also identified the effects of construction of the proposed fish passage structure on terrestrial resources as a resource issue.

The Commission received no substantive comments regarding the effects of project operation or maintenance on terrestrial resources. Further, construction of the proposed upstream eel passage structure (i.e., up to two seasonally installed eel ramps) and year-round downstream fish passage and exclusion structure in the power canal would not be expected to affect terrestrial resources. Therefore, staff analyzed the effects associated with Goodyear Lake Hydro's proposals for the Invasive Plant Species Management Plan and a Northern Long-eared Bat and Bald Eagle Protection Plan.

Invasive Plant Species Management Plan

Goodyear Lake Hydro's Invasive Plant Species Management Plan, filed with the Settlement Agreement, includes measures to prevent the introduction and spread of terrestrial and aquatic invasive plant species, for example: employing best management practices (BMPs) during construction or maintenance, such as cleaning and drying boats that come into contact with water, training workers to identify and remove invasive species from construction equipment before entering an invasive-free area, use of

[23] According to the Cornell Lab of Ornithology's eBird database (http://ebird.org), several individual bald eagle adults were observed along the shoreline of the southern half of Goodyear Lake during the January through June period of the years 2014 through 2018. On March 17, 2018, an immature bald eagle was observed along the Susquehanna River, approximately 1 mile south of Colliersville dam.

invasive-free gravel, fill, erosion control material (i.e., straw or fiber rolls), and seed stock during replanting.

In a letter filed June 15, 2018, Interior recommends that Goodyear Lake Hydro implement the Invasive Plant Species Management Plan filed with the Settlement Agreement.

Our Analysis

Several species of aquatic and terrestrial invasive plant species are present at the Colliersville Project. Operation and maintenance of the project could result in the introduction or spread of terrestrial and aquatic invasive species within the project boundary, and during construction of the proposed fish passage and exclusion structure. However, employing measures to minimize the introduction and spread of invasive species during construction, operation, and maintenance, such as those included within the proposed Invasive Plant Species Management Plan, would minimize the introduction or spread of invasive species within the project boundary.

Northern Long-eared Bat and Bald Eagle Protection Plan

Goodyear Lake Hydro proposes to implement the Northern Long-eared Bat and Bald Eagle Protection Plan,[24] filed with the Settlement Agreement, to minimize project effects on bald eagles by: (1) notifying New York DEC and FWS within 72 hours of the date of observation of a bald eagle nest within or immediately adjacent to the project boundary; and (2) limiting tree-clearing activity on project lands during certain periods (i.e., no tree clearing within 330 feet of a bald eagle nest, and no construction within 660 feet of a bald eagle nest during the breeding season [between December and June]).

In a letter filed on June 15, 2018, Interior recommended that Goodyear Lake Hydro implement the Northern Long-eared Bat and Bald Eagle Protection Plan filed with the Settlement Agreement.

Our Analysis

Project maintenance would result in limited ground disturbance within the project boundary, including the potential removal of trees. However, consulting with FWS and New York DEC when bald eagles nest within or immediately adjacent to the project boundary, and incorporating measures to minimize habitat disturbance surrounding active

[24] Measures within this plan regarding the federally listed threatened northern long-eared bat are evaluated below in section 3.3.3, *Threatened and Endangered Species*.

nests on project lands, such as those included in the proposed Northern Long-eared Bat and Bald Eagle Protection Plan, would minimize effects to bald eagles.

3.3.3 Threatened and Endangered Species

3.3.3.1 Affected Environment

FWS's IPaC system indicates one federally listed threatened species known to have the potential to occur in Otsego County: the northern long-eared bat.[25] No critical habitat for any federally listed threatened and endangered species occurs within project-affected lands.

Northern long-eared bat

FWS listed the northern long-eared bat as threatened on May 4, 2015 (FWS, 2015), and determined on April 27, 2016 that designating critical habitat is not prudent (FWS, 2016a).

The northern long-eared bat is a medium-sized bat species (3 to 3.7 inches in length) with longer ears than other species in the *Myotis* genus (FWS, 2015). The species' range includes 37 states, including most of the central and eastern United States, as well as the southern and central provinces of Canada, coinciding with the greatest abundance of forested areas.

The northern long-eared bat is found in a variety of forested habitats in the summer season. During this time, bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. In the fall season, northern long-eared bats leave their forested habitat to hibernate in caves, mines, and other similar habitat. The bats arrive at hibernacula between August and September, enter hibernation between October and November, and emerge from hibernacula between March and April. Hibernacula and surrounding forest habitats play important roles in the bat's life cycle beyond the time when bats are overwintering, including for fall-swarming[26] and spring-

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[25] *See* August 30, 2018 memorandum.

[26] Fall-swarming fills the time between summer and winter hibernation. The purpose of swarming behavior may include: introduction of juveniles to potential hibernacula, copulation, and gathering at stop-over sites on migratory pathways between summer and winter regions.

staging[27] activities. Reproduction is limited to one pup per year in late spring. As such, bat populations can be slow to rebound from anthropogenic and naturally-occurring mortality events.

On January 14, 2016, FWS issued a final 4(d) rule that prohibits the following activities in areas of the country impacted by white-nose syndrome:[28] incidental take within a hibernation site; tree removal within 0.25 mile of a known, occupied hibernaculum; and cutting or destroying known occupied maternity roost trees, or any other trees within 150 feet of that maternity roost tree, during the pup-rearing season (June 1 through July 31) (FWS, 2016b). On January 5, 2016, FWS developed an optional streamlined consultation framework that allows federal agencies to rely on a programmatic biological opinion on FWS's final 4(d) rule to fulfill section 7(a)(2) consultation requirements for northern long-eared bat (FWS, 2016c).[29]

The Colliersville Project is located in Otsego County, which is within the white-nose syndrome zone and the northern long-eared bat species range (FWS, 2017; FWS, 2018). There are no known summer or winter occurrences of northern long-eared bats within the project boundary. However, there are confirmed summer occurrences of northern long-eared bats in Onondaga, Cayuga, and Schuyler counties west of the project,

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[27] Spring-staging is the time period between winter hibernation and migration to summer habitat. During this time, bats begin to gradually emerge from hibernation and exit the hibernacula to feed, but re-enter the same or alternative hibernacula to resume daily bouts of torpor (i.e., a state of mental or physical inactivity).

[28] White-nose syndrome is the main threat to the northern long-eared bat, and has caused a precipitous decline in bat numbers (in many cases, 90 to 100 percent) where the disease occurs.

[29] FWS developed a key to help federal agencies determine if they can rely on the streamlined section 7 consultation in the 4(d) rule, or if their actions may cause prohibited incidental take that requires separate section 7 consultation (FWS, 2016d). FWS's key considers whether the federal action: (1) may affect the northern long-eared bat; (2) involves the purposeful take of northern long-eared bats; (3) is located inside the white-nose syndrome zone; (4) will occur within a hibernaculum or alter the entrance/environment of a hibernaculum; (5) involves tree removal; (6) involves the removal of hazardous trees; and (7) includes (a) the removal of an occupied maternity roost tree or any trees within 150 feet of a known occupied roost tree from June 1 through July 31, or (b) the removal of any trees within 0.25 mile of a hibernaculum at any time of year.

and winter occurrences in Onondaga County west of the project and Schoharie and Montgomery counties east of the project (FWS, 2016e; New York DEC, 2018b).

3.3.3.2 Environmental Effects

Although New York DEC and FWS records indicate there are no northern long-eared bat hibernacula or maternity roosts known to occur within the project boundary, project lands may provide suitable summer roosting and feeding habitat for the species. Routine maintenance in the project boundary would likely involve the removal of trees, which may remove potential summer roosting habitat used by northern long-eared bats.

The proposed Northern Long-eared Bat and Bald Eagle Protection Plan filed with the Settlement Agreement includes requirements that Goodyear Lake Hydro would maintain a minimum distance of 150 feet from a known occupied maternity roost tree during pup season (June 1 through July 31), and a minimum of 0.25 mile from any known occupied hibernacula, during any tree-clearing activity. The plan also requires Goodyear Lake Hydro to consult with New York DEC and FWS if tree clearing is required within these distances; any trees that are a threat to human life or property (hazard trees) may be removed, although Goodyear Lake Hydro would need to consult with New York DEC and FWS if any bats are observed.

In a letter filed June 15, 2018, Interior states that "any take that may occur incidental to this project is not prohibited under the final 4(d) rule" and that "no further ESA coordination or consultation is required at this time."

Our Analysis

Seasonal avoidance of tree-clearing activity from June 1 through July 31, consultation with New York DEC and FWS regarding any tree-clearing activities occurring outside of this period, and reporting observations of northern long-eared bats during any removal of hazard trees, is likely to minimize effects to this species. We also conclude that, while continued operation and maintenance of the project may affect the northern long-eared bat, any incidental take that may result from these activities is not prohibited by the final 4(d) rule.

3.3.4 Recreation, Land Use, and Aesthetic Resources

3.3.4.1 Affected Environment

Recreation

Regional and Local Recreation

The Colliersville Project is located in Central New York, a broad geographic region that includes the greater Binghamton metropolitan area, as well as numerous

dispersed small towns and rural communities. Central New York offers a diverse range of recreational opportunities, including heritage sites, cultural exhibits, sporting events, winter sports, golf, dining, shopping, festivals, and opportunities for outdoor recreation. Within Central New York, Otsego County is located in the greater Cooperstown Region. While the Cooperstown area is well-known for prominent attractions such as the National Baseball Hall of Fame and Museum, Otsego County offers a variety of other recreational opportunities, including theatres and cultural events, bike trails, galleries, all-season fishing, hiking, golf, and the Cooperstown Beverage Trail, which runs 37 miles through Otsego County.

The Colliersville Project is located within about an hour of several New York State parks and forests:

- The Robert V. Riddle State Park is located about 1.5 miles south of the project and consists of over 1,000 acres of fields and forested woodlands. Popular activities at the park include fishing, hiking, bird watching, and snowshoeing.

- The Susquehanna State Forest is located about 2 miles north of the project and consists of over 400 acres. Popular activities at the forest include paddling, boating, fishing, hunting and trapping, and wildlife watching.

- The Milford State Forest is located approximately 4 miles northwest of the project and consists of over 500 acres. Popular activities at the forest include camping, hunting and trapping, snowmobiling, and wildlife watching opportunities.

- Adirondack State Park is located approximately 1 hour north of the project. The park, which encompasses approximately 6 million acres, offers abundant opportunities for outdoor recreational pursuits, including fishing, camping, hiking, birding, hunting, and trapping. New York DEC manages over 40 campgrounds within the park, offering a range of experiences from wilderness island camping to trailer and recreational vehicle sites. Adirondack State Park is a premier canoeing and kayaking destination, providing opportunities for flatwater paddling on lakes and rivers, as well as more technically challenging whitewater paddling opportunities.

- Catskill State Park is located within a 1-hour drive south of the project. The park is a patchwork of public and private land that encompasses 705,000 acres. The park includes more than 300 miles of hiking trails, as well as trails for horseback riding, mountain biking, cross country skiing, and snowmobiling. New York DEC operates 8 campgrounds within the park, and many of these campgrounds provide amenities such as bathhouses and boat rentals. Several premier trout streams are located in

the Catskills, including the Beaver Kill and the East Branch Delaware River. Catskill State Park is drained by a number of smaller rivers, tributary streams, and lakes and ponds that offer opportunities for boating and recreational fishing.

