DRAFT ENVIRONMENTAL ASSESSMENT

FOR NEW HYDROPOWER LICENSE

Blenheim-Gilboa Pumped Storage Project
FERC Project No. 2685-029

New York

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

August 2018

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ACRONYMS AND ABBREVIATIONS

Settlement Agreement	2018 Comprehensive Relicensing Settlement Agreement among the New York Power Authority, the U.S. Fish and Wildlife Service, the New York State Department of Environmental Conservation, and the New York State Office of Parks, Recreation, and Historic Preservation
Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effect
Blenheim	Town of Blenheim, New York
Blenheim-Gilboa Project or project	Blenheim-Gilboa Pumped Storage Project
B.P.	Before Present
°C	degrees Celsius
certification	water quality certification
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FERC Form-80	Licensed Hydropower Development Recreation Report
FPA	Federal Power Act
FPC	Federal Power Commission
FWS	U.S. Fish and Wildlife Service
Gilboa	Town of Gilboa, New York
HP	horsepower
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Conservation
kV	kilovolt
kVA	kilovolt ampere
Lansing Manor Complex	Lansing Manor and Blenheim-Gilboa Visitors Center
mg/L	milligrams per liter
mL	milliliters

µS/cm	micro-Siemens per centimeter
MW	megawatts
MWh	megawatt-hour
NGVD 29	National Geodetic Vertical Datum of 1929
National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
New York City DEP	New York City Department of Environmental Protection
New York DEC	New York State Department of Environmental Conservation
New York Parks	New York State Office of Parks, Recreation, and Historic Preservation
NHPA	National Historic Preservation Act
NPCC	Northeast Power Coordinating Council
NTU	Nephelometric Turbidity Unit
NWS	National Weather Service
NYISO	New York Independent System Operator
NYPA	New York Power Authority or Power Authority of the State of New York
PA	programmatic agreement
Park Service	National Park Service
RM	river mile
SAV	submerged aquatic vegetation
Schoharie County BOS	Schoharie County Board of Supervisors
USGS	United States Geological Survey
V	volt
Visitors Center	Blenheim-Gilboa Visitors Center
WI/PWL	waterbody inventory/priority waterbodies list
WSE	water surface elevation

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1.0 INTRODUCTION

1.1 APPLICATION

On April 27, 2017, the New York Power Authority (NYPA) filed an application for a new license with the Federal Energy Regulatory Commission (Commission) to continue to operate and maintain the Blenheim-Gilboa Pumped Storage Project No. 2685 (Blenheim-Gilboa Project or project). The 1,160-megawatt (MW) pumped storage project is located on Schoharie Creek, in the Towns of Blenheim and Gilboa in Schoharie County, New York (figures 1, 2, and 3). The project does not occupy federal land. For the period 2007 through 2016, the project's average annual generation was about 374,854 megawatt-hours (MWh) and average annual energy consumption from pumping was about 540,217 MWh. NYPA proposes no new capacity and moderate new construction relating to upgrading and improving existing recreation facilities and creating fish habitat in the project's upper reservoir.

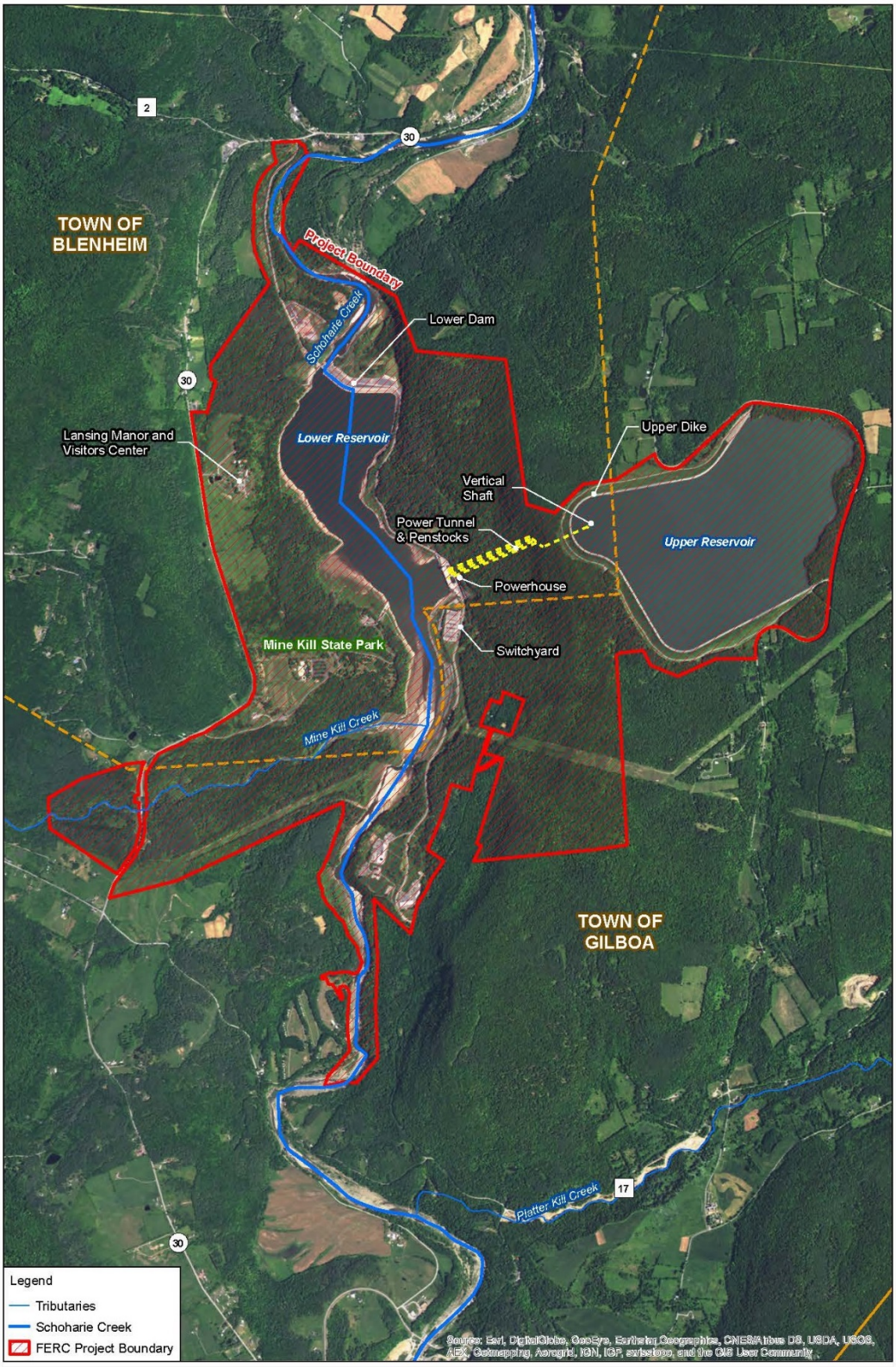

Figure 1. Blenheim-Gilboa Project boundary, Schoharie County, New York (Source: license application, as modified by staff).

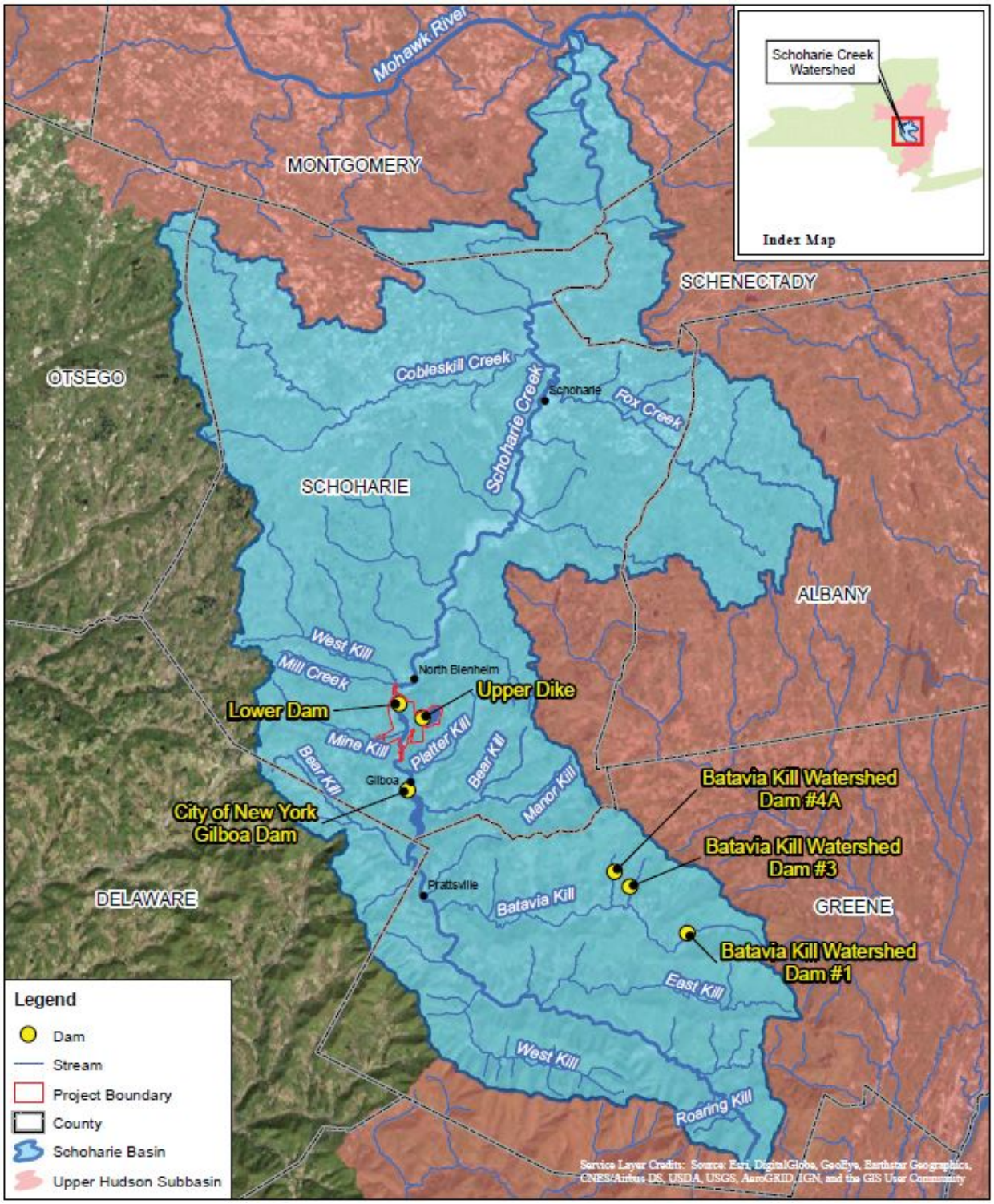

Figure 2. Blenheim-Gilboa Project location within the Schoharie Creek watershed, Schoharie County, New York (Source: license application, as modified by staff).

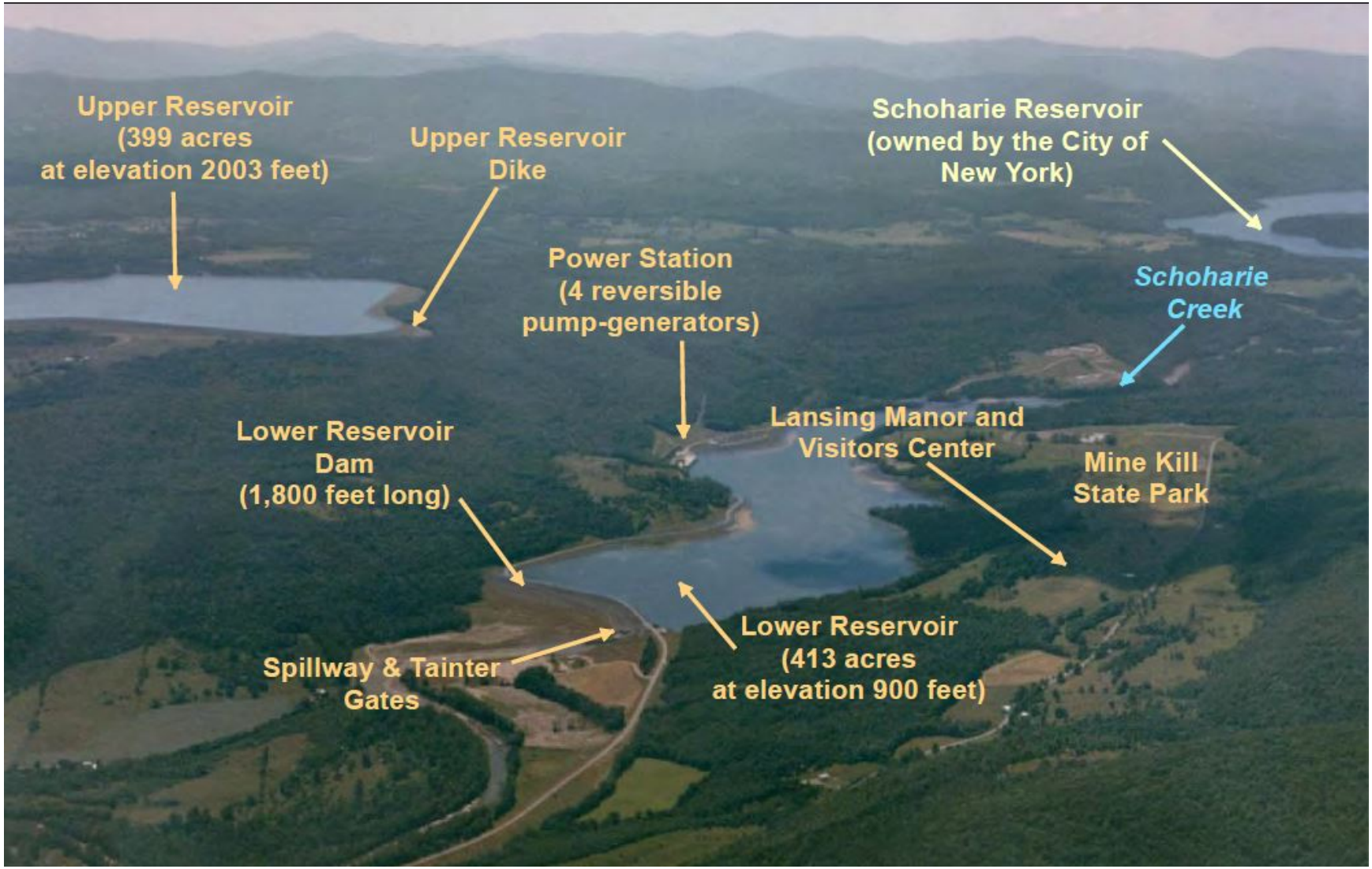

Figure 3. Aerial view of Blenheim-Gilboa Project facilities (Source: license application, as modified by staff).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Blenheim-Gilboa Project is to provide a source of hydroelectric power to meet the New York region's power needs. Under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a new license to NYPA for the Blenheim-Gilboa Project's continued operation and what conditions, if any, 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 draft 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 proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become part of any license issued.

In this draft EA, we assess the effects of: (a) continued project operation as proposed in the application and as specified in the Comprehensive Relicensing Settlement Agreement[1] (Settlement Agreement) (proposed action); (b) the proposed action with additional or modified measures (staff alternative); and (c)

[1] NYPA filed a Comprehensive Relicensing Settlement on February 23, 2018, on behalf of itself, the U.S. Fish and Wildlife Service (FWS), the New York State Department of Environmental Conservation (New York DEC), and the New York State Office of Parks, Recreation, and Historic Preservation (New York Parks).

On May 20, 2018, NYPA also filed a Local Community Relicensing Settlement Agreement, describing off-license agreements among NYPA and the Towns of Blenheim and Gilboa, New York. As the terms of this agreement are not enforceable under the Commission's regulations, the effects of this off-license settlement are not analyzed within this draft EA.

no action. The primary issues associated with relicensing this project are: (1) water management (e.g., upper and lower reservoir levels and downstream flows); (2) aquatic habitat enhancements (constant-level ponds[2] and fish attraction structures) in the upper reservoir; and (3) recreational access.

1.2.2 Need for Power

Pumped storage facilities are net energy consumers. The amount of energy produced as water passes from the upper reservoir to the lower reservoir through the turbines is less than the amount of energy required to operate the plant and to pump water back up to the upper reservoir. However, the benefits of pumped storage facilities are realized when the price for pumping is much less than the value of generation. Typically, there are sources of power such as nuclear, solar, and wind projects that can provide power at low rates during night-time or low-demand hours, compared to rates available during day-time, high-demand hours. Such facilities can include base-load nuclear, coal, and fossil-fueled facilities, as well as renewable resource facilities powered by solar, wind, hydrokinetics, biomass, and other resources. Base-load units are typically brought on-line and remain operational through the course of the day because it is inefficient to bring them on and off line due to the lengthy startup time required, and because they operate at optimum efficiency at higher load. Therefore, the pumped storage facilities can provide power during the day when energy demands are high and can use power from other facilities during the night when energy demand is low.

The Blenheim-Gilboa Project, as a pumped storage facility, provides the New York region with power at times of high energy use and is available in a reserve mode to respond to an unanticipated loss of generation within the electric system. The project has an installed capacity of 1,160 MW and has a gross average annual energy production of approximately 374,854 MWh (2007-2016).

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The project is located within the Northeast Power Coordinating Council (NPCC) - New York region of NERC. According to NERC's 2017 forecast (NERC, 2017), average annual total internal demand requirements for the region are projected to grow at a rate of 0.1 percent from 2018 through 2027. NERC projects anticipated reserve capacity margins (generating capacity in excess of

[2] NYPA constructed four constant-level ponds in the northeast portion of the upper reservoir to provide stable habitat for fish during water-level fluctuations and create spawning and rearing habitat for warmwater, nest-building fish species.

demand) in the region will range between 25.64 percent and 22.54 percent of firm peak demand during the 10-year forecast period.

Should a new license for the Blenheim-Gilboa Project not be granted, the services that the project provides to the grid, including peaking generation and black start capability would need to be provided by other existing projects or in some other fashion by the system operator. Because the project is a net consumer of electricity, the power the project generates itself would not need to be replaced. We conclude that power from the Blenheim-Gilboa Project would help meet a need for power in the NYISO-region in both the short and long-term.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Blenheim-Gilboa Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described below.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require the construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Department of the Interior (Interior). On March 1, 2018, Interior filed a reservation of authority to prescribe fishways, under section 18 of the FPA.

1.3.1.2 Section 10(j) Recommendations

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

Interior filed timely recommendations under section 10(j) on March 1, 2018. In section 5.4, *Fish and Wildlife Agency Recommendations*, we discuss how we address the agency recommendations and how they comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain either 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 CWA, or a waiver of certification by the appropriate state agency. The appropriate state agency's failure to act on a request for certification within a reasonable period of time, not exceed to one year, after receipt of such request constitutes a waiver.

On February 28, 2018, NYPA applied to the New York State Department of Environmental Conservation (New York DEC) for certification for the project. The request for certification was received by New York DEC on the same date. New York DEC has not yet acted on the application.

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 March 7, 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 federally listed species, the threatened northern long-eared bat (*Myotis septentrionalis*), has the potential to occur within the project boundary.[3]

An analysis of project effects on the northern long-eared bat is presented in section 3.3.4, *Threatened and Endangered Species*, and staff's recommendations are included in section 5.1, *Comprehensive Development and Recommended Alternative*. Based on the available information, we conclude that relicensing the project, with the proposed seasonal tree-clearing restrictions described in NYPA's Land Management Plan and Recreation Management Plan, is not likely to adversely affect the northern long-eared bat.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. §1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state's coastal zone management agency concurs with the license applicant's certification of consistency with the

[3] *See* March 8, 2018, official species list memorandum.

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 a letter dated April 3, 2017 and filed with the license application, the New York State Department of State indicated that the Blenheim-Gilboa Project is not located within and does not affect New York State's coastal zone, and that NYPA is not required to submit a federal consistency certification application.

1.3.5 National Historic Preservation Act

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

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) to protect historic properties from the effects of operation of the Blenheim-Gilboa Project. Operation of the Blenheim-Gilboa Project has the potential to adversely affect the Lansing Manor, which is listed on the National Register, and the Blenheim-Gilboa Project and Mine Kill State Park, both of which will likely be eligible for listing in the National Register in 2019 when they reach 50 years of age. The terms of the PA would ensure that NYPA addresses any adverse effects to historic properties identified within the Area of Potential Effects (APE) through the implementation of the Historic Properties Management Plan (HPMP) for the Blenheim-Gilboa Project, which was filed with the license application and updated with the Settlement Agreement.

In its comments on the Settlement Agreement, the New York State Historic Preservation Officer (New York SHPO) states that it supports the Settlement Agreement without reservation or qualification. The New York SHPO states that the HPMP identifies architectural resources within the Blenheim-Gilboa Project boundary, establishes management and consultation measures for avoiding and mitigating adverse effects, and provides for the continued operation of Lansing Manor as a public museum. In addition, although no eligible or listed archaeological resources have been identified within the APE, the HPMP contains archaeological resource management measures to be implemented in the event of any future discoveries. As such, the New York SHPO has concluded that the HPMP constitutes a full, complete, and exhaustive set of protection, mitigation, and enhancement license measures.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR, section 16.8) 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 completed and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this draft EA, we conducted scoping to determine what issues and alternatives should be addressed. We issued an initial scoping document (SD1) on June 4, 2014. It was noticed in the Federal Register on June 10, 2014. We held public scoping meetings on July 7 and 9, 2014, to request comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

Commenting Entity	Date Filed
FWS	July 31, 2014
Anne Mattice Strauch	August 4, 2014
Christian Strauch	August 4, 2014
Robert Olsen	August 6, 2014
Dam Concerned Citizens	August 6, 2014
American Whitewater	August 6, 2014
Blenheim Long-Term Community Recovery Committee	August 6, 2014
Town of Fulton, New York	August 7, 2014
New York DEC	August 7, 2014
Renee Grabowski	August 7, 2014
Town of Schoharie, New York	August 8, 2014
Town of Blenheim, New York	August 8, 2014
Town of Conesville, New York	August 8, 2014
Middleburgh Fire Department	August 8, 2014
Schoharie County Board of Supervisors	August 8, 2014
Gail Shaffer	August 8, 2014
Ruth Mattice	August 11, 2014
Town Board of Middleburgh, New York	August 13, 2014

Based on comments received during the July 7 and 9, 2014, scoping meetings and written comments received during the scoping process, we issued a revised scoping document (SD2) on September 18, 2014.

1.4.2 Interventions

On October 12, 2017, the Commission issued a notice accepting the application and setting December 11, 2017, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed notices of intervention or motions to intervene (none opposed issuance of a license):

Intervenor	Date Filed
American Whitewater	November 3, 2017
Interior	December 7, 2017
Schoharie County, New York	December 8, 2017
Dam Concerned Citizens	December 11, 2017
Towns of Blenheim and Gilboa, New York	December 11, 2017
New York State Council of Trout Unlimited	December 27, 2017[4]

1.4.3 Comments on the Application

On January 4, 2018, the Commission issued a Ready for Environmental Analysis (REA) notice requesting comments, recommendations, and terms and conditions, and prescriptions. On February 23, 2018, NYPA 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 March 1, 2018, notice, and set March 21, 2018 as the deadline for comments, recommendations, terms and conditions, and prescriptions. The following entities responded:[5]

[4] On February 9, 2018, the Commission granted the New York State Council of Trout Unlimited's late motion to intervene.

[5] Several commenting entities in the following table commented on the proposed license term for the Blenheim-Gilboa Project, and whether entities support it or propose an alternative license term. Recommending a specific license term is beyond the scope of Commission staff's analysis within the draft EA; the Commission will determine an appropriate license term in any license issued for the project. Commenting entities also requested that certain non-public, dam safety-related documents be made available to the public. Pursuant to section 215A(d) of the Federal Power Act, the Commission designates certain types of information as Critical Energy/Electric Infrastructure Information (CEII) to protect energy facilities. To obtain such information from the Commission, members of the public may obtain non-public information by submitting a Freedom of Information Act (FOIA) request and complying with regulations under 18 C.F.R. § 388.113.

Commenting Entity	Date Filed
Village of Middleburgh, New York	February 16 and April 16, 2018
Town of Fulton, New York	February 20, 2018
Interior	March 1, 2018
FWS	March 1, 2018
Dam Concerned Citizens	March 5 and 13, 2018
American Whitewater	March 6, 2018
New York Parks	March 13, 2018
New York DEC	March 15, 2018
Schoharie County, New York	March 22, 2018
Congressman John J. Faso	March 22, 2018
Middleburgh Fire Department	March 27, 2018
Town of Gilboa, New York	April 6, 2018
Town of Blenheim, New York	April 6, 2018

NYPA filed reply comments on May 4, 2018. The Town of Fulton and Dam Concerned Citizens filed responses to NYPA's reply comments on May 22, 2018 and June 1, 2018, respectively.

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 Blenheim-Gilboa Project is located on Schoharie Creek within the towns of Blenheim and Gilboa, approximately two river miles downstream from New York DEC's Gilboa Dam (figures 1 and 3).