Nationwide Rivers Inventory

The Colliersville Project is located on a segment of the Susquehanna River that has been listed by the National Park Service (Park Service) in the National Rivers Inventory (NRI).[30] The Park Service designated this segment, which stretches from the outlet of Otsego Lake in Cooperstown, New York to the New York State Route 206 Bridge in Bainbridge, New York, because of its scenic and recreational attributes. For scenic attributes, the NRI database states that limited development has resulted in the reach retaining most of its riparian vegetation, and wooded hillsides provide scenic views. For recreational attributes, the NRI database states that this is the only portion of the Susquehanna River suitable for day and extended boating trips, this reach is used for the General Clinton Canoe Regatta annually on Memorial Day weekend,[31] and this reach includes various segments popular for both warm water and cold water fishing.

Recreation at the Project

The project impoundment, which is also known as Goodyear Lake, provides a variety of water-based recreation opportunities, including flatwater paddling, shoreline and boat fishing, motor boating, and swimming. Goodyear Lake also is a popular warm water fishery and supports fair to good numbers and desirable size classes of various game fish, including walleye, largemouth bass, smallmouth bass, bluegill, and yellow perch (see section 3.3.1, *Aquatic Resources*, for more discussion of the resident fish

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[30] The NRI "is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be at least regionally significant. NRI river segments are potential candidates for inclusion in the National Wild and Scenic River System. (https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm)

[31] The General Clinton Canoe Regatta began in 1963 and is a series of canoe races that attracts more than 1,500 paddlers to 50 races over Memorial Day weekend. It culminates with a 70-mile endurance race from Cooperstown to Bainbridge, the world's longest single-day flat water marathon canoe race, part of the North American Triple Crown of Canoeing (http://bainbridgeny.org/canoe-regatta/).

populations). The project's bypassed reach and the Susquehanna River below the project's tailrace are considered a high-quality, warm to cool water fishery.

Goodyear Lake, the bypassed reach, and the Susquehanna River downstream of the project can be accessed from both public and private boat launches. For public access, New York DEC owns and operates three public access facilities on the lake, and a fourth public access site downstream of the project. Currently, there are no project recreation facilities; however, Goodyear Lake Hydro maintains a gravel trail on the east side of the project that allows individuals to portage around the dam.[32] Figure 4 depicts the locations of these recreation opportunities.

[32] By letter dated April 12, 1991, the Commission determined that there was "no potential for recreational use of project property" and exempted the licensee from filing the Licensed Hydropower Development Recreation Report (FERC Form 80).

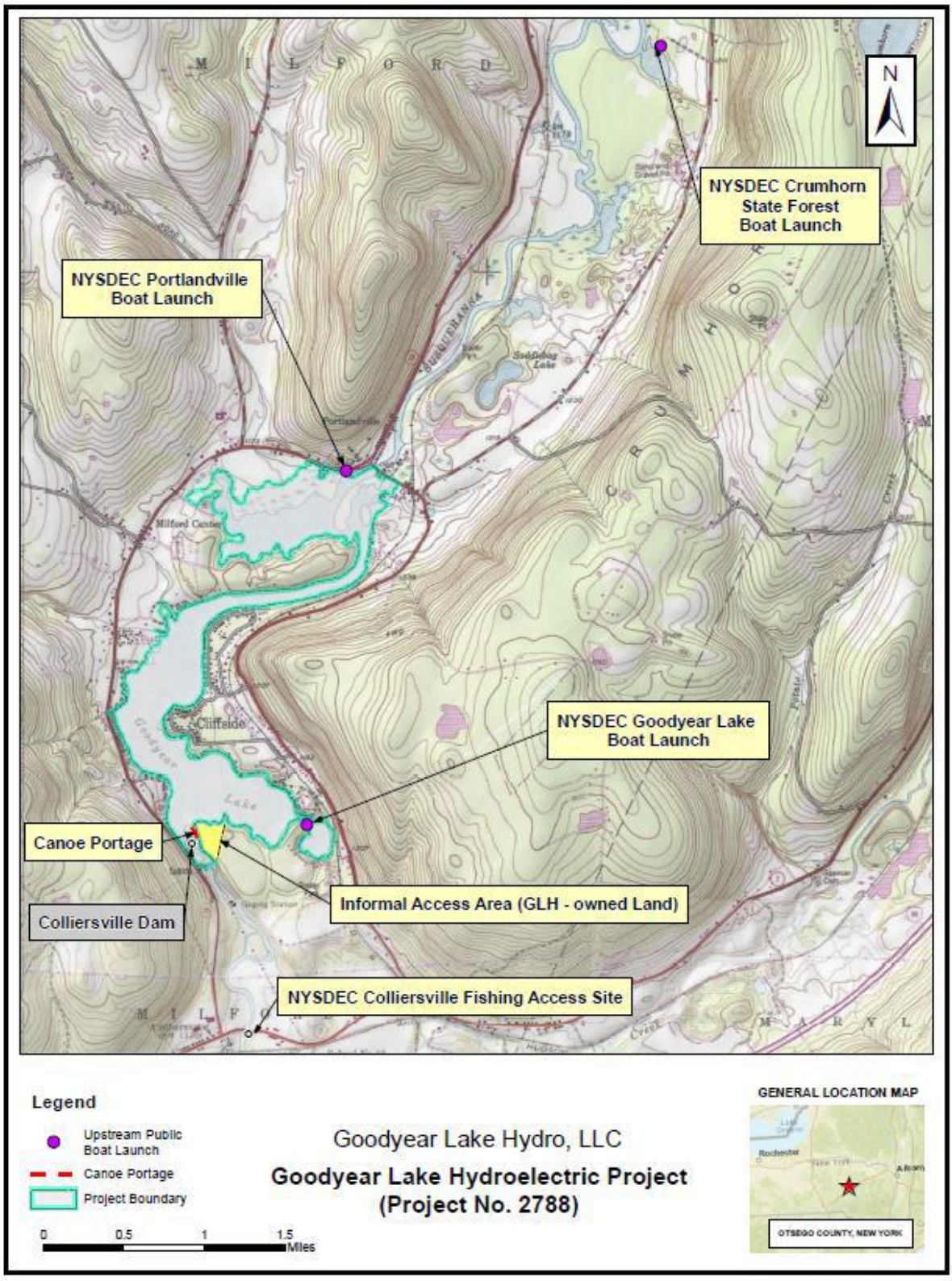

Figure 4: Recreation Access at the Colliersville Project (Source: Goodyear Lake Hydro).

Canoe Portage Trail – a trail exits on the east side of the project that allows individuals to portage around the eastern side of the project's dam and abutment. The trail is free of vegetation and consists of a gravel path through open, mature woodland. The trail is owned and maintained by Goodyear Lake Hydro. Currently there is no signage associated with the portage trail.

Colliersville Fishing Access Site – the Colliersville Fishing Access Site is owned and maintained by New York DEC. This public recreation area is located outside of the project boundary, on the Susquehanna River, approximately 0.8 mile downstream of the Colliersville dam. The access site includes parking for approximately 10 cars, a car-top boat launch, stairs that provide river access, and a kiosk with informational and educational signage. Through use of this site, the public can boat upstream to the project's tailrace discharge or downstream toward Oneonta, New York.

Crumhorn Boat Launch and Fishing Access Site – the Crumhorn Boat Launch and Fishing Access Site is owned and maintained by New York DEC. This public recreation area is located outside of the project boundary, approximately 2.5 miles upstream of the reservoir on the Susquehanna River. The site includes parking for approximately 28 cars, designated barrier-free parking, a barrier-free dock, a boat ramp, a kiosk, informational and educational signage, and disposal facilities for invasive plant species and fishing line. The boat ramp provides public motor boat access to Goodyear Lake and upstream reaches of the river.

Goodyear Lake Boat Launch and Fishing Access Site – the Goodyear Lake Boat Launch and Fishing Access Site is owned and maintained by New York DEC. This public recreation area is located adjacent to the project boundary and provides direct access to Goodyear Lake. The site includes parking for approximately 10 cars, designated barrier-free parking, a barrier-free canoe and kayak launch, a dock, a car-top boat launch, stairs that provide river access, a kiosk, informational and educational signage, portable restroom facilities, and disposal facilities for invasive plants and fishing line. In addition, the recreation area is located along a trail system that exists along the east side of Goodyear Lake. This access site and the trails are part of New York DEC's Goodyear Lake Waterway Access area.[33]

Portlandville Boat Launch and Fishing Access Site – the Portlandville Boat Launch and Fishing Access Site is owned and maintained jointly by New York DEC and New York Department of Transportation. This public recreation area is located adjacent to the project boundary and provides direct access to Goodyear Lake. The site includes parking for approximately 10 cars, designated barrier-free parking, a barrier-free canoe

[33] *See* https://www.dec.ny.gov/lands/111720.html.

and kayak launch, a dock, a car-top boat launch, a kiosk, informational and educational signage, and disposal facilities for invasive plant species and fishing line.

In additional to the public launch and fishing access facilities described above, there are numerous private boat docks associated with the permanent residences and seasonal camps that are located around the lake. Another private dock and boat launch are located at the Red Carpet Inn on the Lake (formerly the Knott's Motel), which is located on the east side of the lake, approximately 0.25 river mile upstream from the Colliersville dam. Individuals also can access Goodyear Lake from an approximately 8.75-acre parcel of land located east of the dam (see figure 4). This parcel is owned by Goodyear Lake Hydro and abuts New York State-owned land (the Goodyear Lake Waterway Access area) near New York DEC's Goodyear Lake Boat Launch and Fishing Access Site. Goodyear Lake Hydro allows informal access to this parcel for recreational purposes, such as fishing from the shoreline and swimming, and the public accesses this parcel via New York DEC's Goodyear Lake Boat Launch and Fishing Access Site.

Recreation Study

During the 2015 recreation season (May through October), Goodyear Lake Hydro conducted a recreation study to characterize the presence and relative use of existing recreational facilities and opportunities associated with the project. As part of the study, Goodyear Lake Hydro maintained a log of recreational observations made during routine maintenance activities, as well as daily observations (when on-site) from the project's spillway and powerhouse.[34] Goodyear Lake Hydro also documented observations made by field personnel while performing other field study activities in support of the relicensing.

Based on these observations and Goodyear Lake Hydro's consultation with New York DEC, Goodyear Lake Hydro states that the Crumhorn Boat Launch and Fishing Access Site and the Colliersville Fishing Access Site experience a moderate level of use during the summer recreation season, and the Portlandville and Goodyear Lake Boat Launch and Fishing Access Sites receive a higher level of use. Goodyear Lake Hydro states that the canoe portage trail experiences a lower level use compared to other

[34] While Goodyear Lake Hydro conducted a Recreation Study, it did not follow a scientifically acceptable method for gathering recreation use data. Instead, the data gathered is based solely on observations from personnel tasked with documenting what they saw on the impoundment as they conducted other duties. Consequently, the resulting data is extremely subjective; however, it does provide an overall sense of the activity occurring on the impoundment.

recreation sites. Based on the observations made during the recreation study, parking never exceeded 50 percent at any of the recreation sites.