The project consists of: (1) a 2.25-mile-long, 30-foot-wide earth and rock fill embankment dike with a maximum height of 110 feet, constructed at Brown

Mountain and forming the 399-acre upper reservoir (operating at the maximum and extreme minimum elevations of 2,003 feet and 1,955 feet National Geodetic Vertical Datum of 1929 [NGVD 29], respectively) with 15,085 acre-feet of usable storage and dead storage of 3,706 acre-feet below elevation 1,955 feet NGVD 29; (2) a 655-foot-long emergency spillway with a 25-foot-wide asphaltic concrete crest at elevation 2,005 feet NGVD 29 and a capacity of 10,200 cubic feet per second (cfs); (3) an intake system that includes: (i) a 125-foot-wide hexagonal-shaped intake cover supported by six vertical concrete piers, and trash racks attached to the outside of the piers with a clear spacing of 5.25 inches; (ii) a 1,042-foot-long, 28-foot-diameter, concrete-lined vertical shaft in the bottom of the upper reservoir; (iii) a 906-foot-long horizontal, concrete-lined rock tunnel; and (iv) a 460-foot-long concrete-lined manifold that distributes flow to four 12-foot-diameter steel-lined penstocks, each with a maximum length of about 1,960 feet, to four pump-turbines located at the powerhouse; (4) a 526-foot-long, 172-foot-wide, and 132-foot-high multi-level powerhouse located along the east bank of the lower reservoir at the base of Brown Mountain, containing four reversible pump turbines that each produce approximately 290 megawatts (MW) in generation mode, and have a total maximum discharge of 12,800 cfs during generation and 10,200 cfs during pumping; (5) powerhouse trash racks, including a bottom trash rack with a clear spacing of 5.625 inches, and four upper trash racks with a clear spacing of 5.25 inches; (6) an 1,800-foot-long central core, rock-filled lower dam with a maximum height of 100 feet that impounds Schoharie Creek to form the 413-acre lower reservoir (operating at the maximum and minimum elevations of 900 feet and 860 feet NGVD 29, respectively) with 12,422 acre-feet of usable storage and dead storage of 3,745 acre-feet below 860 feet NGVD 29; (7) three 38-foot-wide by 45.5-foot-high Taintor gates at the west end of the lower dam; (8) a 425-foot-long, 134-foot-wide concrete spillway structure with a crest elevation of 855 feet NGVD 29; (9) a 238-foot-long, 68.5-foot-deep concrete stilling basin; (10) a low-level outlet with four discharge valves of 4-, 6-, 8-, and 10-inch diameters for release of 5 to 25 cfs, and two 36-inch-diameter Howell-Bunger valves to release a combined flow of 25 to 700 cfs; (11) a switchyard on the eastern bank of Schoharie Creek adjacent to the powerhouse; and (12) appurtenant facilities.

The project boundary encloses the facilities described above (figure 1). The project boundary encompasses 2,893 acres of land including the two reservoirs which have a total surface area of approximately 838 acres. All land within the project boundary is owned by NYPA.

2.1.2 Project Safety

Dam Concerned Citizens, Congressman John J. Faso, Schoharie County, and other stakeholders throughout the proceeding have expressed dam safety

concerns due to the watershed's large surface runoff, the difference in Probable Maximum Precipitation and Probable Maximum Flood calculations used for the project in comparison to those used for New York City DEP's Gilboa Dam, and the adequacy of project facilities to withstand anticipated extreme weather events. These issues relating to dam safety are addressed through the Commission's dam safety criteria found in Part 12 of the Commission's regulations and the Engineering Guidelines as follows.

The Blenheim-Gilboa Project has been operating for more than 45 years under its existing license[6] and 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 relicensing, Commission staff will evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff will continue to inspect the project during any new license term to ensure 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. The Commission will continue to require NYPA to ensure that the project meets the Commission's dam safety criteria found in Part 12 of the Commission's regulations and the Engineering Guidelines (http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp).

2.1.3 Existing Project Operation

During operation, the water being stored is conveyed from the upper reservoir to the lower reservoir during generation and is returned to the upper reservoir during pumping. The project's pump-turbines may be turned on or off several times throughout the day, but the project typically generates electricity during the day when consumer demand is high and other power resources are more expensive. Pumping usually occurs at night and on weekends when there is excess electricity in the system available for use.

The upper reservoir currently operates between a normal minimum water surface elevation of 1,955 feet NGVD 29 and a normal maximum elevation of

[6] The Commission issued an original license to NYPA on June 6, 1969, with an expiration date of April 30, 2019.

2,003 feet NGVD 29, a fluctuation of 48 feet. The lower reservoir currently operates between a normal minimum water surface elevation of 860 feet NGVD 29 and a maximum of 900 feet NGVD, for a maximum of 40 feet of fluctuation.

According to a July 30, 1975, settlement agreement on the project's Water Management Plan (1975 Water Management Plan),[7] during low-flow periods (when there is no spill from Gilboa Dam, which is located upstream of the project), NYPA releases a minimum flow of 10 cfs to Schoharie Creek if there is at least 1,500 acre-feet of 'make-up water'[8] in storage. When there is less than 1,500 acre-feet of make-up water in storage, the 1975 Water Management Plan stipulates that a minimum flow of 7 cfs be provided unless: (1) project inflows from Mine Kill and Platter Kill tributaries (combined) are less than 7 cfs during the period March 15-July 15; or (2) if during the period July 16-March 14, there is an insufficient amount of make-up water in the reservoir system to augment tributary inflows and achieve a total downstream release of 7 cfs. In both of these cases, flow releases from the lower dam approximate the prorated project inflow from the Mine Kill and Platter Kill tributaries combined.

For the period 2007 through 2016, the project's average annual generation was about 374,854 megawatt-hours (MWh) and average annual energy consumption from pumping was about 540,217 MWh.

2.1.4 Existing Environmental Measures

Under the current license, NYPA funds eight U.S. Geological Survey (USGS) stream gages within Schoharie Creek, and releases minimum flows per the 1975 Water Management Plan, as described above.[9]

[7] *See* the Commission's July 30, 1975, order approving settlement agreement.

[8] NYPA defines "make-up" water as the amount of water which is normally available in the reservoir system to account for evaporation and to enhance aquatic life downstream during low-flow periods by maintaining a minimum release from the lower dam.

[9] The license application states that the gage locations are Schoharie Creek at Prattsville, Manor Kill at West Conesville near Gilboa, Schoharie Reservoir near Grand Gorge, Schoharie Creek at Gilboa, Platter Kill at Gilboa, Mine Kill near North Blenheim, Schoharie Creek at North Blenheim, and Schoharie Creek at Breakabeen, New York.

Under the current license, NYPA also:

- monitors rates of landslide movement within the project boundary;
- aerates water releases from the lower dam between 5 and 700 cfs;
- stocks fish annually in the lower and upper reservoirs to support New York DEC's active management of the reservoirs and provide recreational fishing opportunities;
- maintains four constant-level ponds in the upper reservoir to provide stable habitat and water levels for littoral zone fishes;
- maintains a 1,600-acre wildlife management area, including 2 acres of wetlands and an eastern bluebird trail;
- maintains a white-tailed deer management area for winter forage;
- administers a permit-only archery deer hunting program on project lands;
- operates and maintains three upper reservoir recreation sites and a fishing access area on Schoharie Creek below the lower dam;
- supports the operation and maintenance of Mine Kill State Park; and
- operates and maintains the Lansing Manor Complex,[10] including Lansing Manor and the Blenheim-Gilboa Project Visitors Center.

2.2 NYPA'S PROPOSAL

2.2.1 Proposed Project Facilities and Project Boundary

NYPA does not propose to construct any new project facilities. NYPA proposes to remove from the project boundary a 53-acre parcel on the southwestern side of the project boundary, west of New York State Route 30. NYPA states that the parcel is surplus land that is not needed for any project purpose. The parcel includes steep, forested land and a portion of Mine Kill, and is adjacent to (but not part of) Mine Kill State Park.

[10] The Lansing Manor Complex, discussed below in section 3.3.5, *Recreation, Land Use, and Aesthetics*, consists of the Lansing Manor House Museum (including outbuildings, such as a Tenant House, Land Office, and Corn Crib) and the Blenheim-Gilboa Visitors Center.

2.2.2 Proposed Project Operation and Environmental Measures

NYPA does not propose any changes to project operation. Under the proposed Water Management Plan, NYPA could continue pumping operations until the upper reservoir water level reaches 2,003 feet NGVD 29 or the lower reservoir level reaches 860 feet NGVD 29, whichever comes first. NYPA may continue generating until the upper reservoir level reaches 1,955 NGVD 29 feet or the lower reservoir level reaches 900 feet NGVD 29, whichever comes first.

NYPA proposes the following measures to protect or enhance environmental resources at the project, represented by the five plans filed with the Settlement Agreement:

- Implement the Water Management Plan, which would replace the 1975 Water Management Plan, to include:
    - Providing aeration for water releases from the lower dam between 5 cfs and 700 cfs;
    - When there is no spill from the Gilboa Dam, release a minimum flow from the lower dam of at least 5 cfs (or project inflow if less) and up to 10 cfs depending on reservoir elevations and capacities.
    - Continuing to fund the operation and maintenance of eight existing USGS streamflow gages, and funding the construction, operation, and maintenance of seven new USGS streamflow gages within lower Schoharie Creek;
    - Establishing procedures for project releases from the lower dam during low-, moderate-, and high-flow periods. At the sole discretion of its management, NYPA would implement operational measures during high-flow events (e.g., lowering reservoir levels prior to a forecasted storm, peak shaving, and pumping to the upper reservoir, etc.) to potentially attenuate downstream effects of such events; and
    - Consulting with New York DEC to develop a flow regime within Schoharie Creek downstream of Gilboa Dam once New York City DEP begins conservation releases[11] from Gilboa Dam.

[11] At Gilboa Dam, New York City DEP is currently constructing an intake structure at the bottom of Schoharie Reservoir (impounded by Gilboa Dam), subsurface tunnels, and a valve chamber along Schoharie Creek, to provide New York City DEP with the capability to release water into Schoharie Creek "to

- Implement the Ecological Enhancement Plan, to include:
    - Installing fish attraction structures in the upper reservoir within 3 years of license issuance;
    - Monitoring of the fish attraction structures for fish usage, general condition, and location in years 1, 3, and 5 following installation;
    - Enhancing the habitat complexity of one of the constant-level ponds in the upper reservoir within 3 years of license issuance;
    - Conducting post-construction monitoring of the enhanced constant-level pond;
    - Establishing an Ecological Enhancement Fund of $2 million to fund enhancement projects in the Schoharie Creek watershed, to be administered by an Ecological Enhancement Committee composed of one voting representative each from NYPA, New York DEC, and FWS;
    - Continuing to stock fish annually in the lower and upper reservoirs to support New York DEC's active management of the reservoirs and provide recreational fishing opportunities; and
    - Continuing to maintain the four constant-level ponds in the upper reservoir.
- Implement the proposed Land Management Plan, to include:
    - Monitoring rates of landslide movement near the South Access Road and Schoharie Creek's eastern shoreline;
    - Continuing management of the approximately 1,600-acre wildlife management area (including 2 acres of created wetlands, the bluebird trail, and the Cooperative Archery Hunting Area);
    - Specifying procedures for roadway maintenance and vegetation management; and
    - Conducting ground-disturbing activities to avoid impacts to bald eagles, timber rattlesnakes, and northern long-eared bats.

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facilitate dam maintenance, respond to potential emergencies, mitigate flood risk for downstream communities, and enhance downstream habitat for fish and wildlife." Construction is slated for completion by 2020. *See* http://www.nyc.gov/html/dep/html/press_releases/15-058pr.shtml#.W0YsCHtKi70.

- Implement the proposed Recreation Management Plan, to include:
    - Operating and maintaining project recreation sites, including the Lansing Manor Complex, Mine Kill State Park, the Upper Reservoir Access areas, the Schoharie Creek Fishing Access area, and the Cooperative Archery Hunting Area;
    - Funding capital improvements at the Lansing Manor Complex to include rehabilitating the historic buildings and upgrading the Visitors Center;
    - Funding capital improvements at Mine Kill State Park to include upgrades to the pool complex, renovations to the bathhouse, reconditioning the boat ramp and providing a wash station and built-in boat storage, improvements to the trails, new comfort stations, a new picnic shelter, and replacing or updating existing playground equipment;
    - Providing portable toilets and improved parking at the three Upper Reservoir Access areas; and
    - Providing portable toilets and area improvements at the Schoharie Creek Fishing Access site.
- Implement the proposed Historic Properties Management Plan.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would be operated as proposed by NYPA. The staff alternative includes most of NYPA's proposed measures[12] with some modifications and additional staff-recommended measures as follows:

- Modify the proposed Ecological Enhancement Plan to remove the provision to establish a $2 million Ecological Enhancement Fund.
- Modify the Recreation Management Plan to remove the $4 million dollar payment to New York Parks, paid annually in payments of $500,000 for the first eight years of the new license; and instead list the specific capital improvements that will be made at Mine Kill State Park, including upgrading the pool complex, renovating the bathhouse, reconditioning the boat ramp and providing a wash

[12] Interior's 10(a) and 10(j) recommendations, and New York DEC's 10(a) recommendations mirror the Settlement Agreement's terms and plans. Our proposed modifications to the Ecological Enhancement Plan and Recreation Management Plan are further discussed below in section 5.1.3, *Measures not recommended by staff* and section 5.3, *Summary of Section 10(j) recommendations*.

station and built-in storage, improving the trails, building new comfort stations and a picnic shelter, and upgrading the playground equipment, and a proposed schedule for completion for the capital improvements.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

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

2.4.1 Issuing a Non-power License

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

2.4.2 Federal Government Takeover of the Project

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

2.4.3 Retiring the Project

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.[13] The Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to

[13] *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).

decommission a project, or there are serious resource concerns that cannot be addressed with appropriate measures, making decommissioning a reasonable alternative.[14] 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.

Project retirement could be accomplished with or without dam removal.[15] 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 Blenheim-Gilboa Project would be lost if the project were 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 dam would be more costly than retiring it in place, and removal could have substantial, negative environmental effects.

[14] *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).

[15] 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 (2017). 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 (aquatic, recreation, etc.) Historic and current conditions are described under each resource area. 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 protection, mitigation, and enhancement measures, and any cumulative effects of the proposed action and alternatives. Our conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.[16]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Blenheim-Gilboa Project is located on Schoharie Creek, which originates in the northern Catskill Mountains and flows generally north for about 83 miles to join the Mohawk River. The Mohawk River, which is approximately 140 miles long and drains approximately 3,460 square miles of land area, is a tributary to the Hudson River. The total drainage area for Schoharie Creek is approximately 923 square miles.

The project's lower dam, which impounds the lower reservoir, is located approximately 53 miles upstream of the confluence of Schoharie Creek with the Mohawk River. The man-made upper reservoir is at the top of Brown Mountain, to the east of Schoharie Creek and the lower reservoir. The watershed area above the lower dam is 356 square miles. Schoharie Creek originates at approximately 4,100 feet in elevation, and its headwaters descend steeply down the slopes of the Catskill Mountains before reaching the Schoharie Valley lowlands. Schoharie Creek drops approximately 3,200 feet over the first 25 miles of its descent from its headwaters; most of this descent occurs in the creek's first 10 miles. Schoharie Creek, about 30 miles downstream from the headwaters in the area of the project's lower reservoir, is generally characterized as a wide stream with steep banks on either side (Town of Blenheim, 2012). Below the lower reservoir, the elevation of Schoharie Creek drops approximately 10 feet per mile over the approximately 50-

[16] Unless noted otherwise, the sources of our information are the license application (NYPA 2017), additional information filed by NYPA (September 18, 2017 and May 25, 2018), and the February 23, 2018 Settlement Agreement.

mile span to the creek's confluence with the Mohawk River. As illustrated in figure 2, several tributaries drain into Schoharie Creek within the project area.

The New York City DEP's Gilboa Dam is located approximately 5 miles upstream of the project's lower dam. Gilboa Dam diverts 316 square miles of the watershed for New York City's water supply. The dam impounds Schoharie Reservoir, which is a headwater reservoir derived from precipitation and runoff. Water is diverted from the Schoharie Reservoir (in a southerly direction) through the 18-mile-long Shandaken Tunnel to Upper Esopus Creek, and is eventually delivered into the New York City drinking water supply system. The Shandaken Tunnel is capable of diverting approximately 600 million gallons of water per day (approximately 900 cfs). Upstream of the Gilboa Dam, three flood-control dams are located on the Batavia Kill, a tributary to Schoharie Creek (figure 2).

The region encompassing the project experiences an average annual high temperature of 55 degrees Fahrenheit (°F) and an average annual low temperature of 34 °F. The region experiences average annual precipitation of 41.92 inches. Precipitation is typically highest in the months of June and July. There is an average of 79 inches of snowfall each year (United States Climate Data, 2017).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR, section 1508.7), a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Through scoping, agency consultation, and our independent analysis we have not identified any resources that would be cumulatively affected by the continued operation of the Blenheim-Gilboa Project.

3.2.1 Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on the resources. Because the proposed action can affect resources differently, the geographic scope for each resource may vary. As noted, we have not identified any resources that would be cumulatively affected by the proposed project.

3.2.2 Temporal Scope

The temporal scope of our cumulative effects analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on each resource that could be cumulatively affected. Based on the potential new license term, the temporal scope looks 30 to 50 years into the future, concentrating on the effects on the resources from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

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

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this draft EA. We have determined that geology and soils, aquatic, terrestrial, threatened and endangered species, recreation, land use, aesthetics, cultural resources, and socioeconomics may be affected by the proposed action and action alternatives. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geologic and Soils Resources

3.3.1.1 Affected Environment

Physiography and Geology

The Blenheim-Gilboa Project is located in the glaciated portion of the Alleghany Plateau, and is part of the Appalachian Plateau physiographic region within the Northeastern Highlands ecoregion. The Appalachian Plateau is a large natural region lying west of the Hudson lowlands and south of the Mohawk River valley and the Lake Ontario-Lake Erie plains. The plateau is underlain with nearly horizontal rock strata, and was glaciated as recently as 10,000 to 12,000 years ago. Ice and the force of rivers have dissected or cut into the bedrock, giving the region a rugged, hilly aspect.

The bedrock underlying the project is of sedimentary origin (i.e., shale, siltstone, and sandstone) resulting from the erosion of an ancient high peaks Taconic mountain range that existed to the east approximately 370 million years

ago in the Devonian Period (Greene County Soil and Water Conservation District, 2007). The rock formations at the project include various facies of the Genesee and Hamilton Groups, both of the upper to middle Devonian Period.

Some sedimentary bedrock associated with these groups, specifically the Hamilton Group, is known to be calcareous in nature thus contributing to the alkaline soils found in this region. The youngest unit exposed is the Oneonta Formation, which includes the Kaaterskill sandstone member. It is composed of interbedded sandstone and red shale capping the plateau between Reed Hill and Brown Mountain, and underlies the entire upper reservoir area. Some of this rock unit was removed by pre-glacial erosion, and more was removed by ice. The thickness of the formation varies from 200 to 500 feet depending on topography.

Underlying the Oneonta Formation is approximately 400 to 500 feet of interbedded shale, siltstone, and sandstone of the Moscow Formation. The vertical shaft that extends from the upper reservoir to the horizontal power tunnel penetrates the full thickness of the Moscow Formation. The powerhouse and horizontal portion of the power tunnel are constructed in the rocks of the Panther Mountain Formation. The Panther Mountain Formation is similar to the Moscow Formation but separated from it on the basis of fossil content. In addition, the Panther Mountain Formation possesses some beds of more massive and durable character than are found elsewhere in the area (NYPA, 2015d).

Geologic formations in Gilboa, New York, including lands within the project boundary, are important for their unique and extensive fossil content. In autumn 1869, extensive flooding in Schoharie Creek exposed standing stumps of fossil trees within bedrock (Goldring 1927). In the 1920s, large numbers of fossil *Eospermatoperis* trees were discovered at Riverside Quarry, a stone quarry near the New York State Route 990V bridge over Schoharie Creek that provided much of the material for the construction of Gilboa Dam and was later backfilled (Titus and Titus 2012). In the 1970s, during construction of the Blenheim-Gilboa Project's powerhouse and other facilities on the west flank of Brown Mountain, a lens of rock within the Panther Mountain Formation was found to contain late Middle Devonian Period vegetation from a pond, lake, or streamside deposit, including the extinct herbaceous lycopod *Leclercqia complexa*, the progymnosperm *Rellimia thomsonii*, and several other species of Devonian Period plants (Hernick 2003). In 2010, backfill was removed at the Riverside Quarry site and three major types of tree-like species (*Eospermatopteris*, a tree-like member of class Lycopsida, and one of the aneurophytalean genus *Tetraxylopteris*) were described in further detail, likely occurring in a mixed and disturbed wetland assemblage (Stein et al. 2012). These discoveries describe a tropical, early forest habitat of tree-like and shrubby plants with dense areas of lycopods, present over 380 million years ago at the edge of an inland Catskill Sea, and provide insight

into evolutionary links between ancient and modern plants and the development of terrestrial ecosystems.

The surficial geology within the project boundary is characterized by glaciation. Four major intervals of glaciation occurred during the Pleistocene Epoch (2 million to 10,000 years ago), characterized by multiple advances and retreats of ice. In the Catskill Mountains region, glaciers merged with continental ice sheets, and large lakes often formed in front of retreating glaciers. This glacial retreat resulted in the deposition of deltaic (sands and gravels) and lacustrine (clays and silts) sediments. The most recent ice sheet advance occurred approximately 15,000 to 8,000 years ago. Both the thickness of soil deposits and the depth of bedrock are highly variable within the project boundary, with thick sequences of glacial till deposits and thinner interbedded lacustrine (clay) layers present over bedrock (Rizzo, 1999).

Seismic activity

Seismic activity has been reported within the project area. The most significant earthquakes include a magnitude 5.3 event approximately 10 miles north of the project on October 7, 1983, and a magnitude 4.1 event approximately 17.4 miles northwest of the project on June 17, 1991. Between 2005 and 2017, there have been twenty-seven earthquakes with a magnitude of 2.5 or greater, occurring within 124.3 miles (200 kilometers) of the Blenheim-Gilboa Project. The largest events during this period were two magnitude 3.1 earthquakes, which occurred 19.3 miles (July 24, 2007) and 18.6 miles (December 13, 2009) from the project. During the relicensing proceeding, a magnitude 2.8 earthquake occurred on September 26, 2015 with the epicenter located near the toe of the west dike of the project's upper reservoir (USGS, 2017).[17]

Since April 2013, NYPA has had a Seismic Events Procedure to provide guidelines for the inspection of project facilities if a significant earthquake occurs near the project. These guidelines require a physical inspection of the Upper Reservoir Dike, Lower Reservoir Dam, and Tainter gates as well as a review of instrumentation readings of all wells, piezometers, and inclinometers (NYPA, 2015b). This procedure was used on September 27, 2015 after the 2.8-magnitude earthquake occurred near the project (NYPA, 2015b). Inspections on September 27 and 28, 2015, revealed no anomalies (NYPA, 2015a). The Seismic Events Procedure was updated October 1, 2015 to include Schoharie County Emergency

[17] The September 27, 2015 earthquake was initially reported as a 3.0-magnitude earthquake. The current USGS database reports the magnitude as 2.8, and indicates that the earthquake information was last updated May 26, 2016 (https://earthquake.usgs.gov/earthquakes/eventpage/ld60102901#origin).

Management and Communication Center on the notification list for an earthquake of magnitude 2.0 or greater.

Rock cut movement

During construction of the project's lower dam, a series of rock cuts were created in sedimentary bedrock exposed at the site. In 2007, a sedimentary bedrock outcrop (which made up the original embankment slopes prior to project construction)[18] collapsed near the lower reservoir spillway, approximately 12 feet southeast of the spillway channel and 150 feet northwest of the crest of the dam.

Subsequent analysis of the rock cuts indicated they were highly irregular in profile due to the differential weathering of individual beds of the sedimentary rock, where certain eroded beds undermined some overlaying, more resistive beds. Undermined beds had locally failed and blocks ranging from cobble size up to several cubic feet were found on the slopes and at the base of the cuts. In 2009, NYPA stabilized the site and no further failures have been observed.

Soils

Lordstown and Oquaga Series and Schoharie Series soils represent over half (58 percent of series) of the dominant soil types within the project boundary.[19] Other major soil series (representing 27 percent of series within the project boundary) include: the Lordstown, Oquaga, and Nassau Series; Schoharie and Hudson Series; Mardin and Culvers Series; Volusia, Morris, and Erie Series; and Barbour and Tioga Series. The series vary from low to high erodibility. The rugged topography (moderate to steep slopes) in this region of the Catskill Mountains contributes to the moderate to severe erosion hazard classifications of many of the dominant soil types.

The lower reservoir shoreline includes Barbour & Tioga fine sandy loams, Schoharie & Hudson silt loams, Schoharie and Hudson silty clay loams, and Volusia, Morris, and Eerie very stony soils, and represent the least erodible soils in the project boundary.

[18] At this location, bedrock protrudes out of the earthen embankment of the Lower Dam (Murphy, 2007).

[19] *See* figure 4.3.1.3-1 (three views) in the license application.

The most erodible soils, found throughout the project boundary, include Lordstown & Oquaga very stony soils, Lordstown, Oquaga, & Nassau soils, Mardin & Culvers very stony soils, and Schoharie soils (NRCS, 2013).

Shoreline

The shoreline of the upper reservoir consists of a manmade dike on the north, west, and south banks, which is lined with riprap and has little vegetation. The shoreline on the northeast and east bank is composed primarily of lodgement till and is naturally vegetated and undeveloped. There is no significant erosion along the shorelines of the upper reservoir. Steeper shoreline areas (along the upper dike) consist of riprap and are well-armored. Gently sloping shoreline areas are vegetated with littoral vegetation (NYPA, 2014).