As part of the study, Goodyear Lake Hydro also conducted a site visit to visually inspect the public recreation facilities. Goodyear Lake Hydro invited New York DEC, the SRBC, FWS, and the Goodyear Lake Association to participate.[35] Based on the site visit, the group noted that the existing facilities provide a reasonable level of public access and are in good shape. Goodyear Lake Hydro provided photos of the public recreation facilities in its August 16, 2017 response to the Commission's additional information request.

Land Use and Aesthetics

The Susquehanna River Basin is generally composed of forestland (70 percent), farmland (22 percent), and urban areas (7 percent). Land within the vicinity of the project[36] is primarily composed of six major land use classes: commercial and services (93 acres), cropland and pasture (4,776 acres), mixed use forest (11,894 acres), mixed urban or built-up land (70 acres), residential (602 acres), and lake (303 acres). Publically-owned land in the vicinity of the project includes the Goodyear Lake Waterway Access area, Robert V. Riddle State Park (located approximately 2 miles from the project), and the Arnold Lake and Milford State Forests (approximately 4 miles from the project).

Year-round residences and seasonal camps are generally concentrated towards the low shoreline slopes along the southern end of the lake, near Lakeshore Drive North and east of New York State Route 28. As a result of the residential development along Goodyear Lake, many sections of the shoreline are maintained as open lawns. Seasonal or floating boat docks are also common around the shoreline of the lake.

The Colliersville Project boundary encompasses 441 acres, of which approximately 364 acres are impounded. Primary facilities associated with the Colliersville Project include the dam, which impounds Goodyear Lake, a power canal, and a powerhouse containing two generating units. The project facilities are located adjacent to Route 28 and are generally visible from the road.

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[35] In 1921, local property owners formed the Goodyear Lake Association for the mutual protection and the development of the lake as a residential and summer camp community.

[36] For the purposes of this Land Use section, Goodyear Lake Hydro defines "project vicinity" as the area within a 3-mile radius of the dam.

3.3.4.2 Environmental Effects

Recreation

As described in section 3.3.1 of the Settlement Agreement, Goodyear Lake Hydro proposes to install and maintain "additional signage associated with the canoe portage route that exists on river left of the [p]roject's dam." This additional signage would include an upstream take-out sign, three directional signs along the portage trail, and a downstream put-in sign. In addition, Goodyear Lake Hydro proposes to install fencing along the project's east abutment in proximity to the canoe portage trail.

In its June 15, 2018 letter providing recommendations, terms, and conditions, Interior recommends the recreation measures proposed by Goodyear Lake Hydro and described in the Settlement Agreement. Further, as evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed recreation measures.

Our Analysis

Public recreation facilities at the project provide access to Goodyear Lake, the bypassed reach, and the downstream reach of the Susquehanna River for boating, fishing, and swimming. Under Goodyear Lake Hydro's proposals, including continuing to operate the project in run-of-river mode, releasing a 20-cfs minimum flow in the bypassed reach, and installing fish passage facilities, the project would continue to support the existing recreational opportunities by maintaining Goodyear Lake, the existing fisheries in the impoundment, and the river reach downstream of the project.

Although Goodyear Lake Hydro does not provide any boat launches or formal fishing access areas, New York DEC actively maintains and manages four public boat launch and fishing access sites and observed use at these sites does not appear to exceed demand. Further, no comments have been received from the public, nor the Goodyear Lake Association, which indicate activity at the reservoir has reached a level that is problematic to recreational users or permanent residents. Goodyear Lake Hydro's proposal, via the Settlement Agreement, to continue to maintain the canoe portage trail and enhance the trail by installing signage and fencing, would augment this recreation feature and ensure that individuals remain able to portage around the dam.

Land Use and Aesthetics

Goodyear Lake Hydro does not propose any measures to address land use or aesthetic resources at the project.

Our Analysis

As Goodyear Lake Hydro is not proposing any changes to the management of lands within the project boundary, continued operation of the project would have no effect on land use resources. Regarding Aesthetics, construction of the proposed fish passage measures (see section 3.3.1, *Aquatic Resources*) may temporarily disrupt both aural and visual resources near Colliersville dam; however, these impacts are expected to be minimal.

3.3.5 Cultural Resources

3.3.5.1 Affected Environment

Section 106 of the NHPA requires the Commission to evaluate potential effects on properties listed or eligible for listing in the National Register prior to an undertaking. In this case, the undertaking is the issuance of a new license for the Colliersville Project. Project-related effects could be associated with the continued operation and maintenance of the project, including construction of the proposed fish passage facilities.

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Traditional cultural properties are a type of historic property eligible for the National Register because of their association with cultural practices or beliefs of a living community that are: (1) rooted in that community's history or (2) important in maintaining the continuing cultural identity of the community. In this EA, we also use the term cultural resources to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register.

Section 106 also requires that the Commission seek concurrence with the New York SHPO, as appropriate, on any finding involving effects or no effects on historic properties, and allow the Advisory Council on Historic Preservation (Advisory Council) an opportunity to comment on any finding of effects on historic properties. If Native American properties have been identified, section 106 requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties.

On April 9, 2014, the Commission designated Goodyear Lake Hydro as the non-federal representative for carrying out day-to-day consultation regarding the licensing efforts, pursuant to section 106 of the NHPA. However, the Commission remains largely responsible for all findings and determinations regarding the effects of the project on any historic property.

Areas of Potential Effects

Pursuant to section 106 of the NHPA, the Commission must take into account whether any historic property could be affected by a new license within a project's area of potential effects (APE). The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. For the Colliersville Project, the APE includes the lands enclosed by the project's boundary.

Cultural History Overview

The earliest evidence of human occupation in New York dates to the Paleoindian Period (ca. 12,000 – 9,000 Before Present [BP]), when the continental glaciers retreated at the end of the last ice age. The retreat of the Laurentide Ice Sheet, an ice mass that once covered the project area, allowed people from the south, and perhaps west, to begin moving into the area. These first people arrived with a distinctive stone technology and way of life that included a highly mobile settlement pattern, and a subsistence pattern adapted to hunting large mammals and exploiting local small animal populations.

A warming and more arid climate following glacial retreat led to increased ecological diversity during the Archaic Period (ca. 9,000 – 3,000 BP). The Archaic Period was characterized by the establishment of settlement patterns that focused on seasonal resource availability; during the warmer months, populations gathered in larger river valleys and along the shorelines of lakes, and during colder months, family groups would disperse into the uplands and smaller valleys.

Following the Archaic Period, the Woodland Period (ca. 2,700 years B.P. – contact) saw the development of horticulture and other intensive forms of subsistence technologies and provided the basis for semi-sedentary and sedentary village life that was characterized by widespread and significant changes in cultural patterns across the eastern United States. The primary Early Woodland cultural complex identified in the region is the Meadowood phase. Meadowood projectile points and evidence of large Early Woodland base camps have been identified in areas near the project. Adena artifacts have also been found at archaeological sites downstream from the project, near the confluence of the Susquehanna River and Schenevus Creek. The presence of these artifacts suggests that the confluence of the Susquehanna River and Schenevus Creek was an important area of occupation during the Early Woodland Period.

Within New York, cultural traditions appearing during the Middle Woodland Period are significant to the development of later Iroquoian cultural patterns. During the Late Woodland Period, maize, bean, and squash agriculture became an important source of subsistence. The Owasco culture, generally identified as the precursor to the historic Iroquois, was the first group in central and eastern New York associated with extensive horticulture. Major sociopolitical changes accompanied the widespread adoption of

cultivation practices, including increased territorialization and changes in residence patterns. While the exact transition from the Owasco to Iroquoian traditions remains unclear, an identifiable Iroquoian tradition within eastern, central, and northern New York had emerged by the 1300s.

The first European settler in the township of Milford was a squatter by the name of Carr, who arrived prior to the American Revolution. In 1783, the first permanent settlers began arriving in Milford. That same year, Isaac Collier settled the village of Colliersville. Then, in February of 1791, Otsego County was set off from the larger Montgomery County and Cooperstown was named the county seat.

Early settlers recognized the hydropower potential afforded by the Susquehanna River and the first mill along the river was erected in 1792. In 1806, Isaac Collier's son, Peter, and Jared Goodyear built a dam across the Susquehanna River near the present-day location of the Colliersville dam (Town of Milford, 2018). By 1815, there were at least four mills along the Susquehanna River near Colliersville. Agriculture remained the primary economic activity within Milford Township, and the opening of the Albany and Susquehanna Railroad in 1866 linked the region to larger markets.

Project History

Between 1906 and 1907, the Hartwick Light and Power Company constructed what would become the Colliersville Project just upstream from the site of the former dam and mill owned by the Collier and Goodyear Families. The principal project facilities include the Colliersville dam, power canal, and powerhouse. In 1924, the upstream section of the canal was reconstructed after the original structure failed during a flood event. The powerhouse, which remains largely unchanged since its construction in 1906, was originally equipped with four horizontal-shaft, double-runner turbines.

The dam originally supplied power to the Oneonta & Mohawk Valley Electric Railroad (a trolley line that was part of what later became known as the Southern New York Railway) and nearby residential communities. Passenger service on this line ended in the late 1920s and freight service ended in 1940. In 1931, the dam was acquired by New York State Electric & Gas (Town of Milford, 2018). Historic operation of the project ceased in 1969, and the original generating equipment was removed in 1970. On March 13, 1979, F.W.E. Stapenhorst, Inc. was granted an original license from the Commission for the construction, operation, and maintenance of the current Colliersville Project. In 1979, F.W.E. Stapenhorst exchanged the original four generating units with two Ossberger crossflow turbine/generator units. In 1991, HDG (a subsidiary of Enel Green Power North America, Inc.) acquired the project, and in 2015, the project assets were transferred to Goodyear Hydro (also a subsidiary of Enel Green Power North America, Inc.).

The Colliersville dam impounds Goodyear Lake, a reservoir with a surface area of approximately 364 acres. In 1921, local property owners formed the Goodyear Lake Association for the mutual protection and development of the lake as a residential and summer camp community. The Goodyear Lake Association remains active today.

Cultural Resources Investigations

In July 2017, Goodyear Lake conducted literature and archive research using the New York Cultural Resource Information System (CRIS) database, which is maintained by the New York SHPO. Based on its review of the CRIS database, Goodyear Lake Hydro determined there are no previously documented archaeological or historic resources listed in or eligible for inclusion in the National Register located within the APE. Table 3 presents the resources identified through CRIS, their relation to the project's APE, and their National Register status.

While several archaeological investigations have been conducted near the project area, the project APE has not been subjected to systematic archaeological survey. However, the project is located in an area identified as archaeologically sensitive by the New York SHPO. In addition, while the Colliersville Project, which is over 110 years old, has not been formally evaluated to determine eligibility for inclusion in the National Register, Goodyear Lake Hydro states that the principal facilities, including the dam, power canal, and powerhouse, appear to maintain their integrity in form and function.

Table 3: Previously Identified Archaeological and Historic Resources near the Colliersville Project (Source: license, as modified by staff).

Site Name	Type	Location Relative to the APE	National Register Status
Chauncy & Squires Circular Sawmill	Archaeological Site	Approximately 60 feet outside of the APE	Undetermined
Gould Circular Sawmill	Archaeological Site	Approximately 100 feet outside of the APE	Undetermined
Goodyear Mills	Archaeological Site	Approximately 600 feet outside of the APE	Undetermined
Salone Site	Archaeological Site	Approximately 60 feet outside of the APE	Undetermined
Ewell Grist Mill/Feed Mill – NY 28	Building	Approximately 80 feet outside of the APE	Eligible
CR 35A Bridge – CR35A	Structure	Outside of but immediately adjacent to the APE	Eligible

2846 NY 28	Historic Building	Approximately 170 feet outside of the APE	Eligible
Portlandville Hamlet Historic District	Historic District	Outside of but immediately adjacent to the APE	Eligible

3.3.5.2 Environmental Effects

Goodyear Lake Hydro proposes to operate the project in a run-of-river mode and maintain the reservoir elevation at no more than 3 inches below the crest of the spillway (except during emergency provisions). Goodyear Lake Hydro also proposes to maintain a continuous minimum flow of 20 cfs or inflow to the project, whichever is less, downstream of the powerhouse during the first 5 years following issuance of a new FERC license. Then, after 5 years, this 20-cfs minimum flow would be released at the toe of the project dam into the bypassed reach. Goodyear Lake Hydro also proposes to install up to two seasonal upstream eel ramps, the location and operation of which would be determined based on 2 years of eel habitat use monitoring that would be initiated following issuance of the license. Finally, Goodyear Lake Hydro proposes to install and maintain a year-round downstream fish passage and exclusion structure in the power canal to facilitate the downstream movement of American eel and resident fish.

Goodyear Lake Hydro states that because the project has been operating in a run-of-river mode for over 100 years, it does not expect that run-of-river operation will have any effects on shoreline archaeological resources, should any be present within the APE. Regarding the construction of the proposed fish passage facilities (section 3.3.1, *Aquatic Resources*), Goodyear Lake Hydro states that these structures are expected to be built at previously disturbed locations within the footprint of the existing facilities, so it does not expect this construction to have an effect on any cultural resources at the project. Nevertheless, in its license application, Goodyear Lake Hydro states that it will consult with the New York SHPO to determine if additional cultural resources studies are required to identify any historic properties that may be affected by the project, assess the effects the construction and operation of the proposed fish passage facilities could have on any identified historic properties, and develop appropriate measures to avoid, minimize, or mitigate adverse effects on historic properties, if appropriate. However, the license application contains no information regarding consultation with the New York SHPO.

In response to the Commission's May 18, 2017 request for additional information about its consultation with the New York SHPO, Goodyear Lake Hydro sent a letter on August 7, 2017, to the New York SHPO. This letter described the Colliersville Project facilities; detailed the project's APE; included a discussion of the historic context, previously recorded archaeological and historic resources near the project, and project effects on archaeological and historic resources; and requested concurrence that the

project will have no effect on historic or archaeological resources listed in or eligible for listing in the National Register. In an August 31, 2017 response (filed with the Commission by Goodyear Lake Hydro on November 2, 2017), the New York SHPO states that it is not prepared to issue a no effect finding without first reviewing a cultural resources report that deals with the above-ground structures that comprise the Colliersville Project. By the letter dated November 2, 2017, Goodyear Lake Hydro agreed to complete an evaluation of the project's above-ground structures and prepare a report for the New York SHPO's review. That report has not yet been filed with the Commission.

In its August 31, 2017 letter, the New York SHPO also notes that while there are no archaeological sites in or adjacent to the APE that are currently listed or determined eligible for listing in the National Register, a number of sites have been recorded. Because no systematic archaeological survey of the APE has been completed, additional sites might also exist. Further, the New York SHPO requests that Goodyear Lake Hydro provide documentation of average daily and annual lake level fluctuations to confirm that there is no potential for erosive degradation of any lake-side archaeological sites, as stated by Goodyear Lake Hydro. Goodyear Lake Hydro responded that studies of several reservoir environments have demonstrated that the average reservoir shorelines achieve an equilibrium profile if the reservoir water level remains relatively stable over time, as has been the case at the Colliersville Project. Soils along the shoreline are deep, well drained, and are not generally susceptible to mass erosion, soil movement, slumping, or other forms of instability. Further, the shoreline of Goodyear Lake features many waterfront residences and seasonal camps that feature well-maintained and stabilized lawns and shorelines.[37]

Our Analysis

Project effects are adverse when an activity directly or indirectly alters the characteristics of an archaeological or historic property that qualifies it for inclusion in the National Register. If there is an adverse effect, then action must be taken to avoid, mitigate, or lessen the impact. The adverse effect also must be resolved in consultation with the designated SHPO.

While the Colliersville Project has not been formally evaluated to determine its eligibility for the National Register, it is over 110 years old and its principal facilities appear to retain their integrity in form and function. Except for replacing the four generating units with two Ossberger crossflow turbine/generator units, it appears few modifications have been made since the project was constructed in 1906/1907. As such, the project is potentially eligible for listing and, until it has been formally evaluated,

[37] *See* Goodyear Lake Hydro's November 2, 2017 letter.

should be treated as eligible. Goodyear Lake Hydro's proposed upstream and downstream fish passage facilities, while proposed to be built at previously disturbed locations within the existing project footprint, could alter the characteristics of project facilities, which would be an adverse effect to an eligible historic property. In addition, although Goodyear Lake Hydro proposes to operate the project in a run-of-river mode and, therefore, not affect shoreline resources, maintenance activities, vandalism, and mitigation measures associated with other project resources could cause other adverse effects.

Developing an HPMP that includes measures for protecting historic resources and provisions for consultation with the New York SHPO would ensure that adverse effects are addressed and the historic property is protected. The purpose of the HPMP would set forth specific actions and processes to manage historic properties within the APE during the term of a new license. It would serve as a guide for Goodyear Lake Hydro and provide a framework for consultation with the New York SHPO to ensure that the required approvals are received and appropriate measures are implemented as Goodyear Hydro designs and constructs the fish passage facilities. It also would provide a framework for operating personnel when performing necessary activities to address any ongoing and future effects to historic properties. Any HPMP should be prepared in accordance with the *Guidelines for the Development of Historic Properties Management Plans for FERC Projects* (Advisory Council and FERC, 2002), and include descriptions of the process for consulting with state and federal agencies, training staff, and periodically reviewing and revising the HPMP.

We note that Goodyear Lake Hydro has agreed to complete a cultural resources evaluation of the above-ground structures that comprise the Colliersville Project. Because the project was built in 1906 and retains integrity of location, design, and setting, the Colliersville Project is potentially eligible for listing in the National Register. However, an evaluation would confirm the project's eligibility and provide additional historic context. The results of this evaluation would further inform the necessary measures to be taken to protect the facility during construction of the fish passage facilities. Including the results of this evaluation in an HPMP would ensure that appropriate measures are taken to avoid, mitigate, or lessen adverse impacts to the project.

Finally, while the project is in an area identified as archaeologically sensitive by the New York SHPO and a comprehensive archaeological survey of the project boundary has not been completed, Goodyear Lake Hydro Goodyear Lake Hydro proposes to continue to operate the project in a run-of-river mode, as it has been operated for 110 years. Operating the project in run-of-river mode limits reservoir fluctuations and there is no indication that the shoreline would be affected by project operation. However, during the term of the license, it is possible that unknown archaeological or historic resources may be discovered during project-related activities that require ground-

disturbance. If previously unidentified archaeological or cultural artifacts are encountered, requiring Goodyear Lake Hydro to discontinue all ground-disturbing activities, notify the Commission and the New York SHPO, and consult on the proper treatment of the newly discovered resource would ensure any previously undiscovered resources are properly protected. Incorporating these measures into an HPMP would ensure that a process was in place to deal with any unintended discoveries.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate in its current manner. A 20-cfs minimum flow downstream of the powerhouse would continue and reservoir elevation would be maintained at no more than 12 inches below the spillway crest. The measures proposed by the licensee in the Settlement Agreement would not be required. As such, minimum flows and aquatic habitat in the bypassed reach would not be improved. The project would continue to impede American eel passage upstream of the dam and result in high mortality of American eel and some resident fish migrating downstream through the powerhouse. Furthermore, improvements to the canoe portage trail would not occur, limiting recreational access around the dam.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Colliersville Project's use of the Susquehanna River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[38] 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*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: 1) the cost of individual measures considered in the EA for the protection, mitigation, and enhancement of environmental resources affected by the project; 2) the cost of alternative power; 3) the total project cost (i.e., for operation, maintenance, and environmental measures); and 4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

Table 4 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by Goodyear Lake Hydro in its license application and subsequent submittals. We find that the values provided by the applicant are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs, net investment (the total investment in power plant facilities to be depreciated), estimated future capital investment required to

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[38] See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (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.

maintain and extend the life of plant equipment and facilities, relicensing costs, and normal operation and maintenance cost.

Table 4: Parameters for economic analysis of the Colliersville Project (Sources: Goodyear Lake Hydro and staff).

Parameter	Value
Period of analysis (years)	30
Term of financing (years)	20
Energy value ($/MWh)[a]	29.60
Capacity value ($/kilowatt-year)[a]	195
Net investment[b]	$383,550
Operation and maintenance ($/year)[c]	$246,615
Federal income tax rate (percent)[d]	21
Local tax rate (percent)[d]	3
Interest rate/discount rate (percent)[d]	8.00
Dependable capacity (kilowatts)	600

[a] Based on the Energy Information Administration's 2017 Annual Energy Outlook.
[b] Remaining undepreciated net investment and relicensing cost. Value provided by the applicant was updated to 2018.
[c] Includes insurance costs. Value provided by the applicant was updated to 2018.
[d] Estimated by staff.

4.2 COMPARISON OF ALTERNATIVES

Table 5 compares the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EA: no action, Goodyear Lake Hydro's proposal, the staff alternative, and the staff alternative with mandatory conditions.

Table 5: Summary of the annual cost of alternative power and annual project cost for the alternatives for the Colliersville Project (Source: staff).

	No Action	Goodyear Lake Hydro's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Installed capacity (MW)	1.4875	1.4875	1.4875	1.4875
Annual generation (MWh)	5,985	5,775	5,775	5,775
Dependable capacity (MW)	0.6	0.6	0.6	0.6
Annual cost of alternative power ($/MWh)	$294,160 49.15	$287,940 49.86	$287,940 49.86	$287,940 49.86
Annual project cost ($/MWh)	$291,850 48.76	$379,100 65.64	$369,850 64.04	$379,560 65.72
Difference between the cost of alternative power and project cost ($/MWh)	$2,310 0.38	($91,160) (15.79)	($81,910) (14.18)	($91,620) (15.86)

4.2.1 No-action Alternative

Under the no-action alternative, the Colliersville Project would continue to operate as it does now. With an installed capacity of 1.4875 MW, the project generates an average of 5,985 MWh of electricity annually. The average annual cost of alternative power would be $294,160, or about $49.15/MWh. The average annual project cost would be $291,850, or about $48.76/MWh. Overall, the project would produce power at a cost that is $2,310, or $0.38/MWh, less than the cost of alternative power.