Within the lower reservoir, the eastern shoreline is dominated by bedrock outcrops, and the western shoreline is largely lacustrine silt and clay. Upstream of the reservoir in the riverine section of Schoharie Creek, the shoreline is composed of floodplain alluvium. Steepness typically ranges from 20 to 40 percent slopes depending on location. Steeper shoreline areas consist of exposed bedrock and riprap and are therefore well-armored (NYPA, 2014). Gently sloping shoreline areas are well vegetated with littoral vegetation (NYPA, 2014). As described below, the bed and banks of the Schoharie Creek upstream and downstream of the lower reservoir are dynamic and experience significant erosion during flood events; however, the lower reservoir itself is more depositional (because it is wider and deeper) and does not tend to erode along the shoreline.

Slide Movement

In the early 1970s, a series of slide movements developed at the project. Originally starting along the South Access Road (figure 4), these slide movements eventually incorporated the entire east shoreline of the lower reservoir between the switchyard and an adjacent transmission tower. Following exploration testing and evaluation, stabilization measures, including a series of berms and horizontal drains, were implemented.

Since the initial sliding occurred, NYPA has monitored the rate of movement. Remedial measures, completed from May 2001 to November 2002, included construction of a large stabilization berm and drainage improvements to reduce pore pressures within the weak soil layer. Instrumentation within the slide area indicates movements have diminished from 1 to 3 inches per year prior to the installation of the remedial measures to about 0.15 to 0.30 inches per year since construction of the rock-filled berm and drainage system.

In May 2004, following a significant rain event, a landslide occurred on the western side of the North Access Road approximately 600 feet southwest of the intersection of New York State Route 30 and North Access Road (Broderick, 2004a and 2004b).[20] The geological settings in the slide area were believed to be similar to those found at the South Access Road slide area. The landslide area was subsequently stabilized, and significant slide movements have not occurred within the project boundary near the North Access Road since 2004.

[20] See Figure 4.3.1.2.3-1 in Exhibit E of the license application.

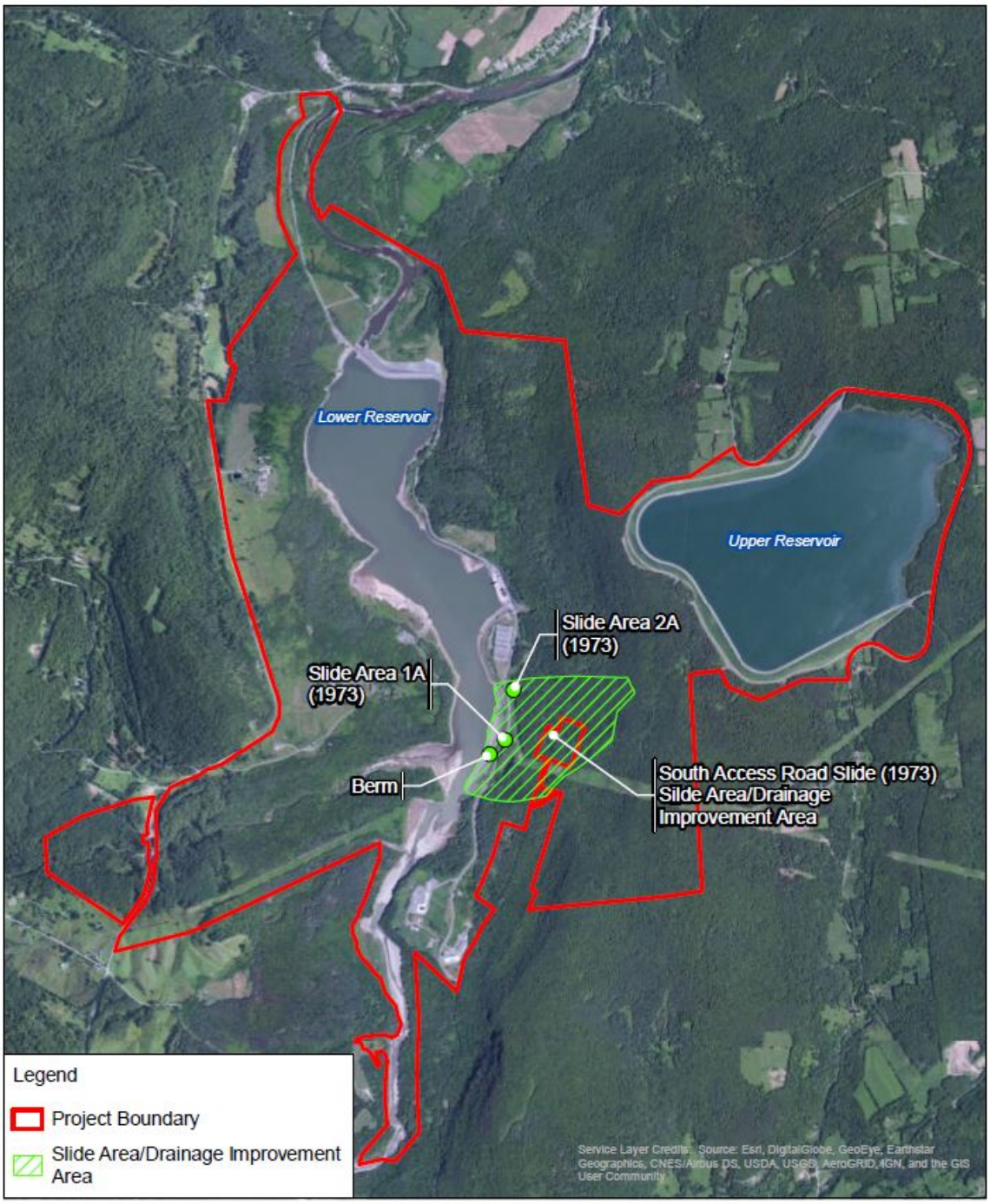

Figure 4. South Access Road slide areas (Source: NYPA's May 25, 2018, additional information response, as modified by staff).

Erosion and Deposition Events

Over the project's history, two major flood events have resulted in extensive shoreline erosion and sediment deposition within the project boundary. A January 1996 flood event required the restoration of the right bank of Schoharie

Creek downstream of the spillway. NYPA's subsequent assessment of the spillway channel and Schoharie Creek found instability in portions of the reach downstream of the spillway for approximately 1 mile, to the northern edge of the project boundary (Clear Creeks, 1998). The assessment also found considerable near-bank stress associated with the tight radius bend of the downstream meander, a reduction in channel capacity caused by downstream aggradation, and overtopping flood waters that resulted in: (1) erosion of a wide bypassed channel in the right bank; (2) scouring and uprooting of riparian vegetation; and (3) the cutting of multiple channels in the floodplain.

Historic records indicate that Schoharie Creek has overtopped within this area during past flood events. Following a 1955 flood, the Soil Conservation Service (predecessor of the Natural Resources Conservation Service) had attempted to block the bypassed channel and restore the banks within this reach (Clear Creeks, 1998). NYPA also conducted restoration work in 1980 and 1988 to address impacts of flooding in those years (Clear Creeks, 1998).

To address the 1996 flood event, NYPA restored the area by: excavating material on the inner bend of Schoharie Creek and placing excavated material on the outer bend; restoring the outer bend to elevation 810 feet NGVD 29; placing riprap for reinforced armor protection; realigning the Schoharie Creek centerline to redirect flow from the bypassed channel to the main channel; and placing riprap to protect the spillway's shoreline.

In August 2011, extremely high flows[21] due to Tropical Storm Irene undermined the post-1996 stabilization. Widespread erosion and deposition of sediment and changes in the elevation of the lower reservoir bottom occurred. Bottom elevations in and around the lower reservoir had net changes ranging from -25 feet to +16 feet (TVGA, 2012). During and immediately following the Tropical Storm Irene flood event, 156,733 cubic yards of sediment were eroded while 724,535 cubic yards were deposited resulting in a net gain of 567,802 cubic yards of sediment throughout the lower reservoir and surrounding area (TVGA, 2012).

This erosion and deposition resulted in elevational changes to: (1) the middle to southern portion of the lower reservoir (south of the powerhouse); (2) along the south and southwest shorelines, specifically at the confluence of the Mine Kill; and (3) along the northwestern shoreline south of the lower dam. The

[21] Peak inflow and outflow during Tropical Storm Irene were 129,125 cfs and 118,614 cfs, respectively. By comparison, the peak inflow and outflow during the 1996 flood event were 84,000 cfs and 74,677 cfs, respectively.

area of greatest deposition occurred along the linear center of the reservoir, southwest of the powerhouse. The remainder of the lower reservoir experienced minor changes in elevation, and NYPA determined that no significant impact to reservoir capacity occurred as a result of Tropical Storm Irene.

To address Tropical Storm Irene's effects on Schoharie Creek's right bank downstream of the spillway, NYPA restored the Schoharie Creek berm, added additional channel slope protection, and repaired other storm damage within the project boundary. On January 3, 2017, NYPA also obtained easements necessary to access storm-damaged areas in the southern end of the project boundary and address shoreline erosion caused by Tropical Storm Irene.[22]

Prime farmland

Of the 2,893 acres of land within the project boundary, 376 acres are classified as farmland, including 196 acres of prime farmland and 180 acres of statewide importance.[23] Per the NRCS, land designated as farmland can include prime farmland, unique farmland, and land of statewide or local importance and does not have to be currently used for cropland. In some areas classified as farmland, such as around the upper reservoir, no significant erosion has been observed. In other areas (i.e. the riverine reaches of Schoharie Creek upstream and downstream of the lower reservoir), erosion is the result of naturally-occurring high flows.

3.3.1.2 Environmental Effects

In SD1 and SD2, Commission staff identified the following issues related to geology and soils: (1) the effects of project operation and project-related recreation on shoreline erosion within the upper and lower reservoirs; (2) the effects of project operation on erosion of farmland, including prime farmland; (3) the effects of potential seismic events and subsidence on project facilities; and (4) the effects of project operation, specifically downstream flow releases, on channel maintenance in Schoharie Creek.

The Commission did not receive substantive comments regarding project effects on farmland, shoreline erosion, and channel maintenance. Regarding project effects on farmland, there is no evidence that project operation or maintenance affects farmland within the project boundary. Regarding project effects on shoreline erosion and channel maintenance, it does not appear that

[22] *See* Commission staff's February 10, 2017, letter, to Dreyer Boyajian, LLP.

[23] *See* figure 4.3.2-1 in the license application.

project operation has a strong influence on shoreline erosion or channel maintenance, rather these issues appear to be driven by the effects of high-flow events (as further discussed below in the Aquatic Resources section's analysis of the proposed Water Management Plan.) Therefore, these issues are not analyzed further in this section.

Seismic Activity and Subsidence

Under the proposed action, NYPA proposes in its Land Management Plan to monitor rates of landslide movement near the South Access Road and Schoharie Creek's eastern shoreline.

In its March 5, 2018, comments, Dam Concerned Citizens states that recent landslides within the Mohawk-Schoharie drainage basins demonstrate a relationship between extreme rainfall events and soil instability, and referenced a major landslide near the location of the present-day lower dam release works that occurred in the 1940s, prior to the construction of the Blenheim-Gilboa Project. Dam Concerned Citizens recommends that NYPA install post-tensioned earth anchors at the lower dam, on the basis of New York City DEP having previously installed 40 earth anchors below its Gilboa Dam spillway to reduce the potential for soil failure at that site. In its June 1, 2017 comments, Dam Concerned Citizens referenced another landslide that occurred during Tropical Storm Irene approximately 3 miles downstream of the lower dam on the eastern side of the Schoharie Creek that blocked New York State Highway 30. Dam Concerned Citizens suggests that the hill down slope of the upper reservoir is susceptible to a similar landslide, as it is characterized by a thin layer of highly erodible Lordstown Series soil.

In its May 4, 2018 reply comments, NYPA states that slide movement issues were addressed in the Potential Failure Modes Analysis (PFMA) that was performed as part of the Commission's Part 12 Dam Safety Program, and found that potential landslides within the project boundary do not present a credible potential failure mode.

Our Analysis

Due to the underlying geologic formations, glacial overburden, and erodible soil, lands within the project boundary are subject to a degree of movement. The South Access Road and eastern shoreline of Schoharie Creek have experienced slide movements since the 1970s, shortly after the project was constructed. NYPA has monitored the South Access Road slide area (figure 4) since this time, and was required to construct a rock-filled berm and drainage system that has reduced slide movement from 1 to 3 inches per year to about 0.15 to 0.30 inch per year.

NYPA's proposed monitoring of the South Access Road slide area should be sufficient to determine if any further remediation is necessary. Additionally, if any other areas within the project boundary exhibit slide movement, subsidence, or instability related to seismic events, the Commission's Part 12 Dam Safety Program (Part 12 program) and Engineering Guidelines would require NYPA to monitor any issue due to seismic activity or subsidence and remediate as necessary. The Commission's Part 12 program provides for annual inspections of the project by the Commission's dam safety engineers, inspections every 5 years by an independent consultant, annual testing of the spillway Tainter gates, filing of regular project safety reports, and maintenance of an emergency action plan (EAP) that is reviewed during annual project coordination meetings and tested annually by NYPA staff. The Part 12 program also addresses the potential effects of seismic activity and subsidence through stability analyses that consider seismic loading, and requires that a project has adequate factors of safety against failure.[24]

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Water resources of the project include the upper and lower reservoirs, Schoharie Creek upstream and downstream of the lower reservoir, and a tributary that feeds the lower reservoir. Water flows directly into the lower reservoir from the west (Mine Kill), and from Schoharie Creek upstream of the project, a result of spilling from New York City DEP's Schoharie Reservoir, which is located 5 miles upstream of the lower dam. Stream flow from 316 square miles of the Schoharie Creek watershed is diverted by New York City DEP at Schoharie Reservoir for New York City's water supply except during spring freshet and flood flows. Little or no spill from New York City DEP's Schoharie Reservoir occurs under normal conditions, so the inflow to the project during normal flows is typically limited to the 40 square miles of drainage between the New York City DEP's Gilboa Dam and the lower reservoir.

NYPA operates the Blenheim-Gilboa Project in accordance with the 1975 Water Management Plan. The 1975 Water Management Plan specifies that flows from the lower reservoir should be maintained as nearly as practicable to what they would be without the project, with project outflows essentially equaling project inflows. Stream gages upstream and downstream of the project and reservoir volume calculations are used to determine project outflows. During low

[24] Exhibit F of the license application includes a public version of NYPA's Supporting Design Report for the project.

inflows (<10 cfs), the project is operated to account for evaporative losses and releases water from storage to provide flows downstream of the project comparable to those which would have occurred if the project had not been constructed.[25] The lower dam is equipped with spillway gates and low-level outlet valves that permit the release of water downstream over the whole range of inflows.

NYPA supports eight existing USGS gages.[26] Four gages monitor inflow and outflow to and from the lower reservoir. One gage monitors releases from New York City DEP's Gilboa Dam. Gages on two tributaries monitor inflow into Schoharie Creek from the west (Mine Kill, which flows into the lower reservoir) and the east (Platter Kill, which flows into Schoharie Creek upstream of the lower reservoir). A fourth gage on Schoharie Creek at North Blenheim, 1.2 miles downstream of the lower dam, measures outflow from the project. The remaining four gages monitor flows into Gilboa Dam.

Inflow to the project was calculated by adding prorated flows from two gaged tributaries to Schoharie Creek (Platter Kill and Mine Kill) to the gaged flow over Gilboa Dam. The proration factor for each tributary was calculated by dividing the ungaged drainage area on the east and west side of Schoharie Creek (15.6 and 24.4 square miles, respectively) by the drainage area at the USGS gage on that side (10.9 square miles at the Platter Kill gage, and 16.2 square miles at the Mine Kill gage). Thus, flow from the Platter Kill gage was multiplied by 1.43 to account for all ungaged flow east of Schoharie Creek, and flow from the Mine Kill was multiplied by 1.51 to account for all ungaged flow west of Schoharie Creek. Flows less than 10 cfs are not recorded by the gage at Gilboa Dam, so to characterize the range of total inflow expected at the project, two sets of inflow

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[25] NYPA releases at least 10 cfs during low-flow periods (i.e., when there is no spill at Gilboa Dam) unless the amount of make-up water in the lower reservoir is below 1,500 acre-feet, in which case the project would ensure downstream releases either by: (1) matching inflow, from March 15 to July 15; or (2) providing at least 7 cfs during the July 16 to March 14 period, unless there is not enough make-up water in the reservoir system to do so, in which case outflow would approximate inflow.

[26] The gages are Schoharie Creek at Prattsville, New York (#01350000); Bear Kill near Prattsville, New York (#01350080); Schoharie Reservoir near Grand Gorge, New York (#01350100); Schoharie Creek at Gilboa, New York (#01350101); Platter Kill at Gilboa, New York (#01350120); Mine Kill near North Blenheim, New York (#01350140); Schoharie Creek at North Blenheim, New York (#01350180); and Schoharie Creek at Breakabeen, New York (#01350355).

values were used for the flow duration analysis. The first set assumed a value of 0 cfs at Gilboa Dam whenever the gage did not report an observed flow, and the second set assumed a value of 9.9 cfs whenever the gage did not report an observed flow. Monthly flow statistics including minimum, median, mean, and maximum flows were calculated for each of these conditions and are presented in tables 1 and 2. In addition to the inflow, these figures show outflow from the project as mean daily flows at the USGS North Blenheim gage. Monthly flow statistics including minimum, median, mean, and maximum flows are presented in table 3.

Table 1. Monthly inflow statistics when unrecorded flow from Gilboa Dam equals 0 cfs for Water Years 1976 - 2016 (Source: license application, as modified by staff).

Month	Minimum	Maximum	Mean	Median
January	3	28,683	460	94
February	7	8,313	370	95
March	7	19,136	983	387
April	14	19,375	1,348	882
May	7	9,686	595	244
Jun	3	11,742	327	29
July	2	7,066	104	11
August	1	39,139	97	7
September	1	17,348	164	6
October	2	15,873	309	15
November	2	11,482	384	66
December	3	8,223	446	68

Table 2. Monthly inflow statistics when unrecorded flow from Gilboa Dam equals 9.9 cfs for Water Years 1976 - 2016 (Source: license application, as modified by staff).

Month	Minimum	Maximum	Mean	Median
January	13	28,683	465	99
February	15	8,313	375	101
March	17	19,136	986	387
April	24	19,375	1,351	882
May	17	9,686	599	244
Jun	13	11,742	334	38
July	12	7,066	113	21
August	11	39,139	106	16
September	11	17,348	173	16
October	12	15,873	316	25
November	12	11,482	390	74
December	13	8,223	451	77

Table 3. Monthly outflow statistics at USGS Gage No. 01350180 at North Blenheim (below lower dam) for Water Years 1976 - 2016 (Source: license application, as modified by staff).

Month	Minimum	Maximum	Mean	Median
January	3	29,900	420	92
February	7	8,190	331	92
March	8	18,000	912	353
April	9	21,600	1,255	809
May	5	9,700	518	239
Jun	3	13,800	300	22
July	3	3,930	77	9
August	2	46,600	102	8
September	2	15,500	170	8
October	1	14,800	280	10
November	3	11,700	348	51
December	3	7,880	415	66

Water Use

Power generation and recreation are the primary uses of Schoharie Creek and the project reservoirs, as there are no other uses within the project boundary.

Water Quality

The New York State waterbody classifications and water quality standards apply to all surface water and groundwater throughout the State. All waters in

New York State are assigned a letter classification that denotes their best uses. Letter classes such as A, B, C, and D are assigned to fresh surface waters. The waterbody classifications of Schoharie Creek, Mine Kill, Platter Kill, and the lower and upper reservoirs are identified. Portions of each of these waterbodies are in the project boundary except the Platter Kill. Waters within the project boundary are classified as either Class B or Class C water. The New York DEC defines the best usages of Class B waters as primary and secondary contact recreation and fishing. Class B waters are suitable for fish, shellfish, and wildlife propagation and survival. The best usage of Class C waters is fishing, however, Class C waters should be able to be used for the same purposes as Class B, unless other factors limit their use for these purposes. Schoharie Creek from Schoharie Reservoir downstream to the beginning of the project's lower reservoir is classified as Class B water. However, the project's lower reservoir, the tributary flowing into the lower reservoir (Mine Kill), the upper reservoir, and Schoharie Creek from the lower dam downstream to Breakabeen (a hamlet in the Town of Fulton) are classified as Class C waters. The lower reach of Platter Kill, which flows into Schoharie Creek upstream of the project boundary, is designated as Class C (TS) Trout Spawning waters.

New York DEC establishes water quality standards and other criteria for many specific parameters. These standards can be either narrative or numeric. Table 4 outlines the water quality standards and criteria applicable to the surface waters of the project. The most recent Mohawk River Basin Waterbody Inventory/Priority Waterbodies List (WI/PWL) Report (New York DEC, 2010) includes an overall evaluation of water quality in the Mohawk River Basin, as well as assessments for specific waterbody segments within the basin. Causes and sources of water quality problems for those waterbodies with known or suspected impacts are also outlined. A description of the assessment of the waterbodies in the project area from the WI/PWL is summarized in table 5.

NYPA conducted a water quality monitoring study on a biweekly basis from April through October 2012 (NYPA, 2014a) to characterize water quality conditions and determine compliance with New York State Surface Water Quality Standards. This study examined seasonal water quality within both the upper and lower reservoirs, tributaries, and in Schoharie Creek upstream and downstream of the project.

Table 4. New York State surface water quality standards for Class B and C Waters (Source: license application, as modified by staff).

Parameter	Standard
Taste-, color-, and odor producing, toxic and other deleterious substances	None in amounts that will adversely affect the taste, color or odor thereof, or impair the waters for their best usages.
Turbidity	No increase that will cause a substantial visible contrast to natural conditions.
Suspended, colloidal and settleable solids	None from sewage, industrial wastes or other wastes that will cause deposition or impair the waters for their best usages.
Oil and floating substances	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
Phosphorus and nitrogen	None in amounts that will result in growths of algae, weeds and slimes that will impair the waters for their best usages.
Flow	No alteration that will impair the waters for their best usages.
pH	Shall not be less than 6.5 nor more than 8.5.
Dissolved Oxygen (DO)	For trout spawning waters (TS), the DO concentration shall not be less than 7.0 milligrams per liter (mg/L) from other than natural conditions. For trout waters (T), the minimum daily average shall not be less than 6.0 mg/L, and at no time shall the concentration be less than 5.0 mg/L. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/L, and at no time shall the DO concentration be less than 4.0 mg/L.
Dissolved Solids	Shall be kept as low as practicable to maintain the best usage of waters but in no case shall it exceed 500 mg/L.
Total Coliform (per 100mL)	The monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 2,400 and 5,000, respectively.
Fecal Coliforms (per 100mL)	The monthly geometric mean, from a minimum of five examinations, shall not exceed 200.

Table 5. Waterbody assessment of the waters in the project area (Source: license application, as modified by staff).

Waterbody	Segment Description	Assessment Category	Uses(s) Impacted	Severity
Schoharie Creek, Lower, Main Stem	From Fultonham in Fulton to lower reservoir	Minor Impacts	Habitat/Hydrology	Stressed
Lower Reservoir	Entire reservoir	Needs Verification	Recreation	Threatened
Schoharie Creek, Middle, Main Stem	From lower reservoir to Schoharie Reservoir	Needs Verification	Aquatic Life, Habitat/Hydrology	Stressed, Stressed
Upper Reservoir	Entire reservoir	Needs Verification	Recreation	Threatened
Mine Kill	Entire stream and tributaries	No Known Impacts	No Use Impairment	N/A
Platter Kill	Entire stream and tributaries	No Known Impacts	No Use Impairment	N/A

Eleven sites were selected in the lower and upper reservoirs, one of the upper reservoir constant level ponds, the main stem of Schoharie Creek upstream and downstream of the project, two tributaries that empty into Schoharie Creek (Mine Kill and Platter Kill), and the lower reservoir (figure 5). The eleven sites consisted of seven discrete sampling locations and four vertical profile sampling locations (Site Numbers 5, 6, 8, and 9 in figure 5) in the upper and lower reservoirs. Continuous water temperature data were also collected at 15-minute intervals at three sites (Site Numbers 4, 7, and 10 in figure 5): above and below the lower reservoir, and in one of the constant-level ponds. Discrete measurements were also collected for the following parameters: water temperature (°C), dissolved oxygen (DO in mg/L and percent saturation), specific conductance (measured in micro-Siemens per centimeter [µS/cm]), pH, and turbidity (NTU). Water clarity was also collected using a Secchi disk at the four reservoir profile locations.

Temperature and DO

Vertical temperature and DO profiles collected at the four vertical profile sampling locations in the upper and lower reservoirs indicate that both reservoirs can thermally stratify, though at different times and for different durations, and that project operation can influence stratification in localized areas near the lower reservoir powerhouse. Thermal stratification in the upper reservoir began to occur in May and lasted until October in 2012. The two vertical profile sites in the upper reservoir showed similar temperature profile trends; however, the upper reservoir South location was deeper and further away from the intake, which seemed to preclude any mixing due to project operation. Within the lower reservoir, thermal stratification near the lower dam was evident in May and lasted until mid-August, while the powerhouse site was thermally stratified only in May during a period when the frequency of project operation was reduced.