4.2.2 Applicants' Proposals

Based on an installed capacity of 1.4875 MW and an average annual generation of 5,775 MWh, the cost of alternative power would be $287,940, or about $49.86/MWh. The average annual project cost would be $379,100, or $65.64/MWh. Overall, the

project would produce power at a cost that is $91,160, or $15.79/MWh, more than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative would have the same capacity and energy attributes as the applicant's proposal. Table 6 presents the staff-recommended additions, deletions, and modifications to the applicant's proposed environmental protection and enhancement measures and the estimated cost of each.

Based on an installed capacity of 1.4875 MW and an average annual generation of 5,775 MWh, the cost of alternative power would be $287,940, or about $49.86/MWh. The average annual project cost would be $369,850, or $64.04/MWh. Overall, the project would produce power at a cost that is $81,910, or $14.18/MWh, more than the cost of alternative power.

4.2.4 Staff Alternative with Mandatory Conditions

Under the staff alternative with mandatory conditions the Colliersville Project would have an installed capacity of 1.4875 MW and an average annual generation of 5,775 MWh, the cost of alternative power would be $287,940, or about $49.86/MWh. The average annual project cost would be $379,560, or $65.72/MWh. Overall, the project would produce power at a cost that is $91,620, or $15.86/MWh, more than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 6 gives the cost of each of the environmental enhancement measures for the project considered in our analysis. All costs in table 6 are in 2018 dollars. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 6: Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Colliersville Project (Sources: staff and Goodyear Lake Hydro).

Enhancement/Mitigation Measures	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Operate the project in run-of-river mode and maintain reservoir elevation within 3 inches of the spillway crest	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$0	$0	$0[a]
Provide a minimum flow of 20 cfs downstream of the powerhouse	Goodyear Lake Hydro, Staff	$0	$0	$0[a]
Provide a minimum flow of 20 cfs into the bypassed reach within 5 years	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$0	$6,216 (loss of energy)	$4,911[b]
Develop a stream flow and river monitoring plan (operation compliance monitoring plan)	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$5,000	$1,000	$1,250
Include procedures to verify a minimum flow of 20 cfs is released from the project in an operation compliance monitoring plan	Staff	$0	$0	$0[c]

Enhancement/Mitigation Measures	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Provide temporary American eel passage	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$1,000	$10,000	$4,125[d]
Monitor American eel use of the bypassed reach and tailrace for 2 years	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$5,000	$21,126	$3,103
Install and operate seasonal eel ramps	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$42,251	$5,281	$5,926[e]
Install and operate a downstream fish passage structure	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$633,770	$3,169	$60,021[f]
Evaluate effectiveness of the downstream fish passage structure	Goodyear Lake Hydro, Interior, New York DEC, SRBC	$105,628	$0	$9,709

Enhancement/Mitigation Measures	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Develop a fishway operation and maintenance plan	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$5,000	$3,000	$2,830
Include procedures for trial operation and testing known as a "shakedown" period and procedures to verify passage of American eel (upstream and downstream) and other resident fish (downstream only) in a fishway operation and maintenance plan	Staff	$0	$0	$0[c]
Implement the proposed Northern Long-eared Bat and Bald Eagle Protection Plan filed with the Settlement Agreement, which includes seasonal restrictions on tree clearing in proximity to bald eagle nests and northern long-eared bat roost trees or hibernacula.	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$2,113	$1,056	$1,029

Enhancement/Mitigation Measures	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Implement the proposed Invasive Plant Species Management Plan filed with the Settlement Agreement, which includes BMPs to minimize the spread of aquatic and terrestrial invasive plants during construction, operation, and maintenance.	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$1,056	$528	$514
Maintain the existing canoe portage trail and install additional signage and fencing.	Goodyear Lake Hydro, Interior, New York DEC, SRBC, Staff	$3,169	$528	$709
Develop an HPMP.	Staff	$5,000	$0	$460

Note: Costs provided by the applicant are indexed to 2018 dollars.

[a] No additional costs because this is a continuing measure.

[b] Cost based on a loss of 210 MWh in generation as provided by the applicant in its August 16, 2017 response to staff's additional information requests.

[c] Staff estimates that there would be no additional cost for this measure.

[d] Staff assumes that Goodyear Lake Hydro would use eel traps to provide temporary upstream passage, and that this measure would be implemented for 8 years.

[e] Staff assumes that the seasonal eel ramps would begin operating in the 9th year after the effective date of a license.

[f] Staff assumes that the annual cost would begin to incur in the 5th year after the effective date of a license.

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 licensing the Colliersville Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review and evaluation of the environmental and economic effects of the proposed action and its alternatives, we selected the staff alternative as the preferred alternative for the Colliersville Project. We recommend this alternative because: (1) issuing a new license for the project would allow Goodyear Lake Hydro to continue to operate the project and provide a beneficial and dependable source of electric energy; (2) generation from the Colliersville Project, with an installed capacity of 1.4875 MW of electric capacity, comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish resources and would improve public recreation opportunities at the project.

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

5.1.1 Measures Proposed by the Applicant

Based on our environmental analysis of Goodyear Lake Hydro's proposal in section 3.0, *Environmental Effects*, and the costs presented in section 4.0, *Developmental Analysis*, we recommend the following environmental measures proposed by Goodyear Lake Hydro to protect and enhance environmental resources, and believe these measures would be worth their cost. Therefore, we recommend the following proposed measures in any license issued for the Colliersville Project:

Project Operation

- Operate the project in a run-of-river mode and maintain water surface elevation in the reservoir at no more than 3 inches below the spillway crest to protect aquatic resources (section 3.4.1 of the Settlement Agreement);

- Provide a continuous minimum flow of 20 cfs, or inflow, whichever is less, to the bypassed reach within 5 years of the effective date of any license issued by the Commission to improve water quality and fish habitat in the bypassed reach (section 3.1.1 of the Settlement Agreement); and

- Continue to provide a continuous minimum flow of 20 cfs or inflow, whichever is less, downstream of the powerhouse after the effective date of any license issued by the Commission and until the 20-cfs minimum flow can be provided to the bypassed reach, to protect aquatic resources.

Aquatic Resources

- Develop a stream flow and river monitoring plan to ensure compliance with run-of-river operation and verify water levels in the impoundment (section 3.4.1 of the Settlement Agreement);

- Provide a temporary method for upstream American eel passage during the first field season following the effective date of any license issued by the Commission until the installation of seasonal eel ramps to facilitate upstream eel passage is completed (section 3.2.1 of the Settlement Agreement);

- Monitor American eel use of the bypassed reach and tailrace to determine the proper location of seasonal eel ramp(s) (section 3.2.1 of the Settlement Agreement);

- Install up to two seasonal eel ramps within 1 year following completion of the eel monitoring described above to facilitate upstream eel passage (section 3.2.1 of the Settlement Agreement);

- Install a downstream fish passage and exclusion structure within 5 years of the effective date of any license issued by the Commission to facilitate the downstream passage of eel and other resident fish (section 3.2.2 of the Settlement Agreement); and

- Develop a fishway operation and maintenance plan that specifies the timing, location, and operation of all fish passage structures to facilitate passage

upstream and downstream of the project (section 3.2.3 of the Settlement Agreement).

Terrestrial Resources and Threatened and Endangered Species

- Implement the proposed Invasive Plant Species Management Plan filed with the Settlement Agreement; and

- Implement the proposed Northern Long-eared Bat and Bald Eagle Protection Plan filed with the Settlement Agreement.

Recreation, Land Use, and Aesthetics

- Install fencing and signage associated with the canoe portage route that exists on the east side of the dam (section 3.3.1 of the Settlement Agreement).

5.1.2 Additional Staff-recommended Measures

Under the staff alternative, the project would be operated with Goodyear Lake Hydro's proposed measures, as identified above, and the following additions or modifications:

- Include the applicant's stream flow and river monitoring plan and procedures to ensure a 20-cfs minimum flow is released from the project within an operation compliance monitoring plan;

- Modify the fishway operation and maintenance plan to include procedures for trial operation and testing known as a "shakedown" period, as well as procedures to verify passage of American eel (upstream and downstream) and other resident fish (downstream only); and

- Develop an HPMP.

Below, we discuss the basis for our staff-recommended measures and the rationale for modifying Goodyear Lake Hydro's proposal.

Project Operation and Water Levels

Goodyear Lake Hydro proposes to operate the project in run-of-river mode and maintain water surface elevation in the reservoir at no more than 3 inches below the spillway crest (150.22 feet). As described in the Settlement Agreement, temporary alterations to run-of-river operation or water levels in the reservoir could occur but must be reported to Interior, New York DEC, and the SRBC within 5 business days and FERC

within 10 business days. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed run-of-river operation and management of water levels in the reservoir.

Continuing run-of-river operation and maintaining water levels near the spillway crest would protect aquatic habitat and species within the reservoir and downstream of the project. Specifically, if the units trip offline, spill would occur quickly, minimizing any effects on flow and aquatic species downstream of the project. In the reservoir, continued maintenance of water levels near the spillway crest would protect fish species such as sunfish that build nests and spawn in shallow near-shore habitat. As such, we recommend Goodyear Lake Hydro operate the project in run-of-river mode and maintain the water level in the reservoir as proposed in the Settlement Agreement. There is no cost associated with this measure since Goodyear Lake Hydro typically operates the project as proposed.

Minimum Flows

Goodyear Lake Hydro proposes to release a continuous minimum flow of 20 cfs, or inflow to the project if less, to the bypassed reach within 5 years of the effective date of any license issued by the Commission. The bypass flow would be provided through the downstream fishway as defined in section 3.2.2 of the Settlement Agreement, or by other means as determined by Goodyear Lake Hydro in consultation with Interior, New York DEC, and SRBC. As described in the Settlement Agreement, temporary alterations to flow in the bypassed reach could occur but must be reported to Interior, New York DEC, and the SRBC within 5 business days and FERC within 10 business days. In its license application, Goodyear Lake Hydro proposes to maintain the 20-cfs flow, or inflow to the project if less, in the project's tailrace until it develops a mechanism to release the minimum flow to the bypassed reach. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed minimum flow in the bypassed reach.

Releasing a minimum flow of 20 cfs into the bypassed reach would substantially increase wetted width, water depth, and the amount of riverine habitat for aquatic species relative to existing conditions. In addition, providing a 20-cfs minimum flow in the bypassed reach would improve water quality by reducing the large diel swings in temperature and dissolved oxygen concentration. Increased habitat quantity and quality would likely facilitate the movement of aquatic species into and out of the reach and protect various species and life stages of fish and macroinvertebrates. Until a mechanism to release the minimum flow in the bypassed reach is developed, continued minimum flow releases of 20 cfs to the project's tailrace would be adequate to protect aquatic resources downstream of the project.