The DO vertical profiles collected at the four vertical profile sampling locations in the upper and lower reservoirs demonstrate that DO concentrations (in mg/L) follow a similar profile pattern as temperature. In addition, hypoxic conditions were present in the hypolimnion at all reservoir sites except near the powerhouse on the lower reservoir, which remained well-oxygenated over the duration of the monitoring study. Hypoxic conditions in the hypolimnion manifested in July and lasted until the reservoirs became well mixed in the fall. Overall, the temperature and DO profile data suggest that project operation mixes the water column near the powerhouse, and stratification is more apt to occur when the project is not operating.

Water temperature at the seven discrete sampling locations followed a similar pattern over the duration of the monitoring study period, reflecting typical seasonal patterns of increasing temperatures during the spring and decreasing temperatures during the fall. On average, the tributaries were the coolest, while the lower reservoir inflow and Schoharie Creek downstream sites were the warmest. However, temperature measurements at the Schoharie Creek Tailwater site were cooler than the temperatures at the lower reservoir inflow site from July to early-September, which is the same period of time when the lower reservoir exhibits thermal stratification, indicating that flow releases from the cooler bottom water near the lower dam influenced downstream water temperatures. Once stratification was disrupted in late September, temperatures at the Schoharie Creek Tailwater site were similar to the temperatures at the lower reservoir inflow site. In general, average daily water temperatures at the lower reservoir inflow and Schoharie Creek downstream locations increased in April, May, and June, were relatively consistent through July and August, and then decreased through September into October. The results of the 2012 water quality monitoring study

indicate that the project does not adversely affect water temperatures in the Schoharie Creek watershed near the project.

DO concentrations at the seven discrete sampling locations were in compliance with the New York State Surface Water Quality Standards. All surface waters remained well oxygenated even during summer low-flow conditions. Average DO concentrations (in mg/L) were highest in the tributaries and lowest at the constant-level Pond site. Furthermore, DO measurements collected in Schoharie Creek upstream of the project were obtained under various Gilboa Dam spilling scenarios. When Gilboa Dam was observed to be spilling during the sampling events on April 26, June 5, and October 23, DO levels were at or near 100 percent saturation, but when Gilboa Dam was not spilling, DO levels were variable, the lowest being 62.4 percent saturation. This suggests reduced flows result in lower DO concentrations.

The hypoxic conditions in the lower reservoir near the lower dam do not adversely affect the DO concentrations at the Schoharie Creek downstream sites. When hypoxic, hypolimnetic water is released through the low-level outlet valves at the lower dam, the water is aerated sufficiently as it enters Schoharie Creek through atmospheric mixing (passively through the low-level outlet valves for releases up to 25 cfs) or by the Howell-Bunger type valves, which are designed to add oxygen to the released water through atmospheric mixing for releases between 25 to 700 cfs. Oxygenation of the released water is further enhanced by turbulence where outlet flows enter Schoharie Creek below the lower dam. Average DO levels at the Schoharie Creek Tailwater and downstream sites were 8.56 mg/L (94.2 percent) and 9.94 mg/L (109.6 percent), respectively. The results of the 2012 monitoring study indicate that the project does not adversely affect DO levels of waters in the Schoharie Creek watershed.

Turbidity

Maximum, minimum, and average turbidity measurements were collected at the seven discrete sampling locations. Turbidity levels at the discrete sampling locations were generally low during the summer, but higher in the spring and after rain events in the fall. Turbidity was observed to increase at most sampling locations shortly after or during a precipitation or high-flow event, which is a common observation throughout the watershed. Extended periods of increased turbidity in the watershed are associated with exposure of glacial clay deposits to runoff from intense rainfall, which causes the water to turn a reddish-brown color. An example of this was documented during a sampling event in October, when heavy rains in the upper watershed caused high turbidity levels at all sampling locations. Higher turbidity levels and shallow Secchi disk measurements were observed at the surface of the upper and lower reservoirs during the fall, which

suggest that watershed inflows from precipitation are a main factor affecting turbidity and clarity in the reservoirs. Furthermore, turbidity levels observed at the lower reservoir inflow site and the two outflow locations (Schoharie Creek Tailwater and Schoharie Creek downstream) were similar and relatively low, especially during low-flow periods in summer. During low-flow periods, turbidity levels remained low even when the project was operating. This suggests that pumping and generation at the project does not adversely affect turbidity. Overall, turbidity levels reflect the prevailing environmental conditions, as the turbidity of streams within the Schoharie Creek watershed is primarily driven by the geology and hydrology of the landscape.

pH

The pH measurements at all sampling locations, except at times in the Schoharie Creek downstream site and at both vertical profile sampling locations in the upper and lower reservoirs, were within the acceptable limits imposed by the New York State Surface Water Quality Standards. The pH at the Schoharie Creek downstream site exceeded the upper limit of 8.5 on four occasions from July 3 to August 13 (range 8.6 - 9.2). The pH levels were also periodically measured above 8.5 in the top layers of both the upper and lower reservoirs in May (range 8.52 - 8.98) and in the lower reservoir in August (8.51). Comparison of DO and pH profiles during periods when pH was above the New York State Standard (8.5) near the surface of the reservoirs indicated that pH followed a similar profile pattern as DO, especially through the epilimnion and metalimnion. This suggests photosynthetic processes are influencing pH levels in the upper layers of the reservoirs. In contrast, the elevated pH levels at the Schoharie Creek downstream site are likely due to groundwater hydrology and an influence of bedrock material.

Conductivity

Conductivity levels in the project area are relatively low and typical for unpolluted freshwater streams. Conductivity measurements varied in relation to streamflow conditions, and were greatest at all seven discrete sampling locations during the dry, summer months. Generally, conductivity levels were higher for water flowing into the lower reservoir compared to outflow. Surface conductivity at the four vertical profile sampling locations showed slight increases over the duration of the study period, until levels decreased in the lower reservoir after a high-flow event in late October. There is no New York State Surface Water Quality Standard for conductivity. Nevertheless, the results of the 2012 water quality monitoring study indicate that the project does not adversely affect conductivity of waters in the project area.

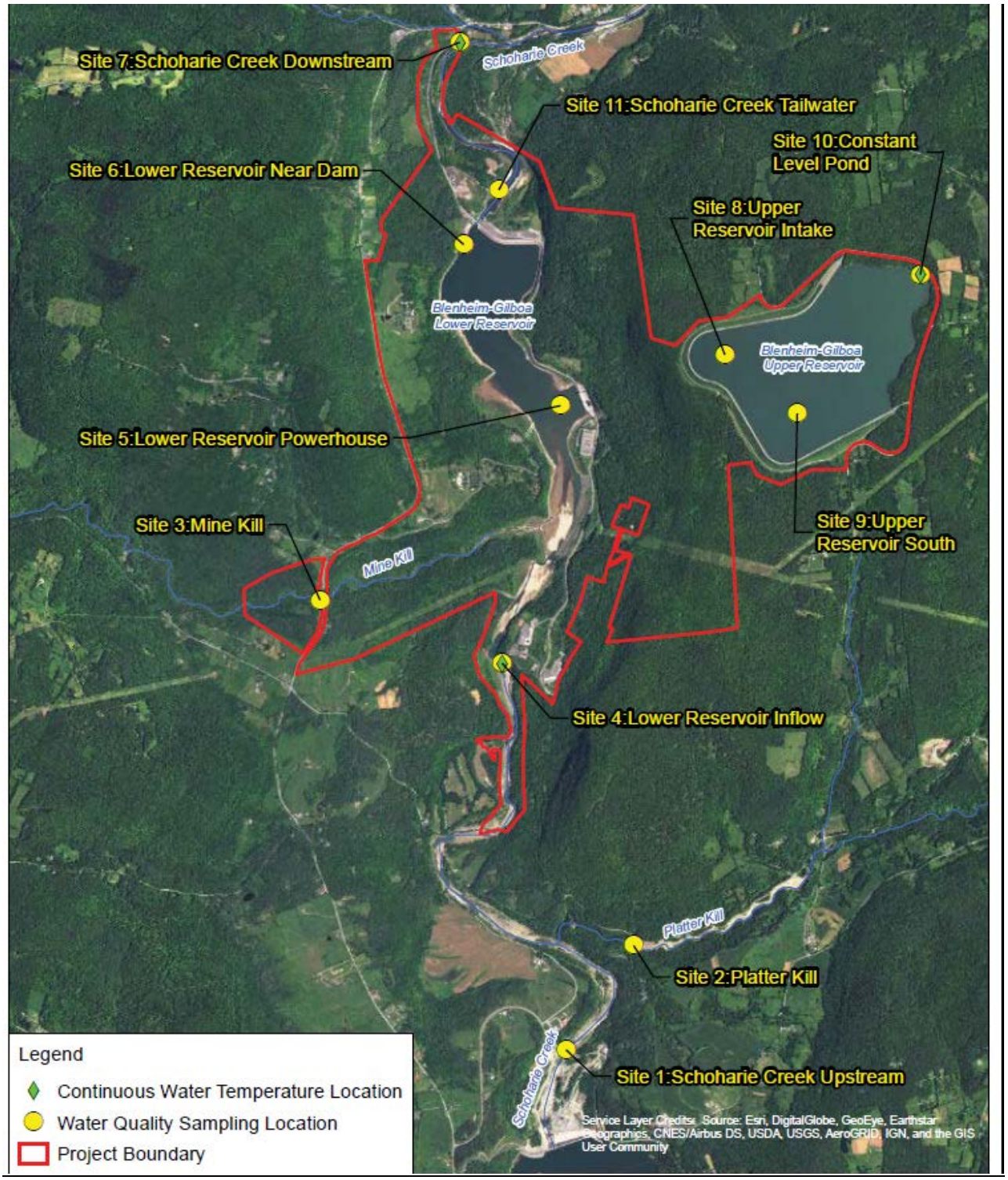

Figure 5. 2012 Water quality sampling locations (Source: license application, as modified by staff).

Aquatic Habitat

Upper Reservoir

The majority of the upper reservoir consists of open-water habitat. Littoral habitat is confined to the northeast corner of the reservoir, which contains four constant-level ponds totaling 4 to 5 acres in size (figure 6). Most of the shoreline along the upper reservoir is steeply sloped and 60 percent of the shoreline is covered with rip-rap. The upper reservoir has a predominantly rocky substrate (Thomas et al., 1984) with little habitat complexity or vertical structure (figure 7).

The maximum depth of the upper reservoir ranges from 32 feet (at the minimum operating elevation of 1,955 feet) to 80 feet (at the full pool elevation of 2,003 feet). The intake is located in the western portion of the upper reservoir in a pit excavated below the reservoir bed; the depth of this intake ranges from 36.5 feet (at the minimum operating elevation) to 84.5 feet (at full pool). Under existing project operation, the median elevation of surface waters in the upper reservoir is 1,994 feet, and water levels exceed an elevation of 1,984 feet 85 percent of the time on an annual basis. There is little seasonal variation in water level elevations of the upper reservoir as monthly median surface elevations are generally within 2 feet of each other (table 6), with the exception of September (3.3 feet below the annual median elevation).

Although the main portion of the upper reservoir experiences frequent water level fluctuations, as much as 10 to 20 feet on a weekly basis (NYPA, 2014a) due to project operation (generation and pumping), the constant-level ponds provide a more stable habitat for aquatic organisms. The four constant-level ponds (figure 6) are separated by berms and contain outlets that partially drain the ponds. When the upper reservoir is at full pool, water overtops the berms, resulting in connectivity (the exchange of water and organisms) among the ponds and between the ponds and the main portion of the upper reservoir. As water levels recede, the ponds retain water at their designed outlet elevations. The shallowest pond is pond 3 (see figure 6), which is 1 to 4 feet deep and lacks the bathymetric diversity (deep holes) to support the overwintering of fishes.

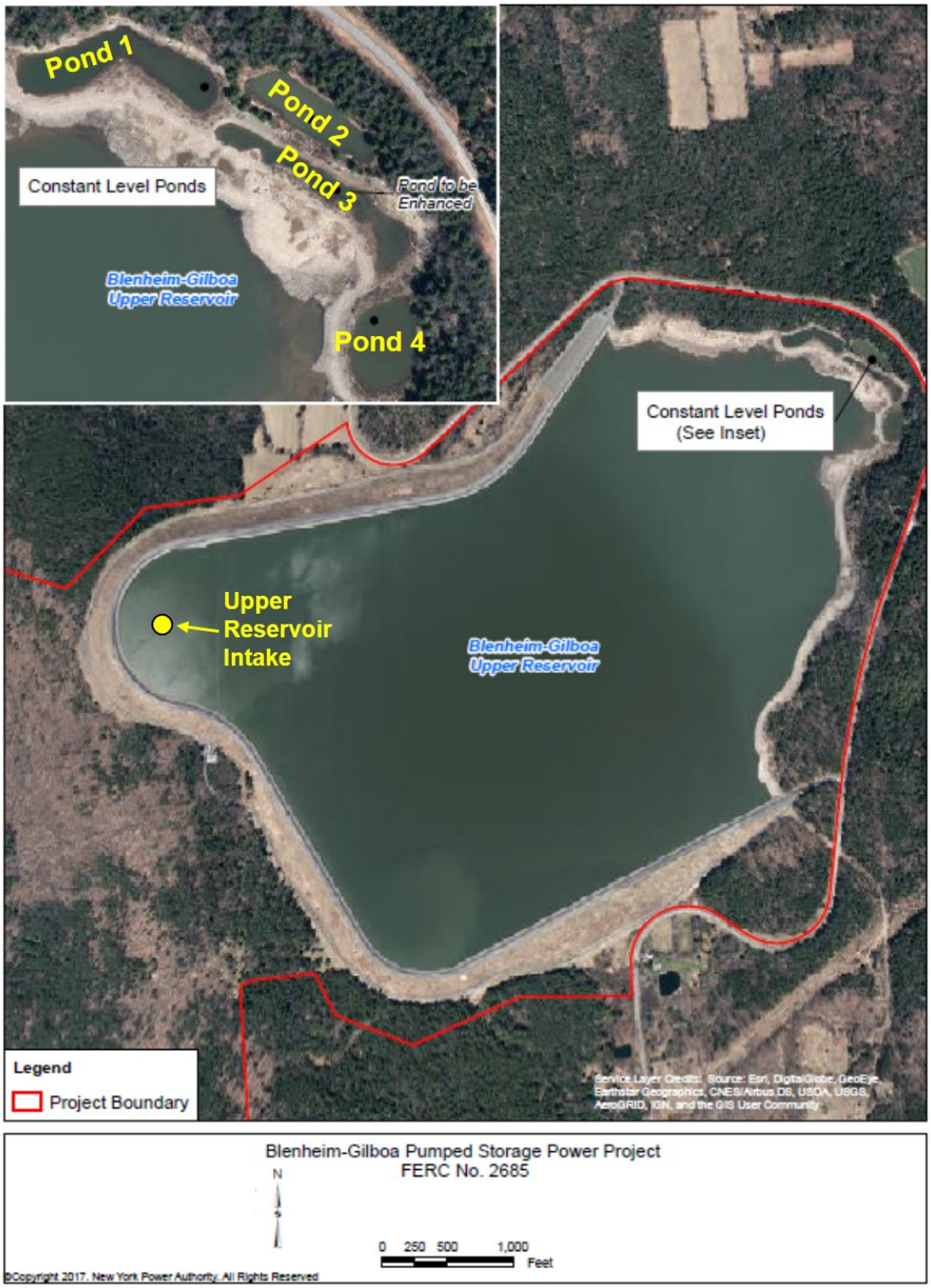

Figure 6. Locations of the four constant-level ponds and project intake in the upper reservoir. Note: Aerial imagery was taken on a date when the upper reservoir was not at full pool, and therefore depicts conditions when the constant-level ponds are retaining water at their designed outlet elevations and the ponds are separated by berms (Source: Settlement Agreement, as modified by staff).

Figure 7. Existing northern shoreline of the project's upper reservoir (below full pond), illustrating the reservoir bed is generally devoid of vertical structure and has little habitat complexity (Source: license application).

Lower Reservoir

The lower reservoir is more elongate and contains more gently sloping banks than the upper reservoir, particularly along its western bank (opposite the powerhouse), which contains littoral habitat with emergent wetlands and exposed cobble. The bottom of the lower reservoir is composed primarily of silt and clay. The deepest portion of the lower reservoir is immediately in front of the powerhouse, which is located along the toe of Brown Mountain. The draft tubes range in depth from 70 to 110 feet across the operating range of the lower reservoir (water level elevations of 860 feet to 900 feet). Under existing project operation, the median elevation of surface waters of the lower reservoir is 874 feet and reservoir water levels exceed an elevation of 863 feet 85 percent of the time on an annual basis.

Schoharie Creek

The portion of Schoharie Creek upstream of the lower reservoir (above the confluence with Mine Kill) has a steep bank with bedrock cliffs and little to no riparian vegetation. The stream bed in this area is predominantly rocky. Below the lower dam, Schoharie Creek transitions from a spillway channel with an armored bank to a meandering, riffle-pool stream comprised of a cobble bed and well developed floodplains.

Table 6. Median monthly water surface elevations (NGVD 29) of the upper and lower reservoirs based on data pooled across years 2002-2016 (Source: license application, as modified by staff).

Month	Upper Reservoir	Lower Reservoir
January	1,993.4	874.9
February	1,994.6	873.7
March	1,993.7	874.6
April	1,994.8	873.5
May	1,995.2	873.0
June	1,994.9	873.2
July	1,995.7	872.0
August	1,994.2	873.6
September	1,990.8	876.5
October	1,993.8	873.4
November	1,994.1	873.8
December	1,994.1	874.8

Fish Community

The primary game fish present in the project reservoirs and Schoharie Creek are smallmouth bass, walleye, and trout—brook, brown, and tiger trout, which is a sterile hybrid of brook trout and brown trout. Based on consultation with New York DEC, NYPA stocks fish annually in the upper and lower reservoirs to support recreational put-and-take fisheries. Current stocking efforts are focused on walleye fingerlings and catchable-size trout (brown, brook, and tiger trout larger than 8 inches). Each year, approximately 1,000 walleye fingerlings are stocked (mostly into the lower reservoir) and 1,300 trout (species combined) are stocked into each reservoir (upper and lower).

Other fish species present in the project area include those commonly found in lentic environments, such as: redbreast sunfish, pumpkinseed, rock bass, bluegill, yellow perch, and brown bullhead. The few largemouth bass collected during surveys in the upper reservoir were mostly found in the constant-level ponds (Lydon et al., 2009). Lotic species are also present in the upper and lower reservoirs, including tessellated darter and log perch, while white sucker and fallfish are more abundant in the lower reservoir and Schoharie Creek (Thomas et al., 1984; Nichols, 2006; Lydon et al., 2009). Emerald shiner constitute an

important forage fish in both reservoirs (Lydon et al., 2009). There are no diadromous fish species present in the project area.

3.3.2.2 Environmental Effects

Effects of Project Operation on Downstream Flooding

Flooding is of concern to Schoharie downstream communities[27] that have been affected by water released from the project during high-flow events. This issue was raised by numerous entities during project scoping and study planning. In its Revised Study Plan filed January 20, 2015, NYPA proposed to conduct a study to investigate the effects, if any, of the Blenheim-Gilboa Project on Schoharie Creek downstream of the lower dam during high-flow events and to evaluate alternative upper and lower reservoir operating scenarios that could potentially reduce downstream flooding within Schoharie downstream communities during high-flow events. On February 19, 2015, Commission staff issued a study plan determination approving NYPA's study plan for its *Effect of Project Operations on Downstream Flooding Study* (Flooding Study), which included an operations model and operations protocol to simulate project operation under different flow conditions, for the purpose of evaluating whether alternative operations during flood events could alleviate downstream flooding.

Based on the findings of the Flooding Study (filed February 17, 2017 and discussed in detail below), NYPA proposes a Water Management Plan, filed with the Settlement Agreement, to establish procedures for project releases from the lower dam during low-, moderate-, and high-flow periods. During high-flow events, where feasible, NYPA states in the Water Management Plan that it would implement alternative operations to potentially attenuate downstream effects of such events. The proposed Water Management Plan would replace the existing 1975 Water Management Plan.

The alternative operations in section 6.5.2, *High Flow Operations* of the Water Management Plan, which are supported by the Flooding Study modeling, include:

(1) Lowering the lower reservoir level: Under this alternative operation, releases from the lower reservoir above inflow would occur prior to a forecasted high-flow event in order to increase available storage capacity. NYPA presents

[27] Schoharie downstream communities include the Towns of Blenheim and Fulton in Schoharie County, New York; the Villages of Middleburg, Schoharie, and Esperance in Schoharie County, New York; and the Towns of Charleston, Florida, and Glen in Montgomery County, New York.

two possible methods of execution: (a) releases from the lower reservoir would be increased up to 2,000 cfs above direct inflow measurements, although the total release from the lower reservoir would not exceed inflow when inflows are 8,000 cfs or above; or (b) the lower reservoir release would be increased up to 15,000 cfs regardless of inflow, with close monitoring to ensure the flow would remain within the banks of Schoharie Creek;

(2) Peak shaving: Under this alternative operation, once peak flow is measured at the USGS gage at Prattsville, and verified through the National Weather Service and other USGS gages, releases from the lower reservoir would be held constant to chop the flood peak and store excess water in the lower reservoir. However, in storms with multiple peaks, there may be a need to sharply increase flow from the lower dam to match inflow from a subsequent peak;

(3) Peak shaving with pumping: Under this alternative operation, when the peak is observed at the USGS gage at Prattsville (as described above), the project's pumps would be placed into operation to pump water to the upper reservoir;

(4) The falling limb: Under this alternative operation, when it is determined that the volumetric inflow is falling from the peak of a high-flow event, and is within 1,000 cfs of the lower reservoir release, NYPA would keep lower reservoir releases to about 1,000 cfs less than inflow to the lower reservoir, until this discharge reaches less than 15,000 cfs. However, if the lower reservoir is near capacity, the flow amount would need to be adjusted; and

(5) Discharging extra storage: Under this alternative operation, when inflow drops below 15,000 cfs, releases from the lower reservoir would remain near 15,000 cfs as inflow continues to drop, which will dissipate excess storage within a few hours or days

NYPA states that use of one or a combination of these alternative operations would be at its discretion, although it would consult with downstream emergency management authorities with jurisdiction to evacuate the public (i.e., Schoharie County Emergency Management Office, etc.) in certain cases. NYPA also states that it may temporarily modify or suspend the use of alternative operations during a high-flow event under circumstances beyond its control, including: equipment failure or malfunction, disruption of hydropower operation, intake blockage, extreme or prolonged weather events, operating emergencies, or as necessary to protect the public and project safety.

In letters filed by Interior and New York DEC on March 1, 2018 and March 15, 2018, respectively, these entities indicated their support of the measures contained in the Water Management Plan, including the project reservoirs'

operation in a manner such that flood flows in Schoharie Creek downstream of the lower dam will be no more severe than what would be expected without the project.

In a letter filed March 22, 2018, Schoharie County states generally that NYPA should maximize operating conditions at the Blenheim-Gilboa Project to reduce the effect of future flooding events on the citizens of Schoharie County, whether the project was intended to act as a flood control dam or not. In a letter filed March 5, 2018, Dam Concerned Citizens states generally that NYPA should engage in peak-shaving during high-water events to attenuate discharge from the Blenheim-Gilboa Project's lower reservoir and to reduce the rate of peak flow out of the system, accomplished through void creation in the upper reservoir prior to high-flow events and other methods, and suggests that these methods could be triggered when inflow to the lower reservoir exceeds 10,000 cfs.[28] However, in a subsequent letter filed June 1, 2018, Dam Concerned Citizens states that it's "…most pleased to learn that when conditions are right, the Power Authority will attempt to reduce flood impacts by using defined procedures ('peak shaving; 'pumping up') which were thoroughly described in the Flooding Study."

Our Analysis

Managing water in a reservoir system is a highly complex process, involving factors such as: (1) the variability of stream flows; (2) multiple uses for a reservoir (e.g., hydropower generation, flood control, public water supply, industrial process water, etc.); and (3) the dynamic nature of operational decision-making as facility conditions, hydrologic forecasts (including storm forecasts), and demand forecasts change (Liu et al., 2011). In the case of the Blenheim-Gilboa Project, the manner in which flows are passed through the project, particularly during high-flow events, has the potential to affect the Schoharie downstream communities.

The Flooding Study used hydrologic, dam operation, and hydraulic models to calculate water surface elevations (WSEs) and quantity of flow within Schoharie Creek downstream of the lower dam under various hydrologic event scenarios (10-year, 50-year, 100-year, and 500-year recurrence interval events). The Flooding Study reported inundation areas, peak flow and peak WSEs, and timing of the peak WSEs for the above hydrologic events to compare the effects of flooding in Schoharie Creek under existing operation to conditions that could

[28] This discharge was selected during the Flooding Study because NYPA's current operating procedures require notification of Schoharie downstream communities if NYPA intends to release more than 10,000 cfs.

occur: (1) without the presence of the lower dam (a hypothetical "without dam" scenario); or (2) under alternative operations during high-flow events as described above (e.g., lowering the lower reservoir, peak shaving, etc.)

Based on NYPA's Flooding Study, existing operation of the project provides benefits to Schoharie downstream communities when compared to a "without dam" scenario. These benefits include reduced peak WSEs and peak flows, and delayed time to peak WSEs. The benefits of reduced peak WSE and delayed peak WSE timing for existing operation as compared to a "without dam" scenario are more significant for larger high-flow events. For example, existing operation reduces peak WSEs downstream of the lower dam by an undetectable amount for a 10-year event, but up to 0.7 feet for a 500-year event compared to a "without dam" scenario (table 7). The corresponding reduction in inundation areas downstream of the lower dam for these events is 0.1 percent and 1.1 percent for a 10-year event and 500-year event, respectively, when compared to a "without dam" scenario (table 7). In terms of the timing of peak WSEs under existing operation compared to a "without dam" scenario, the time delay to peak WSEs downstream of the lower dam and at the confluence with the Mohawk River is 15 minutes at both locations for a 10-year event, and 90 minutes and 60 minutes, respectively, for a 500-year event (table 7).

The Flooding Study demonstrates that additional benefits for Schoharie downstream communities could be provided under alternative operations. For example, the Flooding Study shows that peak WSE reductions under alternative operations in comparison to existing operation would range from 1.5 feet downstream of the lower dam to 0.6 foot at the confluence with the Mohawk River for a 10-year event, and range from 0.5 foot downstream of the lower dam to 0.1 foot at the confluence of the Mohawk River for a 500-year event (table 7). These WSE reductions just downstream of lower dam correspond to a 17.0 percent reduction in inundation area for a 10-year event, and a 0.5 percent reduction in inundation area for a 500-year event (table 7). The WSE reduction decreases with distance downstream from the lower dam due to attenuation in the floodplain and additional inflow from 571 square miles of intervening drainage area in the Schoharie Creek watershed between the lower dam and the mouth. Therefore, the benefits that could be provided by alternative operations appear to be greater for smaller storm events and decrease as the flow magnitude increases, as storage in the lower reservoir is likely already used for larger storms under NYPA's existing operation. In terms of the timing of peak WSEs under alternative operations compared to existing operation, peak WSEs downstream of the lower dam under alternative operations are reached 120 minutes faster for the 10-year event and 15 minutes faster for the 500-year event when compared to existing conditions. Although alternative operations indicate a shorter time to peak WSE, they have a lower peak discharge and lower peak WSE than under existing operation.

Table 7. Summary of downstream flooding impacts (10- and 500-year events) under different operation scenarios (Source: Flooding Study, as modified by staff).

Recurrence Interval Event	Operational Scenario	Difference in Peak WSEs (feet)		Difference in Inundation Area (percent)	Time to Peak WSEs (hour:minute)	
		Just down-stream of lower dam	Confluence with the Mohawk River	Just down-stream of lower dam	Just down-stream of lower dam	Confluence with the Mohawk River
10-year	Without Dam	0.0	0.0	0.1	2:30	18:15
	Existing Operation	0.0	0.0	0.0	2:45	18:30
	Alternative Operation	-1.5	-0.6	-17.0	0:45	20:00
500-year	Without Dam	0.7	0.3	1.1	1:00	14:45
	Existing Operation	0.0	0.0	0.0	2:30	15:45
	Alternative Operation	-0.5	-0.1	-0.5	2:15	16:00

However, peak WSEs at the confluence with the Mohawk River under alternative operations are delayed by 90 minutes for the 10-year event and 15 minutes for the 500-year event when compared to existing conditions (table 7).

The statements filed by Schoharie County and Dam Concerned Citizens' in response to the REA Notice do not describe or propose specific alternative operations beyond those modeled as part of the Flooding Study, and included in the Water Management Plan. In terms of Dam Concerned Citizens' specific request for the alternative operations described in NYPA's Water Management Plan to be triggered at a specific inflow (>10,000 cfs), this request is part of NYPA's proposed Water Management Plan. In section 6.5 of the Water Management Plan, NYPA states that when an expected release from the lower reservoir may exceed 10,000 cfs, flood operations procedures would be initiated and maintained until the flow is less than 8,000 cfs and the lower reservoir has been reset to a level corresponding to the target total project volume.

There are factors that may limit NYPA's ability to use alternative operations during high-flow events. For instance, in order to maintain the integrity of the project's earthen dams the existing license limits the maximum WSEs for the upper (2,003 feet) and lower (900 feet) reservoirs. If the upper and lower reservoirs were at their full capacities during a high-flow event, then storing water in the lower reservoir to engage in peak shaving, or pumping inflow to the upper reservoir for storage, could not occur without exceeding the maximum WSEs and jeopardizing the safety of the project. Ultimately, the alternative operations described by NYPA in the proposed Water Management Plan would provide flexibility regarding operation during high-flow events when information (i.e., timely storm forecasts, flow data from gages) is sufficient to support the use of one or a combination of the alternative operations. Therefore, operating the project under the proposed Water Management Plan has the potential to reduce the flooding effects on Schoharie downstream communities.

Effects of Project Operation on Water Quality

In SD1 and SD2, the Commission identified the effects of project facilities and operation on water quality, particularly water temperature and DO in project reservoirs as a resource issue. NYPA concludes that there are no adverse environmental effects of project operation on water quality in the project reservoirs or Schoharie Creek based on NYPA's 2012 water quality monitoring study.

No resource agencies or other commenting entities made any recommendations addressing water quality.

Our Analysis

NYPA's 2012 water quality monitoring study did not reveal any adverse environmental effects of project operation on DO, water temperature, turbidity, pH, or conductivity. Both the upper and lower reservoirs enter a period of seasonal thermal stratification, but project operations may interrupt stratification of the lower reservoir by mixing the water column, especially near the lower reservoir powerhouse. Bottom water releases at the lower dam during periods of hypoxia in the hypolimnion did not reduce DO concentrations below the New York State Surface Water Quality Standard downstream of the project. The elevated pH levels measured downstream of the project at the Schoharie Creek downstream site are likely an effect of groundwater seepage and buffering by bedrock material in the watershed. In contrast, the elevated pH levels in the reservoirs are most likely due to photosynthetic activity. Turbidity levels among all sampling sites appear to reflect the natural conditions and variability, and do not appear to be influenced by project operation. Specifically, high turbidity correlates with precipitation and high flow events while turbidity levels remain low during low inflow periods regardless of project operation. DO and turbidity levels are within the constraints imposed by the New York State Surface Water Quality Standards, while the pH levels exceeding the standard are explained by natural phenomena.

As current operation does not cause an overall adverse effect on water quality (DO, water temperature, turbidity, pH, or conductivity) within both the upper and lower reservoirs, tributaries, and in Schoharie Creek upstream and downstream of the project, continued operation of the Blenheim-Gilboa Project is not expected to adversely affect water quality.

Fish Attraction Structures

As part of the Settlement Agreement's Ecological Enhancement Plan, NYPA proposes to install concrete habitat structures in the upper reservoir, within 3 years of license issuance, to provide additional fish cover, feeding habitat, and overwintering habitat for fishes. The habitat structures would be deployed on the bottom of the reservoir at 11 locations. At each location, a cluster of three to five concrete habitat structures—a combination of "reef balls" and "layer cakes" (*see* figure 8)—would be deployed. Each concrete structure is approximately 5 feet high, 6 feet wide, weighs 5,000 pounds, and contains holes and crevices for fish cover (figure 8). Nine of the proposed locations where the concrete habitat structures would be deployed range in depth from 23 to 25 feet (at full pool); the remaining two (southernmost) locations are deeper (depth of 73 feet at full pool, figure 8). To inform fishermen of the location of these structures, NYPA proposes to install and maintain a small kiosk at the existing boat launch on the eastern

shoreline. NYPA also proposes to qualitatively monitor, via an underwater camera, the general condition, location, and fish usage of the installed habitat structures in years 1, 3, and 5 following their deployment; and submit a monitoring report to FWS and New York DEC.

In a letter filed on March 1, 2018, FWS stated the concrete habitat structures should enhance fish habitat in the upper reservoir. In a letter filed on March 15, 2018, New York DEC indicated its support of the measures contained in the Ecological Enhancement Plan, including the installation of fish attraction structures in the upper reservoir.

Our Analysis

The bottom of the upper reservoir currently contains little habitat structure or complexity. Under existing project operation, the concrete habitat structures that NYPA proposes to install at the shallower locations (figure 10) would be covered with water about 85 percent of the time over the course of a year. Structures deployed at the deeper locations would be submerged at all times during normal project operation. Therefore, NYPA's proposed installation of concrete habitat structures would increase habitat complexity and vertical relief along the bottom of the upper reservoir and serve as potential fish habitat.

The concrete habitat structures (reef balls and layer cakes) NYPA proposes to install have been used primarily in marine environments[29] and are largely untested in freshwater systems. It is possible these structures would be more effective in attracting bottom or structure-oriented species such as smallmouth bass, rock bass, pumpkinseed, and brown bullhead (Moring and Nicholson, 1994; Bolding et al., 2004) than surface-oriented or pelagic species such as emerald shiner and stocked trout (Vincent, 1960; Viavant, 1995; Bolding et al., 2004). However, it is difficult to predict the extent to which these new structures would attract, and be used by, the various fish species present in the upper reservoir. Therefore, NYPA's proposal to conduct visual monitoring (with underwater cameras) of the habitat structures in years 1, 3, and 5 following their deployment would provide important information on fish usage patterns at these new structures.

Constant-Level Ponds

As part of the Settlement Agreement's Ecological Enhancement Plan, NYPA proposes to continue to maintain all four constant level-ponds and enhance one of these ponds (pond 3, *see* figure 6). The enhancements to pond 3 would

[29] http://reefinnovations.com/reef-ball-foundation/posters.

involve increasing the depth of the pond by raising the outlet elevation from 1,996 feet to 1,999 feet and excavating several deep holes (to a depth of 8 feet deep, or a bed elevation of 1,991 feet, if geotechnically feasible) to increase habitat complexity within the pond. NYPA proposes to consult with FWS and New York DEC regarding acceptable water level ranges within the enhanced pond during periods of low reservoir levels (i.e., below full pool) when there is no exchange of water between the pond and upper reservoir and the pond would need to retain water to serve its intended function. One year after construction/enhancement is complete, NYPA would quantitatively measure and determine if the pond is retaining water at the desired levels; if not, NYPA would re-initiate consultations with FWS and New York DEC concerning water retention improvements.

In a letter filed on March 1, 2018, FWS stated that continuing to maintain the four constant-level ponds and enhancing one of these ponds would help address impacts to the littoral zone associated with water level fluctuations resulting from project operation (generation and pumping). In a letter filed on March 15, 2018, New York DEC indicated its support of the measures contained in the Ecological Enhancement Plan, including the continuation of maintaining the constant-level ponds and enhancing pond 3 as described above.

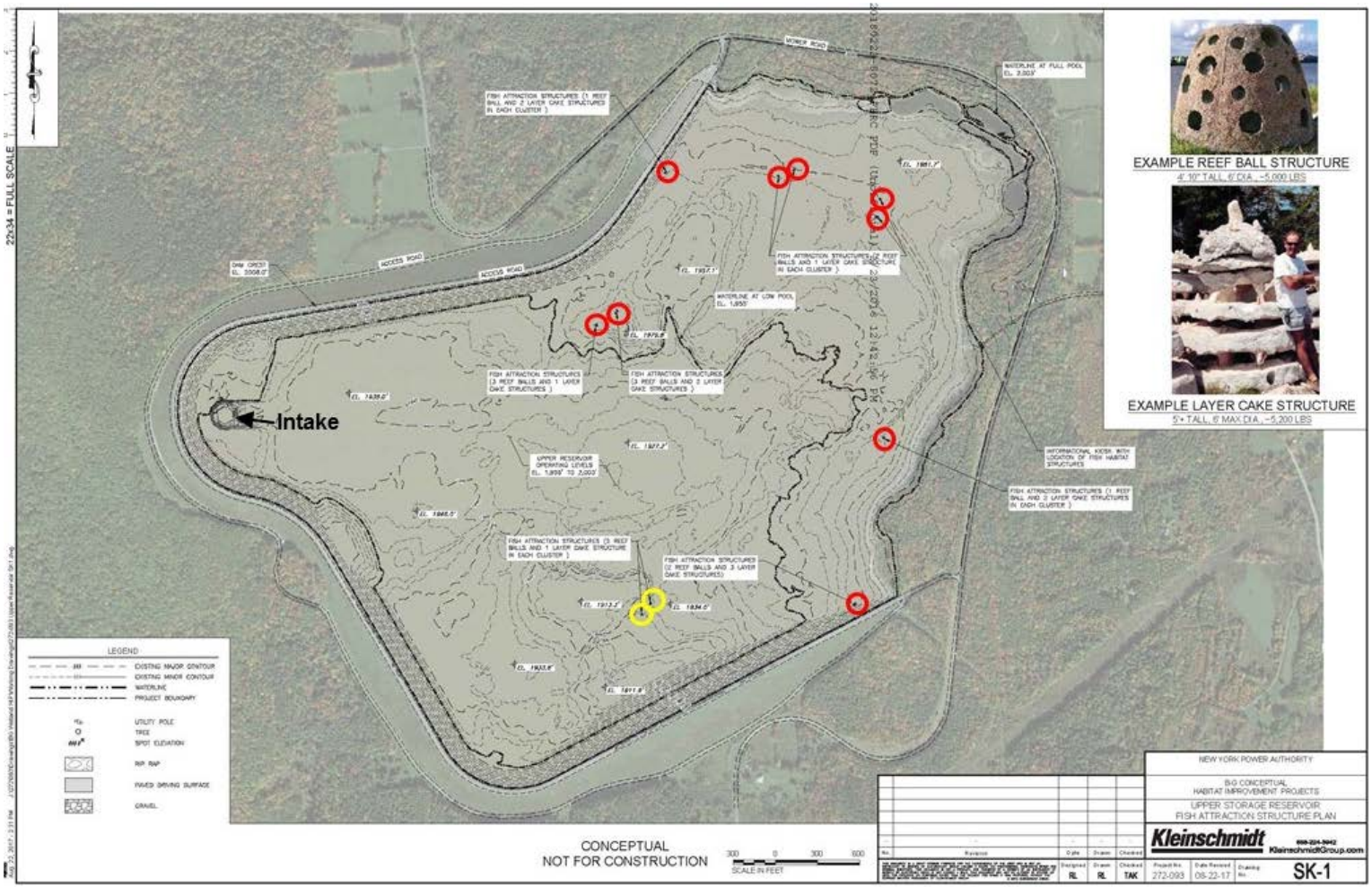

Figure 8. Locations where NYPA proposes to install concrete fish attraction structures in the upper reservoir. Three to five structures (reef balls and/or layer cakes, see upper right inset) would be deployed on the bottom at each location. The red circles denote shallower deployment locations where the depth (at full pool) ranges from 23 to 25 feet; the yellow circles denote deeper locations where the depth at full pool is 73 feet (Source: Settlement Agreement, as modified by staff).

Our Analysis

Although the upper reservoir experiences frequent fluctuations of its surface waters due to project operation, NYPA's proposal to continue maintaining four constant-level ponds will ensure there is stable aquatic habitat within the upper reservoir despite these project-related fluctuations. Moreover, the deepening of one of these ponds would provide an additional 0.4 acre of submerged littoral zone habitat that would benefit species such as bluegill, pumpkinseed, yellow perch, and largemouth bass. The excavation of deep holes in this pond would also provide additional overwintering habitat and thermal refugia for these species, particularly during severe winters when the ponds may freeze over. NYPA's proposal to monitor water retention within the enhanced pond when water levels are low (below full pool) will ensure the pond is serving its intended function of retaining water and providing a stable aquatic habitat.

Ecological Enhancement Fund

As part of the Settlement's Ecological Enhancement Plan, NYPA proposes to establish a $2 million fund, to be directed by an Ecological Enhancement Committee including NYPA, New York DEC, and FWS, to fund aquatic habitat improvement projects within the Schoharie Creek watershed. In its May 25, 2018, additional information response, NYPA provided a list of 53 potential projects within the upper Schoharie Creek watershed, which were selected by NYPA, New York DEC, and FWS. The potential projects were scored to identify those most likely to achieve multiple goals within the watershed, such as improving aquatic connectivity, improving stream systems known to support trout, and other purposes. Although the list of potential projects provided by NYPA is qualitatively scored according to a list of potential values (i.e., known trout presence, flood resiliency, restoring connectivity, etc.) and seven projects obtain the highest score, there is little descriptive information provided about each of the potential projects, and no certainty that the seven highest-scored projects would receive funding. Therefore, we are unable to analyze the effects of this potential measure, specifically how such effects would relate to the Blenheim-Gilboa Project.[30]

Entrainment

The passage of large volumes of water through trash racks and turbines can result in fish impingement and entrainment mortality at pumped storage projects. Blade strikes are thought to be the primary source of mortality for fish entrained through pumped storage and hydropower projects (Franke et al., 1997; Pracheil et al., 2016), although pressure-induced mortality can also occur, especially if the area where fish exit the pump-turbine units has a much lower pressure than the point of entrainment (e.g., passing from

[30] The Ecological Enhancement Fund measure is discussed further in section 5.1.3, *Measures Not Recommended*.

a deep to shallow reservoir) (Cada et al., 1997). Fish size plays an important role in entrainment susceptibility and turbine mortality, whereby smaller fish are more likely to be entrained, but experience lower turbine mortality, although the physical properties of turbine units also plays a role in turbine mortality (Winchell et al., 2000; Cada et al., 1997; Pracheil et al., 2016).

NYPA does not propose any measures to mitigate fish entrainment mortality associated with project operation (generating and pumping). Nor did we receive any comments concerning fish entrainment at the project. However, in the license application, NYPA provided an assessment of entrainment risk and mortality at the project. Because that assessment provides information on the continued effects of project operation on fish populations in the project reservoirs, we summarize the results of that assessment below.

Our Analysis

Due to the wide spacing of the trash racks covering the project intakes (clear spacing of 5.25 inches to 5.625 inches), there is little potential for impingement at the project because even the largest adult fish present in the project reservoirs could easily fit through trash racks with this spacing and would not be impinged. For example, a 30-inch walleye is approximately 3.75 inches wide (Smith, 1985) and could fit through the trash racks.

The adults of most fish species present in the project reservoirs are able to avoid entrainment because their burst swimming speeds exceed the approach velocities at the project intakes. The maximum approach velocities at the intake (draft tubes) of the lower reservoir are lower [1.4 feet per second (fps) to 1.95 fps] than those at the intake in the upper reservoir (2.95 fps to 3.3 fps). As such, the entrainment potential of adult fishes is negligible in the lower reservoir (during pumping) because the burst speeds of all species known to occur in the project area exceed the maximum approach velocities at the lower reservoir intake (figure 9). Meanwhile, some adult fish would be susceptible to entrainment in the upper reservoir (during generation) because their burst speeds are less than the maximum approach velocities at that intake; specifically, pumpkinseed, emerald shiner, and logperch are susceptible to entrainment in the upper reservoir (figure 9). However, the adults of these species are relatively small (maximum lengths of 4 to 8 inches); the blade strike model of Franke et al. (1997) predicts that fish in this size range would exhibit high survival (greater than 96 percent) through units with the specifications (rotation speed, number of runner blades, etc.) of the pump-turbines at the Blenheim-Gilboa Project. In addition, fish use of the intake entrance in the upper reservoir (and associated entrainment potential) is likely limited by the depth of the intake entrance (84.5 feet at full pool) and the fact that these deep waters occasionally stratify and exhibit low dissolved oxygen concentration levels (as low as 2.0 mg/L) during summer that are unsuitable for fish. It should also be noted that even if fish are attracted to the concrete

habitat structures that would be deployed as part of the Ecological Enhancement Plan (described above) that these structures are located on the opposite side of the reservoir, across from the intake (see figure 8); as such, would not increase entrainment.

Unlike adults, the juveniles of most species known to occur in the project reservoirs would be susceptible to entrainment due to their reduced swimming abilities. With the exception of trout and bullhead catfishes, juveniles of all species would be susceptible to entrainment in the upper reservoir because their burst swimming speeds are lower than the maximum approach velocities at the intake (figure 10). Juveniles of some species (shiners and sunfish) would also be susceptible to entrainment into the lower reservoir intake (figure 10). Nevertheless, due to their small size, most juveniles would survive entrainment through the project's pump-turbine units; as the blade strike model predicts that juvenile entrainment survival (for 4-inch fish) exceeds 98 percent.

At pumped storage projects such as the Blenheim-Gilboa Project, where entrained fish are moved (passed) fairly rapidly between two different reservoirs with potentially different pressure environments (depending on project operation and water levels), pressure-induced mortality represents an additional source of entrainment mortality in addition to blade strikes. This is especially the case when fish are entrained at high pressures and released into relatively low pressure environments because fish (especially physoclistous fish that lack a connection between their esophagus and swim bladder, such as percids and centrarchids) have difficulty releasing gas when moved rapidly to a lower pressure environment (Bond, 1996). Cada et al. (1997) suggest that, as a general fish protection measure, exposure pressures should fall to no less than 60 percent of the value to which entrained fish are acclimated. At the Blenheim-Gilboa Project, under the worst case scenario while the project is generating (and the upper reservoir is at full pool and the lower reservoir is at its minimum operating elevation of 860 feet), the pressure a fish would experience upon release into the lower reservoir (44.3 pounds per square inch, (psi)) is similar to that (50 psi) experienced at the point of entrainment. However, under the worst case scenario when the project is pumping (and the lower reservoir is at full pool and the upper reservoir is at its minimum operating level of 1,955 feet), the pressure a fish would experience upon release into the upper reservoir (29.4 psi) is considerably less, only 47 percent of that experienced at the point of entrainment (61.6 psi), which could be detrimental based on the 60 percent threshold suggested by Cada et al. (1997).

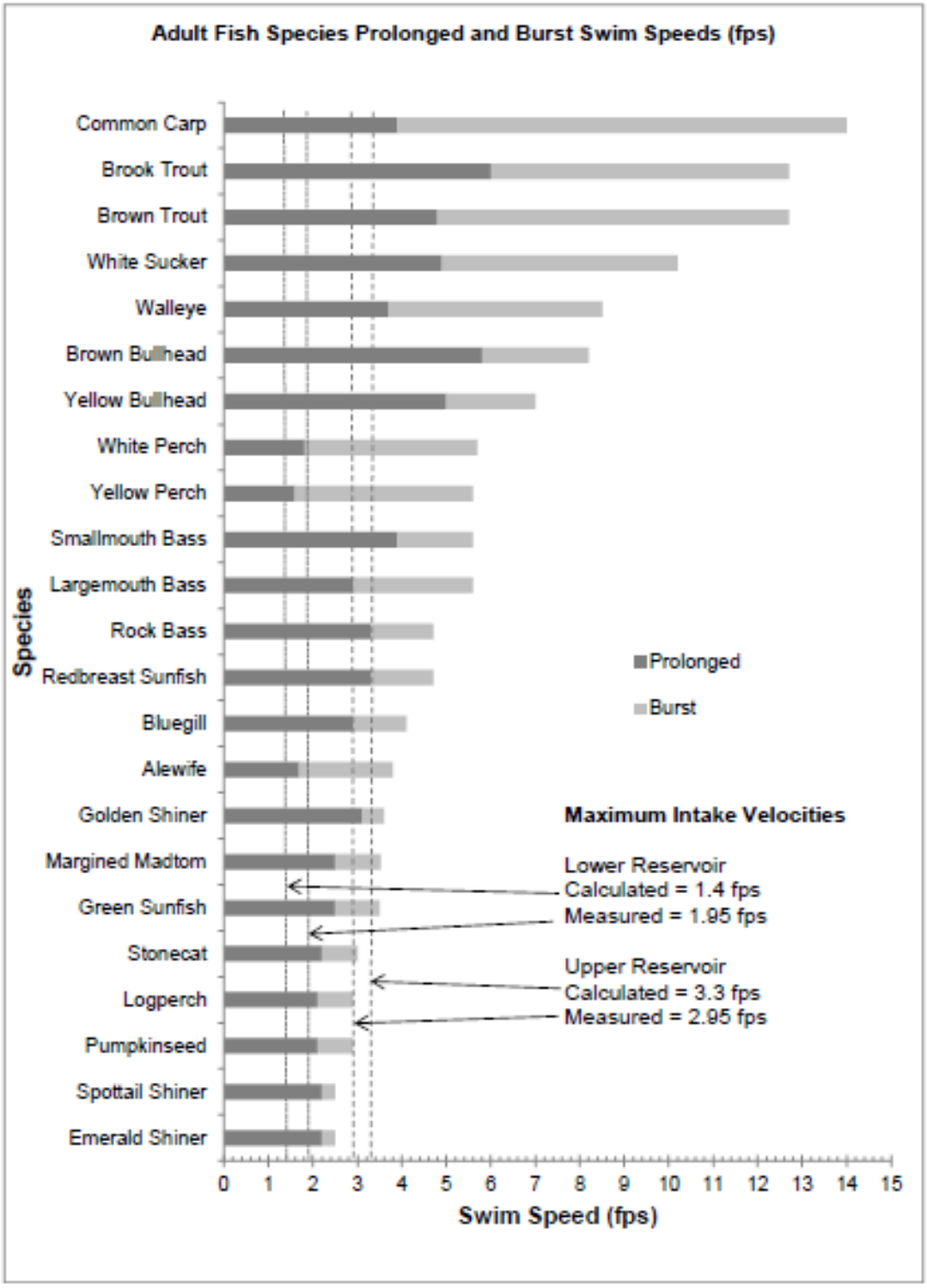

Figure 9. Swimming speeds of adult fish species known to occur in the project reservoirs in relation to calculated and measured maximum approach velocities at the intakes in the upper and lower reservoirs (dashed lines) (Source: license application).