As such, we recommend Goodyear Lake Hydro maintain a minimum flow of 20 cfs downstream of the project's powerhouse, as proposed in its license application, and release a minimum flow of 20 cfs in the bypassed reach through the downstream fish passage structure within 5 years of any license issued by the Commission, as described in the Settlement Agreement. If the proposed minimum flow of 20 cfs is not delivered to the bypassed reach through the downstream fish passage structure, discussed below, we recommend that Goodyear Lake Hydro develop, for Commission approval, a final design plan for the minimum flow mechanism, including the operation and maintenance procedures, to ensure the proposed minimum flow in the bypassed reach is maintained. There is no cost associated with releasing 20 cfs downstream of the powerhouse as Goodyear Lake Hydro currently releases this flow. We estimate that the levelized annual cost to direct a continuous 20-cfs flow to the bypassed reach would be $4,911 as a result of lost generation and conclude that the benefits of the measure would outweigh the costs.

Stream Flow and River Monitoring Plan (Operation Compliance Monitoring Plan)

Goodyear Lake Hydro proposes to develop a stream flow and river monitoring plan to verify water levels in the reservoir. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's development of the proposed stream flow and river monitoring plan.

The settlement parties essentially describe a need for an operation compliance monitoring plan. Goodyear Lake Hydro currently operates the project in a run-of-river mode using an automatic pond level control system that maintains water levels in the reservoir near the spillway crest and trips the units offline if water levels fall more than 3 inches below the spillway crest. Implementation of an operation compliance monitoring plan would verify that run-of-river operation and related reservoir levels are maintained, which should protect aquatic resources within and downstream of the project area and provide a mechanism to report any deviations from the operational requirements of any license issued by the Commission. In addition, an operation compliance monitoring plan could include measures to ensure the minimum 20-cfs flow is released from the project. Therefore, we recommend that Goodyear Lake Hydro develop an operation compliance monitoring plan that includes: (1) a detailed description of the automatic pond level control system, normal project operation, and manual project operation; (2) procedures to ensure a minimum flow of 20 cfs is released from the project; (3) a provision to monitor water levels in the reservoir; and (4) provisions for reporting any operational deviations to the Commission. We estimate that the levelized annual cost to develop an operation compliance monitoring plan would be $1,250 and conclude that the benefits of the plan would outweigh the costs.

Upstream Passage of American Eel

The project's dam is likely a barrier to the upstream migration of American eel throughout most of the year. Therefore, Goodyear Lake Hydro proposes to provide temporary upstream passage for eel during the first field season following the effective date of any license issued by the Commission. Temporary upstream passage would be achieved through the deployment of up to three eel ramps or traps downstream of the dam within 10 days of ice out, or April 1, whichever is later, through November 30. In addition, Goodyear Lake Hydro proposes to monitor and evaluate eel use of the bypassed reach and tailrace for 2 years following the establishment of the 20-cfs bypassed reach minimum flow to identify potential locations for a seasonal eel ramp(s). Upon completion of the eel monitoring, Goodyear Lake Hydro would install and operate up to two seasonal eel ramps. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed upstream eel passage measures.

Upstream eel passage would improve access to approximately 22 miles of mainstem Susquehanna River habitat and numerous tributaries. Goodyear Lake Hydro's proposed temporary passage measures would facilitate the upstream passage of American eel until an eel habitat use evaluation can be completed. Eel trapping would allow Goodyear Lake Hydro to identify when the upstream eel migration occurs at the project and would provide information such as the timing, number, location, and size of eels at the project that would be useful to refine both temporary and seasonal eel passage measures. An upstream eel passage evaluation that continues to implement the temporary eel passage measures would help identify potential passage routes and locations for seasonal eel ramps. Monitoring eels after any minimum flows are established in the bypassed reach would be the most efficient strategy to evaluate seasonal upstream eel passage options. As such, we recommend Goodyear Lake Hydro's upstream eel passage measures as described in the Settlement Agreement. In addition, we recommend that Goodyear Lake Hydro submit annual reports with the results of temporary upstream eel passage efforts and the eel habitat use survey to the Commission. Reports should contain information on the timing, number, location, and size of American eel captured while implementing these measures. We estimate that the levelized annual cost to implement temporary eel passage measures ($4,125), conduct eel habitat use monitoring ($3,103), and install seasonal ramps ($5,926) would be $13,154 and conclude that the benefits of these measures would outweigh the costs.

Downstream Fish Passage

Currently, downstream passage routes for fish include the powerhouse where fish are susceptible to injury and mortality, or over the spillway if flow exceeds the capacity of the powerhouse. Therefore, Goodyear Lake Hydro proposes to install a downstream

fish passage and exclusion structure in the power canal to facilitate the downstream movement of American eel and resident fish. The proposed design of the downstream fishway would meet applicable criteria from FWS's Design Criteria Manual, including a trashrack with 0.75-inch clear bar spacing that would guide fish that enter the power canal to a low-level outlet that would discharge into the upstream end of the bypassed reach. The proposed outlet would have a discharge capacity of 20 cfs to fulfill the proposed minimum flow to the bypassed reach discussed above. Goodyear Lake Hydro proposes to install the structure within 5 years of the effective date of any license issued by the Commission. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish passage measures.

Intake velocity at the existing trashrack is low and most species and life stages of fish would be able to escape impingement and entrainment. However, American eel and other large species moving downstream could suffer very high mortality if entrained through the project's turbines. Providing a safe pathway for downstream fish passage would protect silver phase American eel and other resident species from injury and mortality. Although, the proposed design of the fishway lacks detail at this stage, the Design Criteria Manual includes standards for trashrack angle, velocities at the trashrack and fish conveyance structure, conveyance dimensions, and plunge pool depth that should ensure safe downstream passage of American eel and other resident species. The abundance of eels upstream of the project is unknown, but the upstream eel passage measures discussed above would likely increase the number of eels upstream of the project. Because eels develop over several years before migrating downstream to the ocean, implementation of downstream fish passage measures within 5 years would be sufficient to protect American eels. Therefore, we recommend Goodyear Lake Hydro's proposed downstream fish passage structure as described in the Settlement Agreement. We estimate that the levelized annual cost to install a downstream fish passage structure would be $60,021 and conclude that the benefits of the structure would outweigh the costs.

Fishway Operation and Maintenance Plan

In order to ensure proper operation of the proposed fishways described above, Goodyear Lake Hydro proposes to develop a fishway operation and maintenance plan within 4 years of any license issued by the Commission. The plan would include a description of the project and fisheries, an implementation schedule for the fishways, and operation and maintenance procedures. The plan would also include a requirement for annual assessment and reporting of fishway operation, including a summary of any operational deviations, and newly available fisheries data including passage data from any eel transport operations, the two-year eel habitat use evaluation, and the results of any downstream passage effectiveness study. Under the Settlement Agreement, fish

passage may be curtailed or suspended by the licensee but must be reported to Interior, New York DEC, and the SRBC within 5 business days and FERC within 10 business days. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish passage measures.

To maintain effectiveness fish passage facilities need to be properly operated and maintained. An operation and maintenance plan would ensure that permanent or seasonal fishways constructed at the project would be operated during the appropriate times of the day and year, with an appropriate conveyance flow. In addition, the plan would ensure that routine cleaning and maintenance, including debris removal, are performed so that the fishways operate as intended. Reporting the results of temporary upstream eel passage measures and the eel habitat use monitoring could be done independently of a fishway operation and maintenance plan, as recommended above. Accordingly, we recommend that Goodyear Lake Hydro develop a fishway operation and maintenance plan for the permanent downstream fishway and the seasonal upstream American eel fishway(s) as described in the Settlement Agreement.

In order to ensure the fishways operate as designed, we also recommend that Goodyear Lake Hydro include procedures for trial operation and testing known as a "shakedown" period, as well as procedures to verify passage of American eel (upstream and downstream) and other resident fish (downstream only). We estimate that the levelized annual cost to develop a fishway operation and maintenance plan would be $2,830 and conclude that the benefits of the plan would outweigh the costs.

Invasive Plant Species Management Plan

Several aquatic and terrestrial invasive plant species occur at the Colliersville Project. The Invasive Plant Species Management Plan, filed with the Settlement Agreement, includes measures to prevent the introduction and spread of terrestrial and aquatic invasive plant species, such as employing best management practices (BMPs) during construction or maintenance, cleaning and drying boats that come into contact with water, and use of invasive-free materials and seed stock during replanting. We estimate that the levelized annual cost to implement the Invasive Plant Species Management Plan would be $514, and conclude that the benefits of the measure would outweigh the costs.

Northern Long-eared Bat and Bald Eagle Protection Plan

Maintenance of the project has the potential to clear forested habitat, and thus impact summer roosting habitat for the federally listed threatened northern long-eared bat, and nesting habitat for the state-listed threatened bald eagle. Suitable summer roosting habitat for the northern long-eared bat exists within the project boundary, and

bald eagles have been observed at and near the project during the breeding season. The Northern Long-eared Bat and Bald Eagle Protection Plan, filed with the Settlement Agreement, includes provisions to: (1) notify FWS and New York DEC if bald eagle nesting activity or a northern long-eared bat roost tree or hibernacula is discovered within or immediately adjacent to the project boundary; (2) modify the timing of tree-clearing activity to minimize impacts on bald eagles; (3) consult with FWS and New York DEC prior to tree clearing within the project boundary to ensure that there is no additional information on northern long-eared bat presence within the project boundary; and (4) during tree clearing, maintain a minimum distance of 150 feet from any known occupied maternity roost tree during the June 1 to July 31 period, and 0.25-mile distance from any known occupied bat hibernacula. We estimate that the levelized annual cost to implement the Northern Long-eared Bat and Bald Eagle Protection Plan would be $1,029, and conclude that the benefits of the measure would outweigh the costs.

Canoe Portage Trail

Public recreation facilities at the project provide access to Goodyear Lake, the bypassed reach, and the downstream reach of the Susquehanna River for boating, fishing, and swimming. While Goodyear Lake Hydro does not provide any boat launches or formal fishing access areas, New York DEC actively maintains and manages four public boat launch and fishing access sites and observed use at these sites does not appear to exceed demand. Further, no comments have been received from the public that indicate that activity at the reservoir has reached a level that is problematic to recreational users or permanent residents. Goodyear Lake Hydro's proposal, via the Settlement Agreement, to continue to maintain the canoe portage trail and install new signage and fencing, would enhance this recreation feature and ensure that individuals remain able to portage around the dam. We estimate that the levelized annual cost to install the signage and fencing and maintain the portage trail would be $709, and conclude that the benefits of the measure would outweigh the costs.

Historic Properties Management Plan

While the Colliersville Project has not been formally evaluated to determine its eligibility for the National Register, it is over 110 years old and its principal facilities appear to retain their integrity in form and function. As such, the project is potentially eligible for listing and, until it has been formally evaluated, should be treated as eligible. Goodyear Lake Hydro's proposed upstream and downstream fish passage facilities, while proposed to be built at previously disturbed locations within the existing project footprint, could alter the characteristics of the project, which could be an adverse effect to an eligible historic property. In addition, although Goodyear Lake Hydro proposes to operate the project in run-of-river mode and, therefore, not affect shoreline resources, maintenance activities, vandalism, and mitigation measures associated with other project

resources could cause other adverse effects. Developing an HPMP, in accordance with the *Guidelines for the Development of Historic Properties Management Plans for FERC Projects*, to protect historic properties that are eligible for the National Register would ensure that adverse effects are addressed. The HPMP should include steps Goodyear Lake Hydro will follow while designing and constructing the fish passage facilities in order to minimize adverse effects to the historic project facilities, and a description of the steps that will be taken in the event previously unidentified cultural resources are discovered during project-related activities that require ground-disturbance. These steps would include discontinuing all ground-disturbing activities, notifying the Commission and the New York SHPO, and consulting on the proper treatment of the newly discovered resource. In addition, Goodyear Lake Hydro has already agreed to complete an evaluation of the project's above-ground structures and prepare a report for the New York SHPO's review. The results of that evaluation should be included in the HPMP.

An HPMP that includes the above measures would serve as a guide for Goodyear Lake Hydro and provide a framework for consultation with the New York SHPO to ensure that the required approvals are received and appropriate measures are implemented. It also would provide a framework for operating personnel when performing necessary activities to address any ongoing and future effects to historic properties. We estimate that the levelized annual cost to develop an HPMP would be $460, and conclude that the benefits of the plan would outweigh the costs.

5.1.3 Measures Not Recommended by Staff

Downstream Eel Passage Effectiveness Testing

Goodyear Lake Hydro proposes to evaluate the effectiveness of any new downstream fish passage structure, if requested by Interior, New York DEC, and the SRBC, no sooner than 10 years after the effective date of any license issued by the Commission. Effectiveness testing would consist of one study event focused on evaluating the successful downstream passage of American eel. As evidenced by their execution of the Settlement Agreement, Interior, New York DEC, and the SRBC support Goodyear Lake Hydro's proposed downstream fish passage measures.

No party to the Settlement Agreement has identified a specific study framework or performance standard(s) that would be used to evaluate the successful downstream passage of American eel. Instead, the settlement parties would develop an effectiveness study plan post-licensing, if requested by Interior, New York DEC, and the Susquehanna River Basin. Without specific performance standards to evaluate, there is no information to analyze or determine whether effectiveness testing would benefit American eel. Therefore, there is no justification for recommending a downstream eel passage effectiveness study. Furthermore, the fishway operation and maintenance plan, as

discussed above, should provide adequate information to verify the proposed fishways operate as designed.

River Management Fund and Committee

In the Settlement Agreement, Goodyear Lake Hydro proposes, as an off-license measure, to: (1) establish a river management fund within 12 months of the effective date of any license issued by the Commission; (2) contribute $15,000 to the fund upon establishment and an additional $15,000 to the fund one year following its establishment; (3) convene a river management fund committee consisting of the parties to the Settlement Agreement and; (4) provide administrative support for the committee. The fund would support projects for fish passage, ecosystem restoration, natural resource stewardship, public education, recreation, and/or applied research and development within the Upper Susquehanna River Basin, but would not be used to carry out any obligations under any FERC license or amendment thereto.

We do not recommend that Goodyear Lake Hydro establish a river management fund and committee because these actions are not specific protection, mitigation, or enhancement measures associated with the Colliersville Project. It is the Commission's strong preference to require specific measures directed towards a specific project effect and/or purpose, where such non-specific measures have been proposed.[39] However, because the Settlement Agreement already stipulates that this measure not be included in any license issued for the project, Goodyear Lake Hydro, New York DEC, Interior, and SRBC are free to pursue such funding for measures separate from any license that may be issued.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Some entrainment mortality is likely unavoidable for juveniles of most fish species, even with the proposed downstream passage measures. Most adult fish could avoid involuntary entrainment, but entrainment of some small fish could still occur. However, we expect the long-term impact of entrainment to have minimal consequences to the fish communities in the reservoir and downstream of the project because most fish would either remain in the reservoir or pass safely downstream through the proposed downstream fish passage structure.

[39] See *Policy Statement on Hydropower Licensing Settlement*s, Docket No. PL06-5-000, issued on September 21, 2006.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission should include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency.

In response to our April 16, 2018 notice soliciting comments, recommendations, terms and conditions, and prescriptions, Interior filed five section 10(j) recommendations for the project on June 15, 2018. Table 7 lists the recommendations filed subject to section 10(j), and indicates whether the recommendations are included under the staff alternative, as well as the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Table 7. Analysis of fish and wildlife agency recommendations for the Colliersville Project (Source: staff).

Recommendation	Agency	Within the Scope of Section 10(j)	Levelized Annual Cost	Recommend Adopting?
Provide a minimum continuous year-round release of 20 cfs to the project's bypassed reach, or inflow to the project, whichever is less	Interior	Yes	$4,911	Yes
Develop a stream flow and water level monitoring plan in consultation with, and approved by FWS, New York DEC, and SRBC for the purpose of monitoring compliance with operational license requirements that protect fish and wildlife resources.	Interior	Yes (for developing a stream flow and water level monitoring plan); No (for final approval by the agencies)[a]	$1,250	Yes[b]
Operate the project in a year-round, run-of-river mode with a tolerance of 3 inches below the dam crest.	Interior	Yes	$0	Yes
Implement the Northern Long-eared Bat and Bald Eagle Protection Plan, filed with the Settlement Agreement, for the purpose of minimizing the effects of tree clearing on bald eagle and northern long-eared bat habitat.	Interior	Yes	$1,029	Yes
Implement the Invasive Species Management Plan,[c] filed with the Settlement Agreement, for the purpose of minimizing the introduction and spread of aquatic and terrestrial invasive plant species.	Interior	Yes	$514	Yes

[a] Agency approval of a plan is not a specific fish and wildlife measure.
[b] While consultation with the agencies on plan development is expected, we note that the Commission maintains sole authority to approve or modify any resource plan.
[c] Staff assume that Interior's recommendation is for implementation of the Invasive *Plant* Species Management filed with the Settlement Agreement.

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 16 qualifying comprehensive plans that are applicable to the Colliersville Project, located in New York. No inconsistencies were found.

The following is a list of qualifying comprehensive plans relevant to the Colliersville Project:

Adirondack Park Agency. n.d. New York State wild, scenic, and recreational rivers system field investigation summaries. Albany, New York.

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National Marine Fisheries Service. 1998. Final Recovery Plan for the shortnose sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. December 1998.

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New York State Office of Parks, Recreation, and Historic Preservation. New York Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2003-2007. Albany, New York. January 2003.

Susquehanna River Basin Commission. 2016. Comprehensive plan for the water resources of the Susquehanna River Basin. Harrisburg, Pennsylvania. June 2016.

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6.0 FINDING OF NO SIGNIFICANT IMPACT

If the Colliersville Project is relicensed with our recommended measures, the project would operate while providing enhancements to fish and wildlife resources, improvements to recreation opportunities, and protections to historic resources in the project area.

Based on our independent analysis, issuance of a subsequent license for the Colliersville Project, with additional staff-recommended 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

Andy Bernick –Terrestrial Resources, and Threatened and Endangered Species (Wildlife Biologist; Ph.D., Ecology, Evolutionary Biology, and Behavior; and B.S., Wildlife Biology and Management).

Emily Carter – Project Coordinator, Recreation, Land Use, Aesthetics, and Cultural Resources (Environmental Biologist; Master of Natural Resources; B.A., Environmental Studies)

Monir Chowdhury – Engineering, Need for Power, and Developmental Resources (Engineer; Ph.D. and M.S., Environmental Engineering; and B.S., Civil Engineering, P.E.)

Nicholas Ettema – Geologic and Soil Resources, Aquatic Resources (Fisheries Biologist; M.S., Aquatic Ecology, B.S., Biology)

APPENDIX A

U.S. DEPARTMENT OF INTERIOR'S SECTION 18 PRELIMINARY FISHWAY PRESCRIPTIONS

9 PROPOSED PASSAGE FACILITIES

This Preliminary Prescription is based on a Settlement Agreement (Goodyear 2018) signed by the Service, the NYSDEC, the SRBC, and the Applicant. The Settlement Agreement includes a phased approach to implementing fish passage measures and effectiveness testing at the Project.

9.1 UPSTREAM EEL PASSAGE

The following text was taken from the Settlement Agreement for the Project (Goodyear 2018): "During the first field season following the effective date of the subsequent license to be issued by the Commission until establishment of the seasonal upstream eel ladder(s), the Licensee shall provide a temporary method for upstream American eel movement. Upstream movement will be provided through the deployment of up to three temporary eel ramps/traps within 10 days of ice out, or April 1, whichever is later, through November 30. The temporary method for upstream eel movement will be conducted in consultation with and approved by the USFWS, the NYSDEC, and the SRBC. In addition, during the first field season following establishment of the bypass flow, as defined by Section 3.1, the licensee will initiate a two-year study of American Eel use of the Project's bypassed reach and tailrace. The study will be performed in consultation with the USFWS, the NYSDEC, and the SRBC and will consist of the continued deployment of up to three temporary eel ramps/traps within 10 days of ice out, or April 1, whichever is later, through November 30, for two years. The results of the study will be provided to the USFWS, the NYSDEC, and the SRBC within three months following the study, and will be used to help determine the location of up to two seasonal upstream eel ramps to be installed at the Project within 12 months following completion of the study.

The design of the seasonal upstream eel ladder(s) will be developed in consultation with the USFWS, the NYSDEC, and the SRBC. The Licensee will provide the USFWS and the NYSDEC with a design for the upstream eel ladder(s) six months prior to installation of the eel ladder(s). The ease of installation to adverse effects from high flows will be considered in the design. The final designs must be approved by the USFWS, the NYSDEC, and the SRBC. The Parties agree that the Licensee will make modifications to the design, location, and/or flows associated with the eel ladder(s), in order to ensure safe, timely, and effective upstream movement of American Eel, if required by the USFWS, the NYSDEC, or the SRBC.

The seasonal upstream eel ladder(s) will be operated during a timeframe determined in consultation with, and approved by, the USFWS, the NYSDEC, and the SRBC. The installation/operation of the eel ladder(s) in the spring will be dependent upon river flows and ice conditions. The seasonal eel ladder(s) will be installed/operated, following ice out, but no earlier than April 1, and when river flows allow for the safe installation and operation of the structures."

9.2 DOWNSTREAM PASSAGE AND EXCLUSION

The following text was taken from the Settlement Agreement for the Project (Goodyear 2018): "Within five (5) years (60 months) of the effective date of the subsequent license to be issued by the Commission, the Licensee shall install and maintain a year- round downstream fish passage and exclusion structure for the downstream movement of American Eel and resident species that may enter the Project's power canal and desire to move downstream. The design of the downstream fish passage and exclusion structure will be developed in consultation with, and approved by, the USFWS, the NYSDEC, and the SRBC. The Licensee will provide the USFWS, the NYSDEC, and the SRBC with a design for the structure 12 months prior to installation of the structure. The Parties agree that the downstream fish passage and exclusion structure will meet applicable USFWS design criteria and standards, including a trashrack clear-spacing of ¾" and low-level outlet for American Eel. The Parties agree that a minimum continuous year-round release of at least 20 cfs will be provided as an attraction flow through the fishway. The Parties agree that the intake geometry and site-specific parameters (e.g., location of bypass structure relative to the Project's turbine intakes) will be taken into consideration during the design phase.