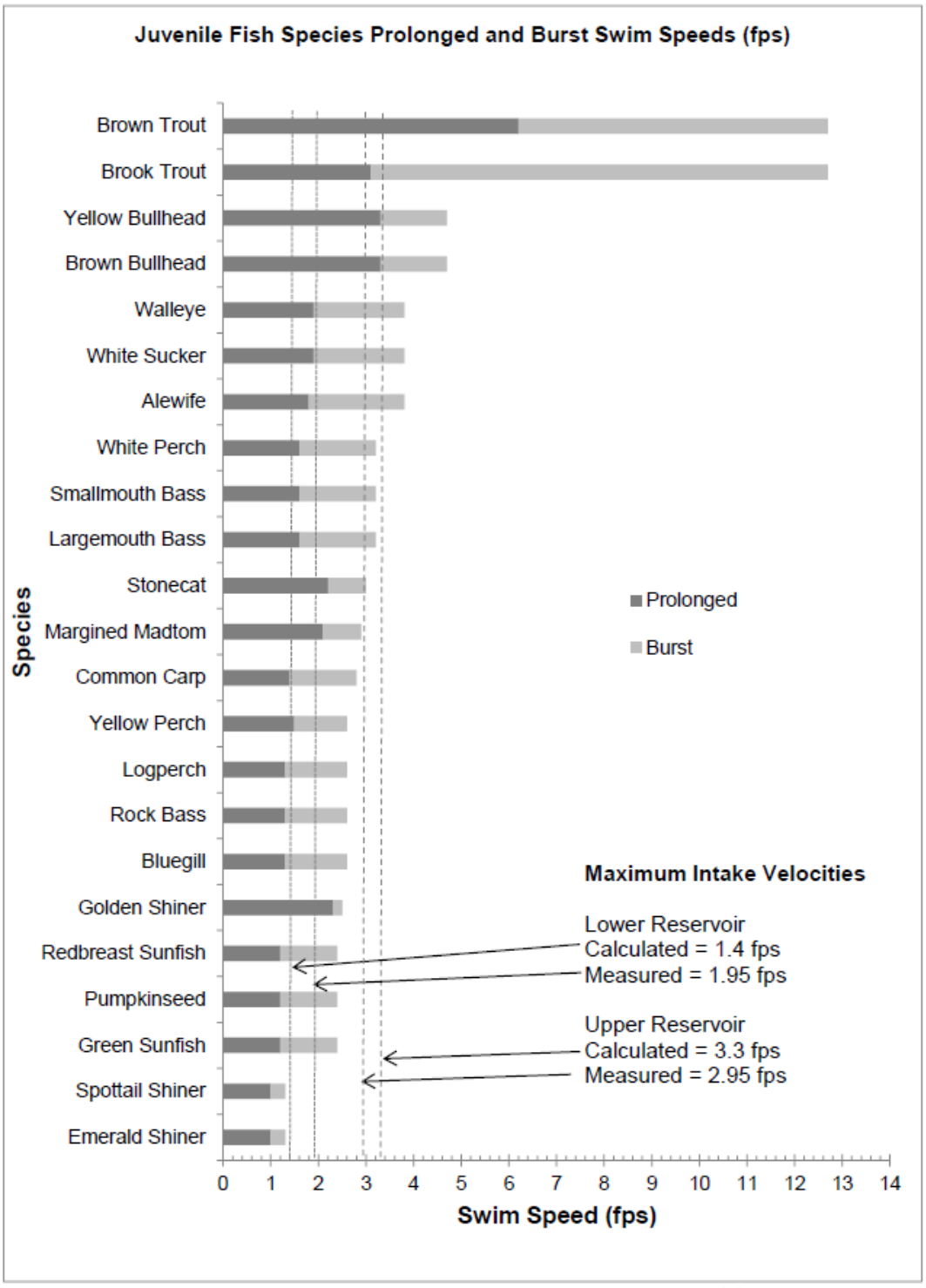

Figure 10. Swimming speeds of juvenile fish species known to occur in the project reservoirs in relation to calculated and measured maximum approach velocities at the intakes in the upper and lower reservoirs (dashed lines) (Source: license application).

As discussed above, the approach velocities at the lower reservoir intake are low (less than 2 fps) and only juvenile shiners and sunfish are susceptible to entrainment. More importantly, the worst-case operational scenario in terms of pressure changes described above—when the lower reservoir is near full pool and the upper reservoir is near its lowest operating level—would occur very infrequently (less than 1 percent of the time based on reservoir surface elevation duration curves for years 2002-2016). Events occurring with such rarity would not be expected to be detrimental at the population level given, especially given that the species most susceptible to pressure-induced mortality (shiners and sunfish) are fecund fishes that spawn every year and produce multiple batches of offspring, helping to offset any minor infrequent losses that could occur due to pressure-induced mortality of juveniles. Therefore, under existing project operation, the total entrainment mortality at the project (pressure-induced and blade strike mortality combined) would be expected to be minimal and not adversely affect fish populations in the project reservoirs.

Minimum Flows

As part of its Water Management Plan, during low-flow periods when there is little to no spill over Gilboa Dam, NYPA proposes to release from the lower dam, and into Schoharie Creek, minimum flows that are based on the total amount of water present (i.e., the combined capacity) within both the upper and lower reservoirs. The combined capacity of the reservoir system (when the upper reservoir is at an elevation of 1,996.9 feet and the lower reservoir is at an elevation of 860 feet) is 22,813 acre-feet. When the reservoirs are at this combined capacity (22,813 acre-feet), releases from the lower dam would equal inflow into the lower reservoir (from Mine Kill and Platter Kill) to maintain a constant volume of water within the reservoir system. When combined capacity is lowest and below 16,529 acre-feet, minimum flow releases from the lower dam would be set equal to inflow to the lower reservoir, or 5 cfs, whichever is less, until the combined capacity of the reservoir system increases above 16,529 acre-feet, at which time minimum flow releases would be 5 cfs. At intermediate reservoir capacities, minimum flow releases from the lower dam would be either 7 cfs (from combined capacities of 20,435 acre-feet to 22,015 acre-feet) or 10 cfs (from combined capacities of 22,015 acre feet to 22,813 acre-feet).

In a letter filed on March 22, 2018, Schoharie County recommended that mandatory conservation releases should occur from the lower dam that maintain a summer flow in Schoharie Creek equal to the flow entering the reservoir during low-flow periods, and that streamflow should be augmented by reservoir releases. Part of this recommendation (releases from the lower dam matching inflows to the lower reservoir) is consistent with NYPA's proposal for minimum flow releases during low-flow periods as described above. However, Schoharie County did not specify a flow value for augmentation purposes (i.e., how much water should be released from the reservoir to

augment streamflow in Schoharie Creek). Therefore, because it lacks specificity, we are unable to analyze this recommendation further.

In letters filed on March 1, 2018, and March 15, 2008, FWS and New York DEC indicated their support of the measures contained in the Water Management Plan, including the protocol for minimum flow releases described above.

Our Analysis

Minimum flow releases from the lower dam under the Water Management Plan would be very similar to those experienced under the current license term and operation of the project—no less than the sum of the prorated project inflow from Mine Kill and Platter Kill and up to 10 cfs, depending on the amount of storage water present in the reservoir system. Under the existing flow regime, the portion of Schoharie Creek downstream of the project has continued to support what has been deemed a "good to excellent" smallmouth bass fishery and "fair" walleye fishery, based on creel surveys conducted from 2004 to 2008 (McBride, 2009). Therefore, given its similarity to the existing minimum flow regime, the proposed minimum flows under the Water Management Plan would be expected to continue sustaining aquatic life downstream of the project and supporting important sport fisheries for smallmouth bass and walleye and the prey these species depend on.

Fish Stocking

As part of the Settlement Agreement's Ecological Enhancement Plan, NYPA proposes to continue stocking fish on an annual basis in the upper and lower reservoirs based on consultation with New York DEC. Recent stocking efforts have focused on trout (brown, brook, and tiger) in the upper reservoir and walleye in the lower reservoir. In a letter filed on March 15, 2018, New York DEC indicated its support of the measures contained in the Ecological Enhancement Plan, including the continuation of the existing fish stocking program.

Our Analysis

Continued stocking of fish species (trout and walleye) that are unlikely to reproduce naturally in the project reservoirs due to a lack of spawning habitat (moderately flowing waters with gravel substrate) would continue to support put-and-take fisheries for these popular game fish. In addition, continuing stocking efforts is consistent with one of New York DEC's primary management goals of providing quality recreational fishing opportunities for the public.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

In 2012, NYPA mapped and characterized land cover types within the project boundary using existing information, interpretation of aerial imagery from 1996 to 2011 (with leaf cover present and absent), and field verification conducted in July 9 to 13, 2012 to identify rare, threatened, and endangered species and associated habitats, field verify cover type mapping that was based on aerial imagery, and develop a qualitative species and habitat inventory. Data sources included the Soils Survey Geographic Database (NRCS 2013), the National Wetland Inventory (FWS 2018), and project data. Habitat classifications were based on standards for ecological communities of New York State (Edinger et al. 2002) and wetlands and deepwater habitats of the United States (Cowardin et al. 1979).

Botanical Resources

Table 8 provides estimated acreages of dominant upland cover types and characteristic species within the project boundary. The Blenheim-Gilboa Project boundary encompasses 2,893 acres of land. Blenheim-Gilboa Project lands are primarily forested, with the exception of open meadow habitat along the upper reservoir dike, and maintained habitat around project facilities and recreation and historic areas. Several unique habitats are also present, including xeric (dry) woodlands along cliffs and ridges, and exposed sedimentary bedrock along the lower reservoir shoreline.

At higher elevations, including the eastern edge of the upper reservoir and the sloping hillside between the two reservoirs, the dominant forest habitats are mixed northern hardwoods, and pine and hemlock forests. Mixed northern hardwood forest habitat generally includes a canopy layer of sugar and red maple, red oak, white ash, black cherry, birches (white and yellow), basswood, white pine, and hemlock, and a shrub layer of beech, maple, hemlock, and ash saplings, and the herbaceous layer includes bracken fern, bluebead, twisted stalk, false Solomon's seal, and wild sarsaparilla. White pine and hemlock forests have a canopy comprised primarily of white pine and/or hemlock, with shade-limited shrub (containing mixed sapling species) and herbaceous (containing Christmas fern, wood fern, Virginia creeper, starflower, Canada mayflower, poison ivy, and white avens) layers. The mowed, outer slope of the upper

Table 8. Mapped habitat and dominant species within the Blenheim-Gilboa Project Boundary (Source: NYPA, 2014, as modified by staff).

Cover Type	Dominant species	Estimated acreage within project boundary
Northern hardwood-coniferous forest	red maple, basswood, birch, American beech, white pine, hemlock	680.0
Northern hardwood forest	basswood, sugar maple, red maple, American beech, white birch, red oak, black locust	437.9
Eastern white pine forest	white pine, barberry, honeysuckle, bracken fern	186.8
Eastern hemlock forest	hemlock, white pine, wild sarsaparilla	175.6
Successional old Field/Shrubland	milkweed, grasses, honeysuckle, hawthorn, red maple saplings	173.6
Manicured lawn	Kentucky bluegrass-actively mowed	120.8
Grassland	milkweed, grasses, and occasional red cedar, honeysuckle, and hawthorn	108.2
Cropland	managed crops	12.5
Rock outcrop	N/A	0.6
Developed area	N/A	85.1
Transportation	N/A	46.9

reservoir dike is dominated by species such as red fescue, timothy, ragweed, Queen Anne's lace, spotted knapweed, and white sweet clover; the inside slope is largely unvegetated rip-rap (NYPA, 2014).

At lower elevations, including the shore of the lower reservoir, forested areas along Schoharie Creek, and Mine Kill State Park, upland habitat is dominated by mixed northern hardwoods. Low ravines along the Mine Kill and other tributaries and portions of the lower reservoir shoreline are dominated by hemlock, with occasional white pine stands. Based on the presence of historic rock walls and successional forests, these forested areas may have been planted in the past to reforest agricultural lands or pasture. Mixed forests surrounding the lower reservoir are characterized by species similar to the

upper reservoir area, with species more typical of lower elevations (e.g., a canopy layer of white oak, black locust, shagbark hickory, and ironwood; shrub layer of honeysuckles, multiflora rose, and European barberry; and herbaceous layer with Jack-in-the-pulpit, New York fern, and mayapple.)

Upland meadow and xeric habitat (i.e., rock outcrops and sparsely wooded areas of ridge tops) have herbaceous layers of mullein, milkweed, yarrow, black and red raspberry, and white sweet clover and occasional shrubs (honeysuckle, staghorn sumac and red cedar). Xeric woodlands include red cedar and white pine, red oak and bur oak saplings, and honeysuckle in shrub form. Herbaceous vegetation includes wild columbine, panicled hawkweed, bluestem, yarrow, and lowbush blueberry, and lichen in areas where herbaceous vegetation is limited or absent.

Wildlife management area

NYPA actively manages approximately 1,600 acres of project land to improve habitat for wildlife. This managed area includes: (1) an eastern bluebird trail extending from the Visitors Center to Mine Kill State Park with nest boxes and regular mowed areas to ensure quality eastern bluebird habitat, managed in cooperation with New York Parks and the State University of New York (SUNY)-Cobleskill; and (2) winter foraging habitat for white-tailed deer, containing 2,000 northern white cedar trees and mowed to maintain open meadow habitat, which was established to replace habitat lost by creation of the project's lower reservoir. NYPA, along with representatives from FWS, New York DEC, New York Parks, New York State Department of Corrections, SUNY-Cobleskill, and Schoharie County Soil and Water Conservation District, and the Schoharie County Conservation Association are members of a Wildlife Management Task Force established for the project, with a stated goal to maintain, enhance and perpetuate wildlife, as well as to increase awareness and interactive opportunities with the environment (NYPA, 2005a, 2005b).

Wetland, Riparian, and Littoral Zone habitat

NYPA's field surveys and cover-type mapping in support of relicensing identified 838 acres of open water and wetlands within the project boundary, of which 184 acres are vegetated emergent, scrub-shrub, and forested wetlands (NYPA, 2014). Wetland acreages are presented in table 9.

Wetlands

Emergent wetlands are the most common wetland habitat present in lower reservoir and Schoharie Creek near the project. Most of the shoreline upstream from the confluence with the Mine Kill consists of steep bedrock cliffs with little or no riparian

vegetation. Palustrine forested wetlands occur in isolated locations, primarily near the mouth of the Mine Kill and adjacent to Schoharie Creek downstream of the lower dam.

Most of the upper reservoir shoreline consists of angular rip-rap with little or no vegetation. Emergent wetlands occur only along the eastern and northeastern shoreline of the upper reservoir, with some willow-dominated scrub-shrub wetlands. Constant-level ponds, constructed in 1979, are present in the upper reservoir (figure 6).

In 2000, the U.S. Army Corps of Engineers (Corps) required NYPA to create 6.19 acres of freshwater wetlands (primarily emergent and scrub-shrub wetland) to compensate for the loss of wetlands within a landslide area to the south of the Visitors Center and northwest of the lower dam. In 2015, NYPA created a 0.33-acre palustrine emergent and scrub-shrub wetland as mitigation required by the Corps due to construction of a warehouse adjacent to the north gate access road. Two additional acres of created emergent wetlands adjacent to the Visitors Center are located within the approximately 1,600-acre wildlife management area described above, and NYPA proposes to continue management of this wetland.

Riparian habitat

Riparian habitat is present along tributaries to the lower reservoir, and is generally dominated by sycamore, cottonwood, and green ash with some areas, primarily sloping banks, dominated by hemlock. Shrub layer vegetation in these areas is primarily dominated by saplings (ash, sycamore, or hemlock), honeysuckle, and *Spiraea* species (white meadowsweet, steeplebush). Herbaceous vegetation is primarily composed of bloodroot, Jack-in-the-pulpit, twisted stalk, goldthread, starflower, wild sarsaparilla, coltsfoot, and virgin's bower. Poison ivy and Virginia creeper are dominant vines in these riparian forests.

Littoral zone habitat

The primary habitat within the littoral zone of the lower reservoir is exposed cobble shoreline. Rocky substrates do not provide suitable habitat for submerged aquatic vegetation (SAV), and thus SAV is largely absent from the lower reservoir, Schoharie Creek, and its tributaries. Limited SAV is present in occasional small depressions within areas of emergent wetland within the lower reservoir.

Table 9. Estimated open water, littoral zone, and wetland acreage in the project boundary (Source: license application and NYPA, 2014, as modified by staff).

Cover Type	**Acres within project boundary**
Artificial pond/reservoir	641.9
Stream/River	41.2
Constant level pond	3.3
Scoured/eroded shoreline	10.0
Exposed shoreline (mud/silt)	10.6
Cobble shore	18.2
Emergent marsh	108.4
Floodplain forest	14.2
Shrub swamp	12.4
Forested wetland	4.4

Invasive plant and insect species

In general, invasive plant species within the project boundary occur in discontinuous patches rather than in large stands. Invasive shrub honeysuckles (Morrow's and Tatarian) and barberry (primarily European) are the most common invasive species, often located in the understory of mixed northern hardwood stands and occasionally white pine forests. Japanese knotweed occurs in several stands, primarily within a large area of recent alluvium at the upstream limit of the project boundary. Garlic mustard and white sweet clover are dominant herbaceous invasive species along upland forest edges and roadsides. Other species, including hawkweed, spotted knapweed, and Japanese stiltgrass are present but not widespread within the project boundary. Purple loosestrife is a common invasive plant in wetland habitat within the project boundary.

The hemlock woolly adelgid (*Adelges tsugae*), a destructive pest of the eastern hemlock, is prevalent throughout Mine Kill State Park. During the 2012 survey, occasional dead hemlock trees and infested live branches were observed to the north of the State Park along the northwest shore of the lower reservoir (NYPA, 2014). This infestation is noteworthy because hemlock is a dominant canopy tree in the project area, and most of the eastern hemlock trees within the project boundary occurs in forests where

hemlock is less than 50 percent of the canopy cover. Woolly adelgid infestations have not been observed along the upper reservoir (NYPA, 2014). New York Parks maps woolly adelgid infestations in Mine Kill State Park and the surrounding area, and in 2013 began a monitoring and control program using both chemical and biological treatments, including the release of *Laricobius* beetles (approved for adelgid control by the United States Department of Agriculture in 2000) to mitigate potential damage from the adelgid within Mine Kill State Park (CRISP, 2013).

The emerald ash borer (*Agrilus planipennis*) is an introduced beetle species that affects North American ash (*Fraxinus*) species, first observed in the Hudson River Valley in 2010.[31] Although a specific search was not conducted, emerald ash borers were not observed within the project boundary during field surveys in 2012. However, New York DEC has identified the emerald ash borer within southeastern Schoharie County, including the Town of Conesville, and the entire county is within the emerald ash borer restricted zone (where any ash wood or products made of ash may not leave the restricted zone without a permit or compliance agreement). Due to the rapid spread of this species, it is possible that ash trees within the project boundary have been, or will be, colonized by emerald ash borers.

Wildlife

The variety of upland and wetland habitats at varying elevations within the project boundary, as well as extensive open-water habitat, supports a large variety of wildlife. Bird species, including grassland-dependent species (bobolink), interior forest species (ovenbird, wood thrush), waterfowl, raptors, and edge species are prevalent during migratory, breeding, and overwintering periods. Mammals observed within the project boundary includes larger species (white-tailed deer, black bear), predators (coyote), wetland-dependent species (beaver, porcupine, mink, raccoon), and small mammals (white-footed mouse, gray squirrel, bats). Reptiles and amphibians, present within forest, wetland, and littoral zone habitat, include common species (green frog) and species associated with intermittent and permanent tributaries (northern dusky and Allegheny mountain dusky salamander).

[31] *See* https://www.dec.ny.gov/animals/7253.html.

State-listed Species

Timber rattlesnake

The timber rattlesnake, a New York State-threatened species that occurs within the Catskills region, has historically been present within the project area, the most recent observation before the present surveys occurring in 1983 (NYPA, 2014).

Timber rattlesnakes are associated with deciduous or mixed deciduous-coniferous forests in hilly or mountainous areas, with rock outcroppings, ledges, and slides (NYNHP 2017a). This species generally forages in forested habitat associated with overwintering den sites. In New York, timber rattlesnake dens are often located below ledges where talus slope debris has accumulated, or within fractures of rock ledges or outcrops. Rattlesnakes use open, rocky areas to bask, shed, and give birth.

Surveys for timber rattlesnakes and suitable habitat conducted in 2012 and 2013 did not identify timber rattlesnake individuals within or adjacent to the project boundary, nor suitable habitat for the species within the project boundary. In September 2017, a dead young-of-year timber rattlesnake was observed on a road within the project boundary, which suggests the presence of an active den within or near the project boundary.

Bald eagle

The bald eagle, a New York State-threatened species and a federally-protected species under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, is present throughout the year within the project boundary.

Bald eagles are typically found near waterbodies that support fish and waterfowl, their primary food sources (NYNHP 2017b). Bald eagles usually construct nests near water in tall deciduous (oak, cottonwood, beech) or coniferous (pine, spruce, fir) trees. Non-breeding adults and wintering birds use communal roost sites that may be some distance from food sources.

Bald eagles are known forage in both reservoirs and upstream and downstream Schoharie Creek, including overwintering periods in areas free of ice, and roost and nest in adjacent forested habitat. Three bald eagle nests have been documented in or adjacent to the project boundary, with some variability in nest location. During the period between 2013 and 2016, one bald eagle nest was present within the project boundary, another nest was less than 1 mile from the boundary, and a third nest was within 2 miles of the project boundary.

3.3.3.2 Environmental Effects

In SD1 and SD2, Commission staff identified three issues related to terrestrial resources: (1) the effects of project operation, maintenance, and project-related recreation on botanical resources and wildlife, including game species; (2) effects of project reservoir fluctuations on riparian and wetland habitat and associated wildlife; and (3) the effects of project operation, maintenance, and project-related recreation on New York State-listed wildlife species, including timber rattlesnake and bald eagle.

The Commission did not receive substantive comments regarding the effects of project operation, maintenance, or project-related recreation on terrestrial resources. Therefore, staff analyzed the effects associated with NYPA's proposals to enhance an existing constant-level pond, which involve the creation of wetland and riparian habitat; manage an existing management area and wetland creation area; and minimize effects to timber rattlesnakes and bald eagles due to ground-disturbing and tree-clearing activity.

Wetland Enhancement

As part of the Settlement Agreement's Ecological Enhancement Plan, in order to provide habitat diversity and wetland edge habitat within the upper reservoir, NYPA proposes to enhance one of four existing constant level ponds located at the upper reservoir with the least amount of habitat and topographic diversity (pond 3, *see* figure 6). The enhancements would improve topographic and substrate diversity, retain a consistent water level to promote shoreline wetland plant establishment, and enhance approximately 1.0 acre of habitat in the upper reservoir, including 0.4 acre of deep-water habitat, 0.5 acre of emergent wetland habitat, and 0.1 acre of riparian habitat on a berm created to impound and maintain water levels in addition to providing habitat diversity and wetland edge habitat. NYPA proposes to plant limited amounts of native plant species within the approximately 800 linear feet of raised berm (e.g., buttonbush, willows, red osier dogwood, and white boneset) and 0.5 acre of emergent wetlands (e.g., pickerelweed, hardstem bulrush, and common three-square) to supplement natural colonization. NYPA also proposes to monitor the success and survival of created wetland habitat for five years following installation.

As part of the Settlement Agreement's Land Management Plan, NYPA also proposes to continue managing 2 acres of wetlands adjacent to the Visitors Center.

FWS and New York DEC, in letters filed March 1, 2018 and March 15, 2018, respectively, state that they endorse the Ecological Enhancement Plan and Land Management Plan filed with the Settlement Agreement.

Our Analysis

Although the upper reservoir experiences water level fluctuations resulting from project operation, NYPA's proposal to enhance one of the four constant-level ponds with the creation of 0.1 acre of riparian berm and 0.5 acre of emergent wetlands, and monitoring the success and survival of plantings over a 5-year period, would provide additional habitat diversity within the upper reservoir that would be beneficial to waterfowl and other wildlife, as would continuing to maintain 2 acres of created wetlands adjacent to the Visitors Center.

State-listed species

Both the New York State-threatened timber rattlesnake and bald eagle occur at the project, and it is likely that both species also reproduce there. Construction of recreational enhancements, including new comfort stations and a picnic shelter near the existing soccer fields, and routine project maintenance could disturb these species.

In the proposed Land Management Plan filed with the Settlement Agreement, NYPA states that, prior to conducting any ground-disturbing[32] or tree-clearing[33] activities, it would review the planned activities and initiate consultation as needed, following FWS and New York State guidelines for timber rattlesnakes and bald eagles. If required through consultation, NYPA states it would implement measures recommended by FWS and New York DEC to address potential impacts to these species, including following FWS' Bald Eagle Management Guidelines[34] prior to undertaking any ground-disturbing or tree-clearing activities. The plan also specifies NYPA's procedures for roadway maintenance and vegetation management, including the timing of these

[32] On page 17 of the Land Management Plan, NYPA defines ground-disturbing activities as those that would remove existing vegetation through excavation and/or grading, including creating new roads or parking areas, clearing and grading for new project or recreational facilities, establishment of new construction staging areas, and other activities. However, it would not include the placement of gravel on existing roadways or parking areas, or the routine grading of existing gravel roads or parking areas, or routine landscaping activities within existing project facilities.

[33] On page 17 of the Land Management Plan, NYPA defines tree-clearing activities as those that would remove trees in excess of 3 inches in diameter, including timber harvesting activities, and tree-clearing activities for proposed construction projects. It would not include routine mowing or vegetation management of woody vegetation less than 3 inches in diameter.

[34] *See* https://www.fws.gov/northeast/ecologicalservices/eaglenationalguide.html.

activities, and the type of management used (e.g., mechanical clearing, herbicide use, etc.)

FWS and New York DEC, in letters filed March 1, 2018 and March 15, 2018, respectively, state that they endorse the Land Management Plan filed with the Settlement Agreement.

Our Analysis

Construction of the proposed recreation facilities and continued operation and maintenance of the project may affect habitat used by timber rattlesnakes and bald eagles. However, consulting with FWS and New York DEC prior to ground-disturbing or tree-clearing activities, incorporating measures to minimize habitat disturbance, and following FWS' Bald Eagle Management Guidelines would minimize effects to these species.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

FWS's IPaC system indicates one federally listed threatened species known to have the potential to occur in Schoharie County: the northern long-eared bat.[35] 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, 2016b).

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

[35] *See* March 8, 2018 memorandum.

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[36] and spring-staging[37] 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:[38] 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, 2016a). 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, 2016g).[39]

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[36] 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.

[37] 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).

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

[39] 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, 2016f). 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.

The Blenheim-Gilboa Project is located in Schoharie County, which is within the white-nose syndrome zone and the northern long-eared bat species range (FWS, 2016d; FWS, 2016h). Additionally, FWS data on known northern long-eared bat hibernacula and maternity roost locations indicates that, while no known maternity roost locations were identified in Schoharie County, several hibernacula exist in the county (FWS, 2016e). However, the closest known hibernacula is 24 miles from the project boundary (NYPA, 2014).

3.3.4.2 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 provide suitable summer roosting and feeding habitat for the species. Construction of recreational enhancements, including new comfort stations and a picnic shelter by the existing soccer fields, and routine maintenance of the project would likely involve the removal of trees, which may remove potential summer roosting habitat used by northern long-eared bats.

In the proposed Land Management Plan filed with the Settlement Agreement, NYPA states that, prior to conducting any ground-disturbing[40] or tree-clearing[41] activities, it would review the planned activities and initiate consultation as needed, following FWS guidelines for the northern long-eared bat. If required through consultation, NYPA states it would implement measures recommended by FWS and New York DEC to address potential impacts to the species, including following any guidelines for the northern long-eared bat recommended by the agencies prior to undertaking any ground-disturbing or tree-clearing activities..

FWS and New York DEC, in letters filed March 1, 2018 and March 15, 2018, respectively, state that they endorse the Land Management Plan filed with the Settlement Agreement.

Our Analysis

Consultation with FWS and New York DEC regarding ground-disturbing or tree-clearing activities and methods to avoid disturbance to northern long-eared bats, and following northern long-eared bat guidelines recommended by the agencies to minimize effects to individual bats or northern long-eared bat habitat, is likely to minimize effects to this species. We conclude that, while construction of the proposed recreation facilities

[40] See section 3.3.3, *Terrestrial Resources* above for NYPA's definition of ground-disturbing activities.

[41] See section 3.3.3, *Terrestrial Resources* above for NYPA's definition of tree-clearing activities.

and 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 under the final 4(d) rule.

3.3.5 Recreation, Land Use, and Aesthetics

3.3.5.1 Affected Environment

Regional and Local Recreation

The Blenheim-Gilboa Project is located in the Saratoga/Capital District state parks administration region, as designated by New York Parks. Recreation amenities in the region include hiking trails, camping, scenic vistas, wildlife viewing, fishing access, boating, swimming, and educational centers (NYPA, 2014). This region contains twelve state parks, including Mine Kill State Park and Max V. Shaul State Park; eight historic sites; and several state forests, including Blenheim Hill State Forest, Leonard Hill State Forest, High Knob State Forest, Keyserkill State Forest Complex, and Burnt-Rossman Hills State Forest. For hiking trails, the Long Path, a hiking trail that extends 357 miles from Fort Lee Historical Park, New Jersey, to Altamont, New York, passes through the towns of Blenheim and Gilboa, and follows the western shoreline of the Blenheim-Gilboa Project's lower reservoir (NYPA, 2014). A 5-mile-long portion of the trail that runs through Mine Kill State Park is a designated National Recreation Trail.[42] In addition, a new 38-mile-long multi-use trail also has been proposed that would travel between the towns of Esperance and North Blenheim, and follow the Schoharie Creek (SALT, 2016).

Schoharie Reservoir is approximately 5 miles upstream from the Blenheim-Gilboa Project's lower dam and has numerous New York City DEP boat launches that allow access to the Schoharie Reservoir. Certain regulations apply, such as the boat must be registered with New York City DEP, and it cannot have a motor. In addition to boating facilities on Schoharie Reservoir, two formal and four informal sites exist downstream of the Blenheim-Gilboa Project that provide access for boating on Schoharie Creek. The two formal access sites include a hand-carry launch site at Max V. Shaul State Park and New York DEC's Schoharie Creek Access. There are four informal access sites; two between the two formal sites (Bielfeldt Road and Breakabeen Route 30 Bridge Access) and two upstream of the New York DEC Access (North Blenheim Route 30 Bridge Access and Bear Ladder Road Access). Three of the access sites are associated with

[42] The National Trail System Act of 1968 authorized creation of a national trail system, which comprises National Recreation Trails, National Scenic Trails, and National Historic Trails. Through designation, these trails are recognized as part of America's national system of trails and provide over 1,000 trails in all 50 states, available for public use in a variety of urban, rural, and remote areas. https://www.americantrails.org/nationalrecreationtrails/about.htm.

Route 30 crossings over Schoharie Creek. These boating access sites and their proximity to the Blenheim-Gilboa Project are depicted on figure 11.

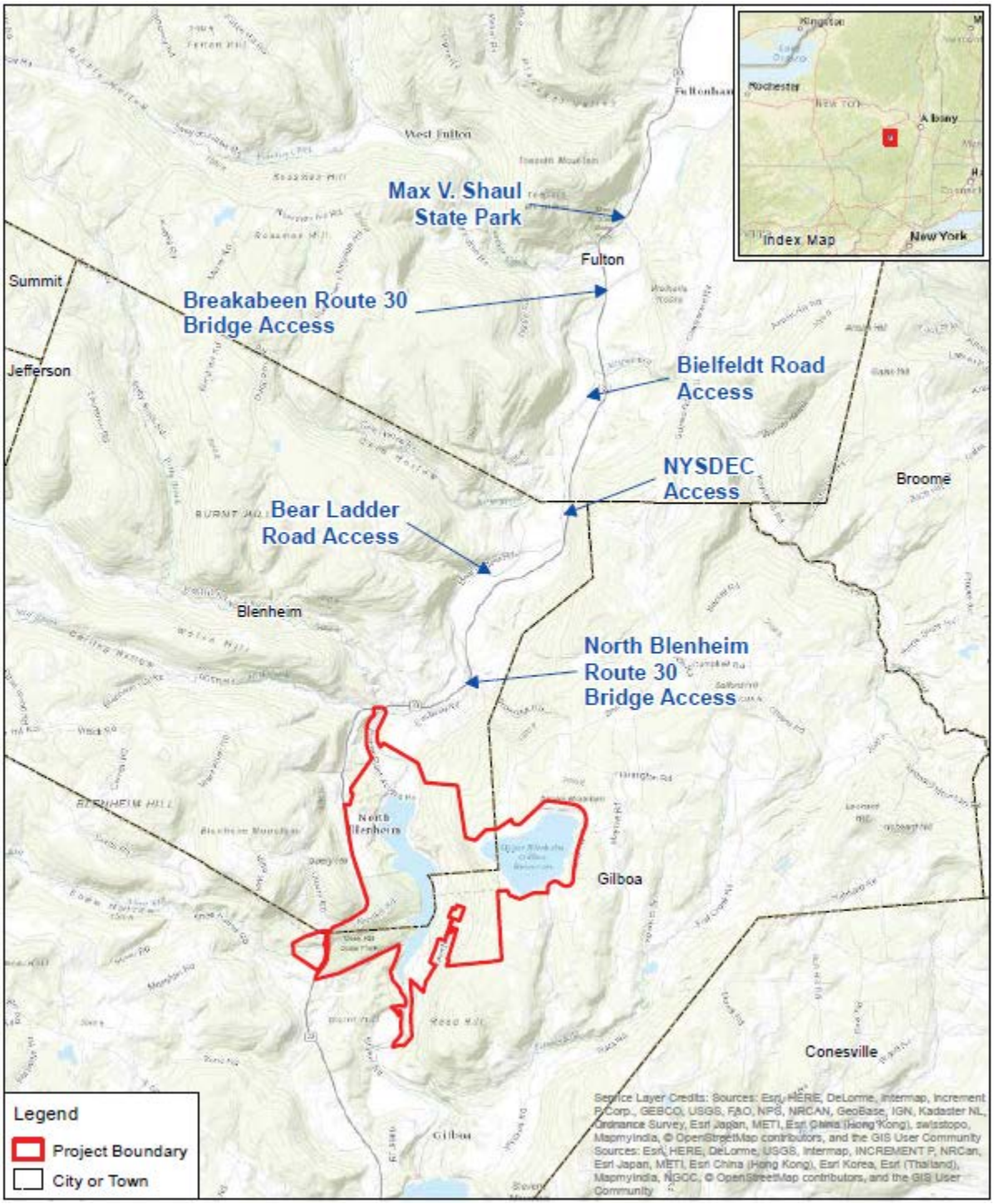

Figure 11. Schoharie Creek Access Sites (Source: license application).

There are also numerous recreational boating opportunities, including Class II and III waters, on Schoharie Creek and within 50 miles of the Blenheim-Gilboa Project. The

boating opportunities on Schoharie Creek include reaches downstream of the project from Middleburgh to Esperance, Esperance to Power House Road, and from Power House Road to the Mohawk River. There are also recreational boating excursions along Schoharie Creek upstream of the project, including at Mine Kill State Park. (NYPA, 2016b).

Project Recreation

The Blenheim-Gilboa Project provides a variety of recreation amenities and opportunities, including picnicking, hiking, fishing, seasonal archery hunting, boating, interpretive centers, and pool swimming (NYPA, 2018). Project recreation sites include the Lansing Manor Complex (Lansing Manor and Visitors Center); Mine Kill State Park, which includes the Mine Kill Falls Overlook; the Upper Reservoir Access sites; and the Schoharie Creek Fishing Access site. Figure 12 depicts the location of these recreation sites and table 10 summarizes their recreation facilities.

Under the current license, project land is open to the public for outdoor recreation, with the exception of those areas that are closed for security purposes. The project also includes land that is available for archery hunting. Areas where hunting is considered unsafe and therefore prohibited are designated and posted as safety zones. Archery hunting is allowed on the remainder of Blenheim-Gilboa Project lands for permitted hunters and NYPA issues up to 100 permits annually. The archery hunting season is governed by the New York DEC's hunting regulations (NYPA, 2018).

Figure 12. Blenheim-Gilboa Project Recreation Sites (Source: license application).

Table 10. Recreation Facilities at the Blenheim-Gilboa Project (Source: license application).

Recreation Site	Recreation Facility Type	Description
Mine Kill State Park	Swimming Pool Complex	Olympic-sized swimming pool, wading pool, diving pool, concessions, bathhouse
	Athletic Fields and Courts	2 soccer fields, 1 baseball field, 1 basketball court, 1 volleyball net, horseshoe pits
	Boat Launch	1 lane boat launch, parking for approximately 49 vehicles with trailers
	Playgrounds	2 playgrounds
	Picnic Facilities	2 picnic areas with approximately 200 tables (including approximately 7 barrier-free tables), 1 picnic pavilion/shelter
	Trails	Long Path (6.75 mile section), Orange Trail (1.25 miles), Yellow Trail (1.5 miles), Blue Ski Trail (0.75 miles), Red Trail/Nature Trail (0.75 miles), Old Long Path Trail (0.75 miles)
	Disc Golf	18-hole course
	Winter Recreation	Snowshoeing, snowmobiling, cross-country skiing, sledding hill, and ice skating rink
	Scenic View/Overlook	Two locations
	Interpretative Signs	Approximately 24 signs addressing various items of interest
	Restrooms	Barrier free
	Parking	Approximately 350 vehicle parking spaces
Lansing Manor Complex	Visitor Centers	Interpretative center and historic property, parking for approximately 42 vehicles
	Picnic Facilities	Picnic area with approximately 10 tables and 1 picnic shelter overlook

	Interpretative Signs	Approximately 24 signs addressing various items of interest
	Restrooms	Barrier free
	Trails	Bluebird Trail (2.5 miles), Wetland Interpretive Trail (0.25 mile)
Upper Reservoir Access Area – North	Informal Angler Access	Parking for approximately 3 vehicles
	Informational Sign	1 sign with hours of operation and site rules
Upper Reservoir Access Area – Boat Launch	Car-top Boat Launch	1-lane gravel boat launch, parking for approximately 2 vehicles
	Informational Sign	1 sign with hours of operation and site rules
Upper Reservoir Access Area – South	Informal Angler Access	Parking for approximately 6 vehicles
	Informational Sign	1 sign with hours of operation and site rules
Schoharie Creek Fishing Access	Angler Access Point	Parking for approximately 14 vehicles

Lansing Manor Complex (Blenheim-Gilboa Visitors Center and Lansing Manor Museum)

The Lansing Manor Complex is located on the western shore of the lower reservoir, along Route 30 in North Blenheim. The complex is owned by NYPA, and consists of the Lansing Manor Museum (including outbuildings, such as a Tenant House, Land Office, and Corn Crib) and the Blenheim-Gilboa Visitors Center (Visitors Center), which is housed in what was once the dairy barn of the manor. The manor house is operated as a house museum in cooperation with the Schoharie County Historical Society and shares parking and restroom facilities with the Visitors Center. The Visitors Center, operated by NYPA, hosts programs and events throughout the year, including a quilt show, classic car show, and family movie weekends. Amenities at the site include a paved walking trail to the manor house and Visitor Center, which are both barrier-free. Interpretive signs and displays, several picnic tables, and a picnic pavilion are also located at the site. The Lansing Manor Complex also offers views of the lower reservoir. The site does not charge a fee for use, and is open to the public 7 days a week, year-round, with closures on major holidays.

In addition to Lansing Manor and the Visitors Center, the grounds of the Lansing Manor Complex also contain a bluebird trail and an area managed for white-tailed deer. Developed in the 1980s and managed in cooperation with New York Parks and SUNY-Cobleskill, the bluebird trail extends from the Visitors Center to Mine Kill State Park and includes nesting boxes and regular mowed areas to ensure quality bluebird habitat. NYPA also maintains an area that is managed for white-tailed deer. This area contains over 2,000 northern white cedar trees as a winter forage source and is mowed to reduce establishment of unwanted woody vegetation. The area also provides for habitat lost when the lower reservoir was constructed (Hamor, 1989).

Mine Kill State Park

Mine Kill State Park is located on the western shore of the lower reservoir on Route 30 in North Blenheim. The facility is owned by NYPA and operated and maintained under an agreement with New York Parks. Amenities at the site include a swimming pool, wading pool, diving pool, disc golf course, playgrounds, basketball courts, horseshoe pits, walking/hiking/mountain biking trails, picnic tables, picnic shelters, and soccer fields. A two-lane, hard surface boat launch provides access to the lower reservoir from the park. Much of the park is barrier-free, including a lift in the pool, barrier free bathrooms, changing rooms, showers, picnic tables, and parking spaces. Just south of the main park area on Route 30, is the Mine Kill Falls Overlook, an overlook which offers views of Mine Kill Falls from a series of decks and stairs. Amenities at the overlook include access to some of the trails at the park, picnic tables, and grills. Hunting is also allowed in certain portions of the park, but a permit must be acquired from NYPA. The park is open to the public year round with summer and winter hours. No fee is charged for use of the park.[43] There is, however, a rental fee for use of the picnic shelters.

Upper Reservoir Recreational Facilities

There are three recreation areas on the upper reservoir, all of which are owned and maintained by NYPA. Sites on the north and south sides of the reservoir provide walking areas and angler access, along with parking along the sides of the Upper Reservoir Service Road. A third site, located on the eastern side of the reservoir, provides access for hand-carry boats and row boats on trailers. To access this launch, recreationists must contact NYPA during normal business hours. These sites are available between April 1 and September 30.

[43] In August 2015, NYPA and New York Parks agreed to eliminate parking and swimming fees at Mine Kill State Park. NYPA compensates New York Parks for the operation and maintenance of Mine Kill State Park.

Schoharie Creek Fishing Access Site

The Schoharie Creek Fishing Access site is located north of the lower dam, off Power Plant Road in North Blenheim. This site has parking and provides dispersed recreation access to Schoharie Creek. Between 2014 and 2016, NYPA improved the access road to allow individuals to drive further downstream to access the shoreline and added parking for approximately six vehicles (NYPA, 2016c). The site is open to the public year-round.

Cooperative Archery Hunting Area

In addition to the formal recreation sites, NYPA also provides access to project lands for archery hunting. The Cooperative Archery Hunting area includes 1,240 acres and comprises all lands owned by NYPA within the project boundary, with the exception of those lands where hunting is prohibited due to safety concerns. The hours and seasons are governed by New York DEC's hunting regulations. Deer and turkey hunting with compound bow, recurve bow, or longbow is permitted during the regular open seasons for bow hunters with the Blenheim-Gilboa archery permit. NYPA issues a maximum of 100 permits to licensed bow hunters who have completed the shooting competency portion of the bow hunter education process. Parking for the Cooperative Archery Hunting Area is available roadside and at the Upper Reservoir Access sites (NYPA, 2018).

Recreation Studies

Recreation Use

NYPA conducted a Recreation Use/User Contact Study in preparation of its license application. As part of the study, NYPA conducted a field study that included a combination of spot counts, calibration counts, traffic counts, and user contact surveys. The sites surveyed included the Lansing Manor Complex, Mine Kill State Park (including Mine Kill Falls Overlook), Schoharie Creek Fishing Access, Upper Reservoir Access Area – North, Upper Reservoir Access Area Boat Launch, and the Upper Reservoir Access Area – South. For Mine Kill State Park, New York Parks provided results for the level of use, types of activities, and projected future use.

The Recreation Use/User Contact Study report shows that the total annual recreation use of surveyed recreation sites was estimated to be 124,065 recreation days. More than half of the recreation use occurred during the summer (59 percent of recreation days). Approximately 24 percent of the use was in the fall and recreation use was lowest in spring (8 percent) and winter (9 percent). Annual recreation use was greatest at Mine Kill State Park (72,701 users annually), followed by the Visitors Center (28,331), Mine Kill Falls Overlook (14,487), Lansing Manor (3,619), and Schoharie Creek Fishing Access (2,685). Use at the three Upper Reservoir Access sites was minimal, with

836 recreation days at the Upper Reservoir Access – North, 713 recreation days at the Upper Reservoir Access – Boat Launch, and 693 recreation days at the Upper Reservoir Access – South (NYPA, 2016c). Table 11 summarizes the estimated or calculated use for each activity type project-wide.

Table 11. Recreation Use by Activity Type Based on Spot Counts, Calibration Counts, and Use Records, March 2015 through February 2016 (Source: license application).[44]

Recreation Activity	Estimated Use (Recreation Days)	Percent of Recreation Use
Interpretative Center	31,950	26
Walk/Hike/Run	22,055	18
Swim	14,987	12
Picnic	11,316	9
Sightsee	10,485	8
Disc golf	9,795	8
Playground	5,117	4
Soccer Camp	3,090	3
Fishing	2,521	2
Photography	1,441	1
Bike riding	673	1
Motor boat	667	1
Non-motor boat	349	0
Cross-country ski	291	0
Hunt[45]	77	0
Snowmobile	-	0
Other recreation use[46]	9,251	7
Total	**124,065**	

As shown, the most popular recreation activity type at the Blenheim-Gilboa Project was visiting an interpretive center (either Lansing Manor or the Visitors Center)

[44] The recreation use data in this table reflects the revised 2015 recreation attendance data provided to NYPA by New York Parks on September 29, 2016.

[45] NYPA issued a total of 89 hunting permits. Hunters with permits are assigned specific areas of the project and were typically not observed hunting or parking in the recreation sites included in the spot or calibration counts. Based on NYPA's observations, an estimated 27 hunters utilized parking spaces at the upper reservoir recreation sites. The remaining 62 are estimated to have used other locations for parking.

[46] Other recreation use includes special events, meetings, geocaching, and general relaxation. NYPA also included use that was unidentified during the recreation survey, which may include both recreation-related and non-recreation use.

at 26 percent. Based on NYPA's records, 31,950 recreation days at the Blenheim-Gilboa Project were spent participating in visiting interpretive centers. The second most frequent recreational use is walking/hiking/running, accounting for an estimated 22,055 recreation days, or 18 percent of the total number of recreation days at the project. This activity was primarily observed at Mine Kill Falls Overlook and Mine Kill State Park. The next most popular recreation uses of the project include swimming (12 percent), picnicking (9 percent), sightseeing (8 percent), and disc golf (8 percent) (NYPA, 2016c).

Based on parking area use, NYPA determined the average summer weekend and peak observed capacity use by recreation site. On average, most sites were well below capacity during the summer study season. Only one site, the Upper Reservoir Access – North site was observed to be at capacity. Table 12 presents the average summer weekend and peak use capacity data.

Table 12. Average Summer Weekend and Peak Use by Site (Source: Recreation Use/User Contact Study report).

		Average Summer Weekend		Peak Use Observed	
Recreation Site	**Available Spaces**	**Spaces in Use**	**Percent Capacity**	**Spaces in Use**	**Percent Capacity**
Mine Kill State Park	406	46	11	166	41
Lansing Manor Complex	45	5	11	13	29
Mine Kill Falls Overlook	23	4	17	18	78
Schoharie Creek Fishing Access	8	1	13	2	25
Upper Reservoir Access – North	3	1	33	1	33
Upper Reservoir Access – Boat Launch	2	1	50	2	100
Upper Reservoir Access – South	6	1	17	1	17

To determine future recreation demand, NYPA relied on both expected population growth in the project region and changes in recreation participation. Population projections for the region, which includes the following counties: Albany, Delaware, Greene, Montgomery, Otsego, Schoharie, and Schenectady, are expected to grow 18 percent over the period 2010-2016 (NYPA, 2016c). To evaluate the ability of the Blenheim-Gilboa Project to meet future recreation demands, projections of recreation days were made through 2060 by activity at each location. NYPA's growth projections developed indicate that for the period from 2015 through 2060, project recreation sites

will average a 38 percent increase in recreation days, for a total of 170,899 projected recreation days in 2060. Table 13 presents the projected 2060 recreation use by recreation site.

Table 13. Projected 2060 Recreation Days by Site (Source: license application).

Site	Estimated Recreation Days March 2015 – February 2016	2060 Projected Recreation Days	Percent Growth
Mine Kill State Park	72,701	106,107	46
Visitors Center	28,331	36,059	27
Mine Kill Falls Overlook	14,487	18,210	26
Lansing Manor	3,619	4,606	27
Schoharie Creek Fishing Access	2,685	3,184	19
Upper Reservoir Access – North	836	1,014	21
Upper Reservoir Access – Boat Launch	713	870	22
Upper Reservoir Access – South	693	849	22
Annual Total	**124,065**	**170,899**	**38**

NYPA also conducted an analysis to project future parking lot demand. Using the projected growth rates for each recreation site as the basis, NYPA projected the percent utilization of capacity for each project parking lot, during average summer weekend use. As shown in table 14, NYPA projects that the level of parking lot use (percent utilization) for 2060 at each of the project recreation sites will be under capacity on an average summer weekend in 2060. According to NYPA, the majority of site parking lots will have less than half of their available capacity occupied.

Table 14. Projected 2060 Average Summer Weekend Use by Site (Source: license application).

Site	**Available Spaces**	**2060 Projected Spaces in Use, Summer Weekend**	**Percent Capacity**
Mine Kill State Park	406	67	17
Lansing Manor House and Visitors Center	45	6	14
Mine Kill Falls Overlook	23	5	22
Schoharie Creek Fishing Access	8	1	15
Upper Reservoir Access – North	3	1	41

Upper Reservoir Access – Boat Launch	2	1	60
Upper Reservoir Access – South	6	1	20
Total	**493**		

Recreation User Opinions

In addition to gathering use data, NYPA also created a recreation user survey to gather information on the types of recreation activities that users were participating in, user opinions on a number of aspects of the recreation opportunities at the project, and basic information about party size and length of stay. The recreation user survey was administered during the study period from March 2015 to February 2016 at all project recreation sites and surveys were collected from 160 respondents.

The survey results reveal that the majority of recreationists at the project rate the project recreation facilities positively. Ninety-five percent of respondents said that they would return to the recreation site over the course of the next year. When asked if the recreation site/facility served their interests, 100 percent of the respondents answered yes. The survey also asked recreationists to rate several aspects of the recreation sites, facilities, and amenities provided at the project on a scale of 1 (poor) to 5 (excellent). The majority of the respondents rated the facilities as Excellent (5) or Fair-Excellent (4) when asked about the availability of parking (91 percent), site condition (98 percent), the variety of facilities/amenities (88 percent), and the availability of access to project waters (83 percent). Table 15 provides the user ratings of overall recreation sites.