If following installation of the downstream fish passage structure the USFWS, the NYSDEC, and the SRBC requests [sic] that effectiveness testing of the structure is necessary for American Eel, the Licensee will perform such testing. The effectiveness testing would consist of one study event focused on American Eel, as compared to other species, and would be performed no sooner than 10 years following the effective date of the subsequent license to be issued by the Commission. The purpose of the effectiveness testing will be to determine if the downstream structure guides American Eel out of the Project's power canal and into the river downstream of the Project's spillway. The Licensee will prepare an effectiveness testing plan that will be provided to the USFWS and the NYSDEC for review and approval at least six months prior to implementation of the plan.

The Parties agree that there may be modifications to the downstream passage facility as a result of the downstream effectiveness study to include increases in flow and design changes, as necessary to provide safe, timely, and effective downstream fish passage."

9.3 FISHWAY OPERATION AND MAINTENANCE PLAN AND REPORT

The following text was taken from the Settlement Agreement for the Project (Goodyear 2018): "Within 48 months of the effective date of the subsequent license to be issued by the Commission, the Licensee shall provide a Fishway Operation and Maintenance Plan (FOMP) to the Commission. The FOMP shall be developed in consultation with the USFWS, the NYSDEC, and the SRBC. The FOMP should include: a description of the project and fisheries, an implementation schedule for the fishways, and operation and maintenance procedures. The FOMP will be updated as needed in consultation with the USFWS, the NYSDEC, and the SRBC.

Annually, the Licensee will prepare a Fishway Operation and Maintenance Report (FOMR) and submit it to the USFWS, the NYSDEC, and the SRBC by January 31 each year following completion of the facility's construction. The FOMR will be in letter report format and will include

a summary of the current state of the fishways (structures, flows, etc.) and a yearly fishway operation and maintenance report (deviations, issues, timing of installation, etc.). The FOMR will also include any newly available fisheries data (e.g., data from the two-year upstream eel study, data from any eel transport operations, or data from any downstream effectiveness study). The FOMR will reference the FOMP and will provide an assessment of any necessary or recommended changes to the FOMP. A specific reporting milestone for the 10-year downstream effectiveness study time period should be included, with annual reminders thereafter. This is to ensure that future staff from the USFWS, NYSDEC, and SRBC are made aware of the option to test the effectiveness of the downstream structures."

9.4 EXCEPTIONS

The following text was taken from the Settlement Agreement for the Project (Goodyear 2018): "The fish passage and/or protection measures may be curtailed or suspended for short periods upon prior mutual agreement between the Licensee, the USFWS, and the NYSDEC. In the event of any operating emergency beyond the control of the Licensee, the fish passage and/or protection measures may be curtailed or suspended for only the time period necessary to rectify such an operating emergency. The Licensee shall notify the USFWS, the NYSDEC, and the SRBC by phone call or email as soon as possible, but no later than five (5) business days after any such operating emergency. The Licensee shall notify the FERC in writing within ten (10) days after any such operating emergency, or by any period as established by the FERC."

10 STATUTORY AUTHORITY

Section 18 of the FPA, 16 USCS §811, states in pertinent part:

The Commission shall require the construction, maintenance and operation by the Licensee at its own expense of such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior.

Section 1701(b) of the National Energy Policy Act of 1992, P.L. 102-486, Title XVII, §1701(b), 106 Stat. 3008, states:

The items which may constitute a 'fishway' under section 18 [16 USCS §811] for the safe and timely upstream and downstream passage of fish shall be limited to physical structures, facilities, or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities or devices necessary to ensure the effectiveness of such structures, facilities, or devices for such fish.

The Preliminary Prescription for Fishways herein is issued under the authority delegated to the Service from the Secretary of the Interior pursuant to Section 18 of the FPA. See 64 Stat.1262; 209 Departmental Manual 6.1; and 242 Departmental Manual 1.1A.

11 RESERVATION OF AUTHORITY TO PRESCRIBE FISHWAYS

In order to allow for the timely implementation of fishways, including effectiveness measures, the Department reserves its authority through the Commission's inclusion of the following condition in any license(s) it may issue for the Project:

Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior during the term of the license pursuant to Section 18 of the Federal Power Act.

12 PRELIMINARY PRESCRIPTION FOR FISHWAYS

Pursuant to Section 18 of the FPA, as amended, the Secretary of the Department, as delegated to the Service, proposes to exercise his/her authority to prescribe the construction, operation, and maintenance of such fish passage facilities and measures as deemed necessary, subject to the procedural provisions contained above.

Fish passage facilities and or measures shall be constructed, operated, and maintained to provide safe, timely, and effective passage for American eels at the Licensee's expense.

To ensure the immediate and timely contribution of the fish passage facilities and measures to fish restoration and enhancement in the Susquehanna River, the following are included and shall be incorporated by the Licensee to ensure the effectiveness of the fishways pursuant to Section 1701(b) of the 1992 National Energy Policy Act (P.L. 102-486, Title XVII, 106 Stat. 3008).

12.1 DESIGN CRITERIA

While the Department does not have a precise estimate of the numbers of eels that would be expected to pass above the Project, measures to achieve safe, timely, and effective passage at the Project would enhance the eel stocks and help achieve overall management goals of Federal and State resource agencies, and the ASMFC.

Therefore, the Licensee will be required to design fishway(s) at the Project sufficient to pass all available upstream migrating eels that arrive at the Project in order to access the 22.4 miles of mainstem and additional tributary rearing habitat above the Project. Because eels migrate downstream to the sea to complete their life cycle, the Licensee will be required to provide downstream passage for eels. The goal for eel passage at the Project is for all eels seeking to go above or below the dam to do so safely, timely, and effectively.

12.2 CONSULTATION

The Licensee shall develop all fish passage designs, studies, plans, schedules, and any supporting information to the fish passage measures described herein in consultation with, and submit for approval by, the Service.

12.3 FISHWAY INSPECTIONS

The Licensee shall provide personnel of the Department, and other Department-designated representatives, access to the Project site and to pertinent Project records, for the purpose of inspecting the fish passage measures to determine compliance with the Prescription.

12.4 FISH PASSAGE OPERATION AND MAINTENANCE PROCEDURES

The timely and proper implementation of the fish passage measures is necessary to ensure the effectiveness of such measures. Accordingly, the Department includes herein the express requirement that the Licensee develop a Fishway Operation and Maintenance Plan (FOMP) and a Fishway Operation and Maintenance Report (FOMR) for implementation at the Project. The FOMP and FOMR will be developed and maintained as described in Section 9.4.

The Service must give preliminary approval of the FOMP prior to the Licensee filing the FOMP with the Commission for final approval. Any material change to the FOMP, including in use or schedule, in fact or practice, that affects fish passage, must be approved by the Service prior to it being filed with the Commission or implemented. The Licensee will provide written documentation to the Service and resource agencies that all fishway operational personnel have reviewed and understand the FOMP, and it will be signed by the operations manager of the Project.

12.5 TEMPORARY UPSTREAM AMERICAN EEL PASSAGE

The Licensee shall implement a temporary method for upstream American eel passage as described in Section 9.1.

12.6 UPSTREAM AMERICAN EEL STUDY

The Licensee shall conduct a 2-year study of American eel at the Project as described in Section 9.1. Reporting of the upstream American eel study should be included in the FOMR, as described in Section 9.3. The Service, in consultation with the NYSDEC and the SRBC, maintains the final authority to determine the adequacy and representativeness of the study. The Service may require additional study to provide the data necessary to evaluate the effectiveness of the fishway should the initial study be deemed inadequate or unrepresentative.

12.7 UPSTREAM AMERICAN EEL PASSAGE

The Licensee shall design, construct, and maintain up to two seasonal upstream eel ladders(s) as described in Section 9.1.

12.8 DOWNSTREAM PASSAGE AND EXCLUSION

The Licensee shall design, construct, and maintain a year-round downstream fish passage and exclusion structure as described in Section 9.2.

12.9 EFFECTIVENESS TESTING

The Licensee shall develop plans for, and conduct, a downstream passage and exclusion effectiveness testing for American eel, if requested, as described in Section 9.2. Reporting of fish passage effectiveness testing should be included in the FOMR, as described in Section 9.3. The Service, in consultation with the NYSDEC and the SRBC, maintains the final authority to determine the adequacy and representativeness of the study. The Service may require additional study to provide the data necessary to evaluate the effectiveness of the fishway should the initial study be deemed inadequate or unrepresentative.

12.10 MODIFICATIONS

The Licensee shall modify the fish passage and exclusion facilities, the operation of these facilities, and the FOMP if deemed necessary by the Service, in consultation with the NYSDEC, SRBC, and the Licensee as described in Section 9. The Service maintains the final authority to determine if any modifications may be necessary based on the Service's engineering expertise, resource management goals, and results of any studies or effectiveness testing.

12.11 EXCEPTIONS

The fish passage and/or protection measures may be curtailed or suspended for short periods upon prior mutual agreement between the Licensee, the USFWS, and the NYSDEC as described in Section 9.4.

12.12 SCHEDULING

Timely construction, operation, maintenance, and measures for upstream and downstream fish passage, including studies and evaluations, are necessary to ensure their effectiveness and to achieve restoration goals. Therefore, the Licensee shall notify and obtain approval from the Service for any extension to comply with prescribed conditions.

12.12.1 Implementation Schedule

The fish passage conditions included in this Preliminary Prescription will be implemented according to the schedule outlined in the Settlement Agreement (Table 12.12-1).

Table 12.12-1. Implementation Schedule for the Colliersville Project (FERC No. 2788) (Goodyear 2018).

Section	Measure	Implementation Schedule
3.1.1	Bypass Flow	Within 60 months of effective date of subsequent license.
3.2.1	Temporary Upstream American Eel Passage	Beginning the first field season following the effective date of the subsequent license.
3.2.1	Two-year Upstream American Eel Passage Study	Beginning the first field season following establishment of the bypass flow.

3.2.1	Upstream Eel Ladder Design	Six months prior to installation of the seasonal upstream eel ladder passage.
3.2.1	Seasonal Upstream Eel Ladder Passage	The first field season after the end of the American Eel upstream movement study.
3.2.2	Downstream Passage	Within 60 months of effective date of subsequent license.
3.2.2	American Eel Downstream Passage Effectiveness Study	No sooner than 10 years following effective date of subsequent license and, if requested by the USFWS, the NYSDEC, and the SRBC.
3.2.3	Fishway Design and Fishway Operation and Maintenance Plan	Within 48 months of effective date of subsequent license.
3.2.3	Annual Fishway Operation and Maintenance Report	Annually, by January 31, after the construction of the downstream fish/eel passage.
3.3.1	Canoe Portage Signage	Within 6 months of the effective date of the subsequent license.
3.3.1	Dam Abutment Fencing	Within 12 months of the effective date of the subsequent license.
3.4.1	Stream Flow and River Monitoring Plan and Run-of-River Operation	Within 6 months of the effective date of subsequent license.

12.12.2 Operational Schedule

The fish passage facilities shall be operated seasonally for upstream passage and year-round for downstream passage as described in Section 9. The seasonal upstream eel ladder(s) will be operated during a timeframe determined in consultation with, and approved by, the Service.