Table 15. Recreational User Ratings of Recreation Sites, Facilities, and Amenities, Report as Percent of Respondents (Source: Recreation User/User Contact Study Report).

Site/Facility/Activity	Number of Responses	5 Excellent	4	3 Fair	2	1 Poor
Availability of Parking	157	79%	12%	8%	1%	0%
Site Condition	157	89%	9%	3%	0%	0%
Variety of facilities/amenities	130	61%	27%	7%	2%	3%
Available Access to project waters	77	43%	40%	12%	4%	0%

When respondents were asked to provide their perception of the amount of use occurring at the site on a scale of 1 (not crowded) to 5 (extremely crowded), the majority of respondents' either stated Not Crowded (1) (69 percent) or Somewhat Crowded (2) (14 percent). When asked about the number of available recreation facilities on a scale of 1 (Not Satisfied At All) to 5 (Extremely Satisfied), the majority of respondents were either Extremely Satisfied (5) (47 percent) or Moderately Satisfied (4) (24 percent). When asked whether they were aware of water levels, 70 percent of respondents stated that they were not. When asked how satisfied they were with water levels during their

trip, survey respondents answered that they were Extremely Satisfied (5) (32 percent), Moderately Satisfied (4) (38 percent), or Satisfied (3) (30 percent). Finally, when asked to rate the recreation site as a public recreation opportunity on a scale of 1 (No Value At All), to 5 (Highly Valued), the majority of respondents stated Highly Valued (5) (74 percent) or Some Value to Highly Valued (4) (22 percent). NYPA noted that none of the respondents to the recreation user survey identified debris as an issue or concern in the lower reservoir.

During the survey, respondents also had the opportunity to provide an explanation of any low ratings associated with their responses. Of the 34 surveys that had one or more low ratings (Fair to Poor; i.e., 3, 2, or 1 ratings), nine respondents took the opportunity to explain their ratings. The most common response topic was lack of amenities/facilities at the Upper Reservoir Access sites, which was mentioned by three respondents. Other mentioned topics were: "tight" parking (two responses), which came from the Lansing Manor Complex site; bathrooms needed (one response), which came from the Mine Kill Falls Overlook site; locked gates (one response), which came from the Upper Reservoir Access – North site; regulations for boating and ease of use (one response), which came from the Lansing Manor Complex site; and the desire for a turn-around space at the Upper Reservoir Access – South site (one response) (NYPA, 2016c).

Recreational Boating Feasibility

As part of the February 19, 2015 Study Plan Determination, Commission staff required NYPA to conduct a desktop assessment of the feasibility of providing recreation boating flows in Schoharie Creek downstream of the project's lower dam. The assessment included a literature review, hydraulic analysis, and structured interviews of individuals who have experience boating on Schoharie Creek downstream of the project from the lower dam to Max V. Shaul State Park, a reach of approximately 9.2 miles.

The literature review produced limited information regarding recreational boating conditions in the 9.2-mile-long reach. The most informative source was the now out of print 2005 *Adirondack Mountain Club Canoe and Kayak Guide East Central New York State*, which described the portion of the Schoharie Creek from North Blenheim Route 30 bridge to Max V. Shaul State Park as Class I to I+ waters, normally runnable in April and early May, or after a storm that causes water to be spilled from New York State DEP's Schoharie Reservoir (NYPA, 2016b).

The hydraulic analysis modeled maximum depths at 54 locations for flows ranging from 10 cfs to 1,000 cfs over the 9.2-mile length of the primary study area. At flows of 350 to 1,000 cfs, the percentage of locations with less than 1.5 feet of depth ranged from 81 percent to 5 percent. The Adirondack Mountain Club guide states that depths of 1.5 feet are "too shallow" for boating. For the same flows, the percentage of locations

with less than 2.0 feet of water ranged from 83 percent to 39 percent. Flows from 350 to 1,000 cfs in the primary study area of Schoharie Creek typically occur only during the spring freshet (April and May) when water is spilled over Gilboa Dam, and there is snowmelt/runoff. Flows sufficient to provide water depths of 2.0 feet or even 1.5 feet during the remaining months of the boating season (June – October) are limited to significant storm events (NYPA, 2016b).

For the structured interviews, NYPA reached out to 32 individuals affiliated with or representing state parks, municipalities, organized events, paddling organizations, and paddlers regarding boating conditions and their experiences boating the identified 9.2-mile-long reach of Schoharie Creek downstream of the project. In response, NYPA received 14 completed surveys. Based on the results of the surveys, NYPA states this reach of Schoharie Creek is boated relatively infrequently, with most trips taking place in the spring during periods of high flow. According to the respondents, a major reason for limited paddling in the primary study area appears to be insufficient water depths throughout much of the boating season. Respondents typically rated the reach as Class I or II depending on flow, and commented that areas of whitewater in this reach are limited. At flows below 1,000 cfs, travel downstream can be difficult in spots, and may require portage. Many also indicated that this reach has changed significantly since Tropical Storm Irene in 2011 (NYPA, 2016b).

In addition to the structured interviews conducted as part of the recreational boating feasibility study, the User Contact Survey also asked several questions that addressed boating at the project. Of the 160 respondents to that survey who indicated the recreational activity in which they participated, one respondent indicated canoeing, two respondents indicated kayaking, and one respondent indicated both canoeing and kayaking, although these recreationists were not participating in non-motorized boating at the time of the survey. Three of these respondents indicated participating in canoeing and/or kayaking in multiple seasons. In addition, none of the respondents to the survey indicated a desire for additional boating opportunities or additional access points to waters above or below the lower dam (NYPA, 2016c).

Land Use

The Blenheim-Gilboa Project boundary encompasses approximately 2,893 acres, of which approximately 838 acres are open water. As shown in table 16, the majority of lands within the project boundary are undeveloped and forested areas (approximately 44 percent of project lands). Forested and undeveloped lands include lands available for the management of white-tailed deer, a bluebird trail, and lands available for archery hunting. Recreation facilities account for 20 percent of project land use. Areas of development related to the Blenheim-Gilboa Project account for approximately 5 percent of project lands. On the eastern shoreline between the upper and lower reservoirs, there is significant development where the power generation facilities and auxiliary structures

are located. Figures 13 through 15 show the land use within the project boundary. There are no non-project uses within the Blenheim-Gilboa Project boundary.

Table 16. Land Use within the Blenheim-Gilboa Project

Land Use Type	Acres	Percent of Total
Forested/Undeveloped	1,264	44
Water	838	29
Recreation	673	20
Developed	139	5
Transportation	43	1
Wetland	24	1
Crop Land and Pasture	12	<1
Total	**2,893**	**100**[47]

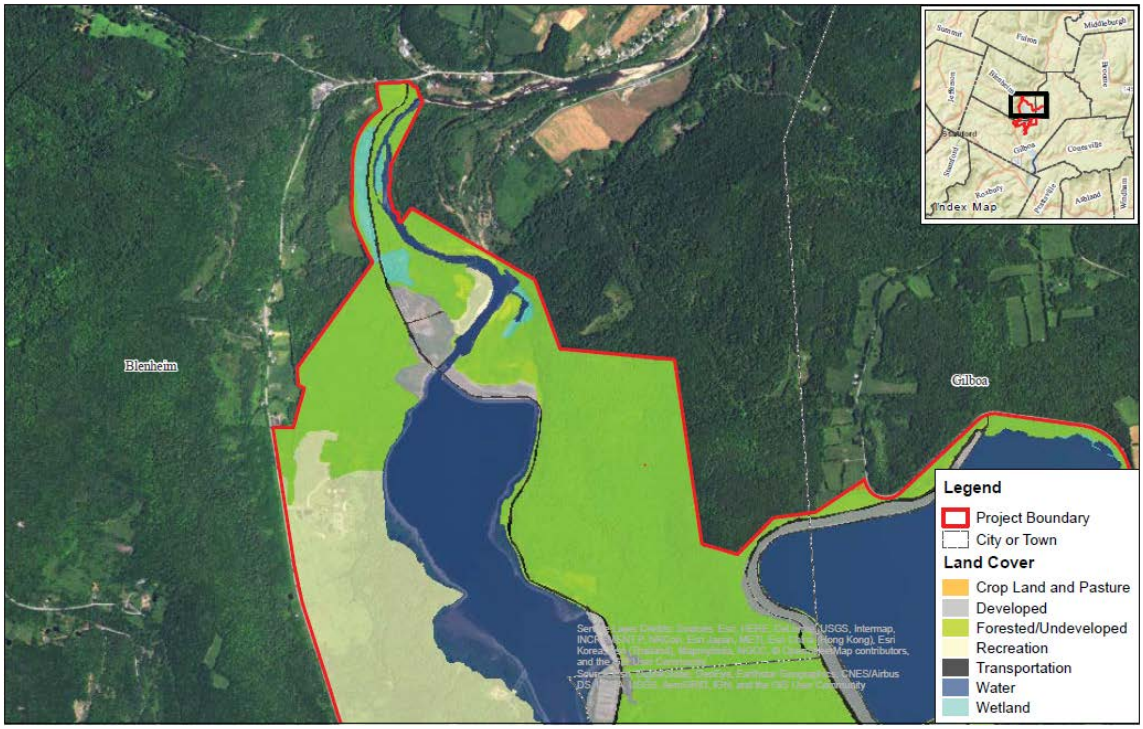

Figure 13. Existing Land Use within the Blenheim-Gilboa Project Boundary, 1 of 3 (Source: license application).

[47] Numbers do not add up to 100 percent due to rounding.

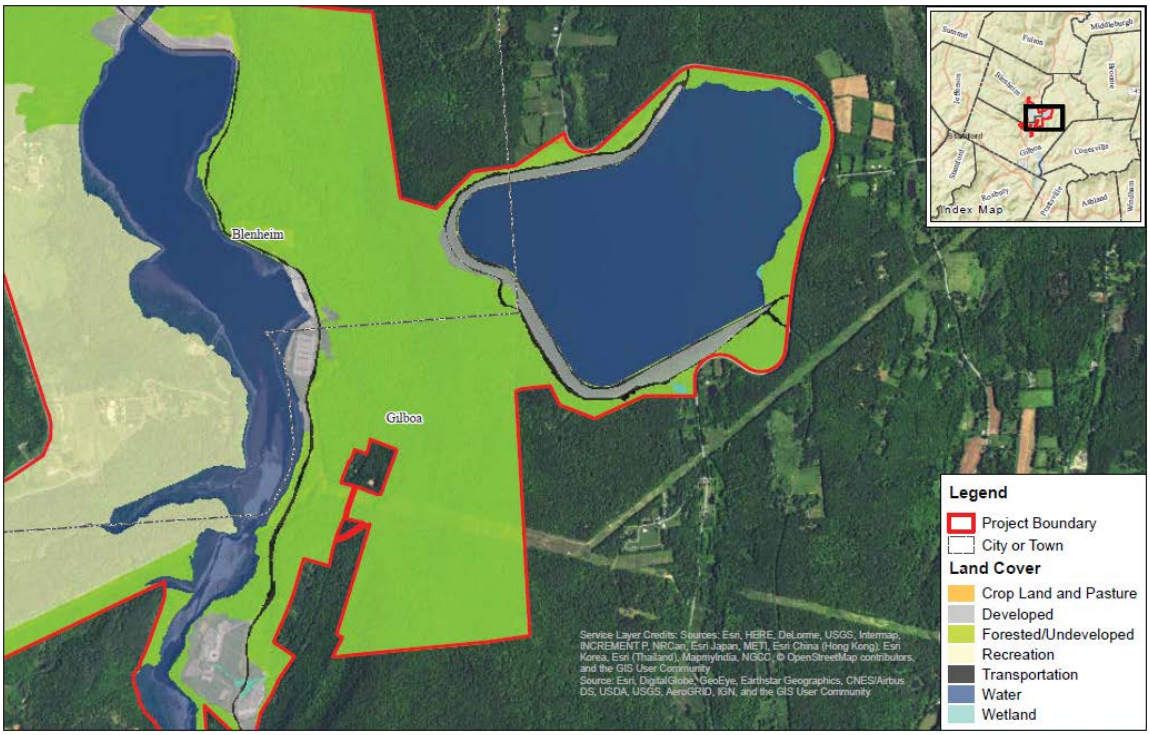

Figure 14. Existing Land Use within the Blenheim-Gilboa Project Boundary, 2 of 3 (Source: license application).

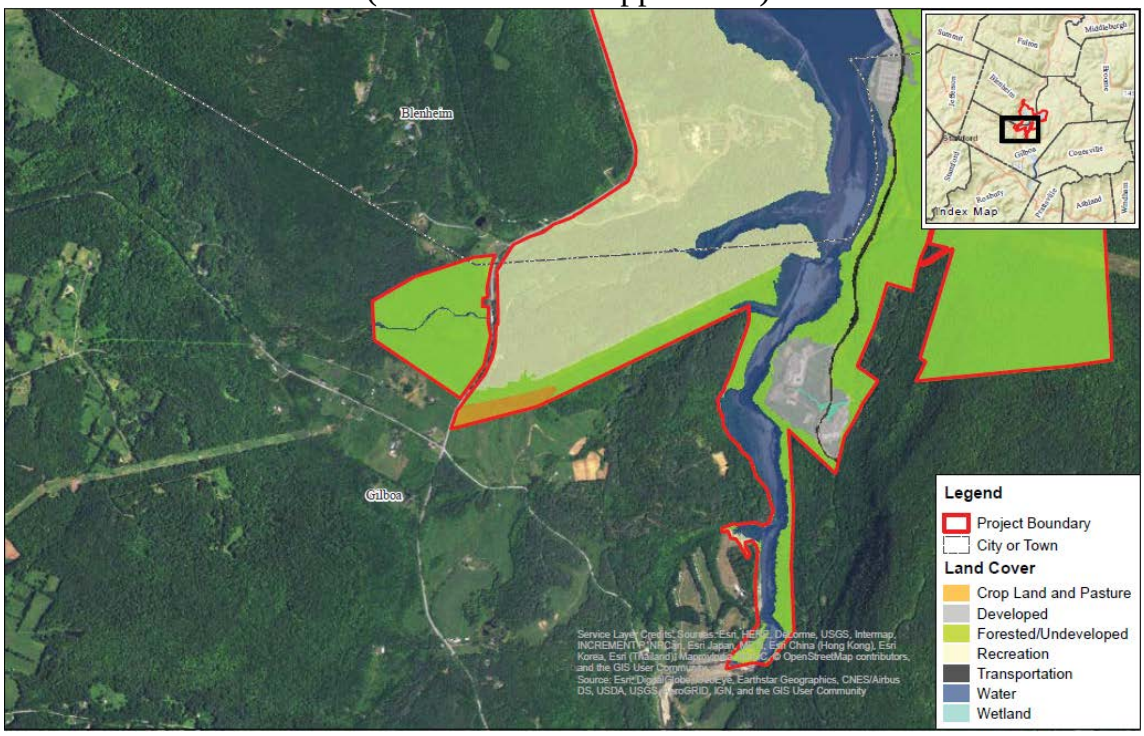

Figure 15. Existing Land Use within the Blenheim-Gilboa Project Boundary, 3 of 3 (Source: license application).

Aesthetics

The region surrounding the Blenheim-Gilboa Project is composed of riverside farmlands, woodlands, historic hamlets, and small towns with vistas of Schoharie Creek and the surrounding hillsides. Steep hills rise up from the floodplains that border Schoharie Creek. The upper reservoir is located on Brown Mountain, east of the lower reservoir. Within the project boundary, there are three areas of development: the Blenheim-Gilboa Project, the Lansing Manor Complex, and Mine Kill State Park.

The historic Lansing Manor, located on the northwest side of the lower reservoir, provides views of the reservoir and its eastern shoreline from the overlook and lawn area. Mine Kill State Park is a 650-acre day use park to the south of Lansing Manor. Views of the lower reservoir, powerhouse, and adjacent switchyard are provided from several locations in the park, including one of the two picnic areas, several trails that access the shoreline, and the boat launch. The boat launch also provides a view of Brown Mountain, east of the lower reservoir, and a limited view of the lower dam. From the lower reservoir, various views of the powerhouse, switchyard, dam, and Brown Mountain are available, depending on the location on the reservoir and proximity to the facilities. Mine Kill Falls Overlook is located within the park and overlooks Mine Kill Falls, an 80-foot-tall waterfall located approximately 1 mile from the reservoir on Mine Kill, a tributary to Schoharie Creek.

Downstream of the lower dam, Blenheim-Gilboa Project lands are undeveloped, except for a small gravel parking lot and an access road on the west shore of Schoharie Creek for angler access approximately 700 feet downstream of the dam. The dam and spillway are visible from this section of riverbank.

The upper reservoir is located on Brown Mountain, with views of the surrounding hills and valleys. The impoundment is contained on three sides by an earth and rock embankment, approximately 2.25 miles long with an access road constructed along the top (the upper dike). There are three access areas on the upper reservoir. Two locations offer pedestrian access to the reservoir, while a third location provides a gravel launch for non-motorized boats. Views of the entire upper reservoir and upper dike are available from all three access points.

3.3.5.2 Environmental Effects

NYPA developed a Recreation Management Plan to address access and recreation within the Blenheim-Gilboa Project boundary. The plan, which was filed with the Settlement Agreement, states that NYPA will continue to operate and maintain project recreation sites, including Lansing Manor Complex, the three Upper Reservoir Access Sites, Schoharie Creek Fishing Access, and the Cooperative Archery Hunting Area. The plan includes descriptions of the recreation sites, guidance on how the sites will be managed and maintained, a provision for monitoring recreation and updating the plan,

and an explanation of how NYPA will coordinate and cooperate with agencies. It also includes a list of improvements that will be undertaken over the term of the new license to enhance the project recreation sites.

In addition to the Recreation Management Plan, NYPA also developed a Land Management Plan that identifies and explains the policies, standards, guidelines, and land use designations used to enhance safety and protect and manage environmental resources, public use, and aesthetics. In regards to recreation, the Land Management Plan sets fourth routine maintenance activities for NYPA-operated recreation sites, including litter clean-up, removal of fallen trees, mowing and vegetation management, and installation and maintenance of signage. As part of the plan, NYPA also proposes to continue to maintain an approximate 1,600-acre management area for wildlife habitat and recreational access. Recreational management activities in this area include maintaining the bluebird trail and Cooperative Archery Hunting Area, and administering the archery hunting permit program.

Recreation Facility Enhancements

To address facility needs at the project, the Recreation Management Plan includes proposed enhancement measures at several of the recreation sites. At all three Upper Reservoir Access Sites, NYPA proposes to provide portable toilets and improve parking. At the Schoharie Creek Fishing Access Site, NYPA proposes to "provide portable toilets and implement area improvements" to improve access for anglers (NYPA, 2018: 16). At the Lansing Manor Complex, NYPA proposes to rehabilitate and upgrade both the Lansing Manor House Museum and the Blenheim-Gilboa Visitors Center.[48]

At the Lansing Manor House Museum, NYPA states that work is necessary to stabilize and upgrade the structures, which include the Manor House, Tenant House, Carriage House, Land Office, Privy, and Wood Shop. These structures are historic and range in age from 135 to 200 years old; therefore, any general maintenance or other work done to stabilize and upgrade the structures, including electrical, plumbing, mechanical, and finish work, would require great care to preserve the historic integrity of the structures. Because of this, the services of historic artisans and specialists will be required.

At the Visitors Center, NYPA states it will upgrade the facilities, which have been in operation for over 40 years. As part of the upgrade, NYPA proposes to modernize the building systems (e.g., electrical, plumbing, mechanical, and security) and ensure the building is ADA-accessible. NYPA also proposes to overhaul the exhibits and renovate the building. NYPA's proposed building renovations include new entrance signage, a

[48] *See* NYPA's May 25, 2018 Response to Additional Information Request Regarding Settlement Agreement.

new reception area, and an interactive event calendar. NYPA also states it will completely renovate the Visitor Center's theater to include a new sound system and an updated audio visual system, with an integrated lighting system and new project screen. NYPA also will produce a new 10 to 15 minute film highlighting the history of the Blenheim-Gilboa Project and its contributions to the community.

As part of the Recreation Management Plan, NYPA also proposes to provide New York Parks with "annual payments of $500,000 for the first eight years of the new license, for a total of $4 million, to fund capital improvements at Mine Kill State Park." In its May 25, 2018 Response to Additional Information Request Regarding Settlement Agreement, NYPA states that New York Parks has identified the following capital improvements as priorities at Mine Kill State Park: $500,000 to replace the pool filtration systems (i.e., filter tanks and piping), resurface the pool deck, address critical replacement needs in the pools themselves (i.e., pool lining, gutters, steps, railings, etc.) and provide barrier free access to the Kiddie Pool; $350,000 for renovations at the bathhouse that includes exterior work, as well as energy efficiency improvements; $660,000 for the boat ramp to recondition the boat ramp and for a small pavilion near the boat launch with built-in storage for rental boats and possibly space for the public to store their own canoes/kayaks; $125,000 for trail improvements that include trail work, repaving paths, and updating user orientation signage throughout the park; $600,000 for comfort stations and a new picnic shelter near the existing soccer fields, including renovations to an existing comfort station and construction of a new comfort station; and $400,000 to replace and/or upgrade the existing playground equipment. NYPA also proposes to continue to work with New York Parks, cooperatively, to assure continued operation and maintenance of Mine Kill State Park.

On March 12, 2018, New York Parks filed comments supporting NYPA's Settlement Agreement, which includes implementation of both the Recreation Management Plan and the Land Management Plan, "without reservation or qualification." New York Parks states that the Settlement Agreement provides a comprehensive overview of the contents of the management plans, and the management plans constitute a full, complete, and exhaustive set of protection, mitigation, and enhancement license measures. New York Parks states that the Recreation Management Plan recognizes the needs and opportunities at the project that New York Parks presented in its 2017 Interim Planning Assessment for Mine Kill State Park, and reflects agreements between NYPA and New York Parks on funding for near-term capital improvements to the pool, comfort stations, and boat launch, and the construction of new playgrounds, picnic areas, and a kayak/canoe launch. On March 15, 2018, New York DEC also filed comments in support of the Settlement Agreement and its recreation measures.

Our Analysis

The Recreation Use/User Contact Study indicates that recreation users are generally pleased with the project's recreation facilities. The majority of the respondents rated the availability of parking, site condition, the variety of facilities/amenities, and the availability of access to project waters as either Excellent or Fair to Excellent. In addition, 96 percent of respondents rated their public recreation opportunity as either Highly Valued or Some Value to Highly Valued. Out of the 160 survey respondents, only 34 provided low ratings for any of their survey responses. When asked to explain those ratings, only nine responded. Of those nine responses, the majority (five) were related to the Upper Reservoir Access Sites, and three of those were related to lack of parking.

In terms of use, the most popular recreational activity at the project is visiting the Lansing Manor Museum and the Blenheim-Gilboa Visitors Center. The next most popular activities are walking/hiking/jogging the trails and swimming at Mine Kill State Park. None of the facilities' parking sites were at capacity during an average summer weekend, and 83 percent of respondents did not view the recreation site they were using as crowded.

NYPA's Recreation Management Plan includes measures to ensure the continued operation and maintenance of the project's recreation facilities. While users are generally pleased with project recreation facilities and do not consider any of the facilities to be overly crowded, the Recreation Use/User Contact Study indicates that demand for recreation at the project will increase over the term of a new license. In addition, existing facilities will continue to age. NYPA's proposal, as part of the Recreation Management Plan, to rehabilitate and upgrade the Lansing Manor Complex and the Blenheim-Gilboa Visitors Center, will ensure that these facilities continue to meet the needs of the public over the term of the license. Visiting the interpretive centers of the museum and Visitors Center is the most popular recreation activity at the project. The capital projects NYPA proposes, including stabilizing and upgrading Lansing Manor and modernizing and renovating the Visitors Center, will enhance an already popular visitor experience.

Regarding NYPA's proposal to provide New York Parks with a total of $4 million to fund capital improvements at Mine Kill State Park, we note that the Commission has stated its strong preference for specific measures directed toward a specific project effect and/or purpose.[49] In general, when funds are proposed to be paid to a non-license entity for a measure, staff will analyze the actual measure itself to determine whether the measure addresses an identified project effect or would enhance a resource affected by the project. In the case of capital improvements proposed at Mine Kill State Park, in its

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

May 25, 2018 response to staff's additional information request, NYPA provided a list of specific capital improvement projects proposed at Mine Kill State Park. In that response, NYPA identified six projects that New York Parks has prioritized, including improvements to the pool complex, bathhouse renovations, boat ramp renovations, trail improvements, new comfort stations and picnic shelter, and new playground equipment.

The Recreation Use/User Contact Study identified Mine Kill State Park as the project recreation site receiving the largest percentage of use. Almost 60 percent of all recreation user days at the project are occurring at Mine Kill State Park. The capital improvements that NYPA and New York Parks have agreed to complete would provide needed upgrades and enhancements to facilities that a majority of project recreationists use. A majority of respondents rated the site condition and variety of project recreation sites as Excellent or Excellent-Fair and NYPA estimates that Mine Kill State Park could see 46 percent growth in recreation user days by 2060. As such, the proposed capital improvements would benefit not only the current users, but the projected users, as well.

While the Settlement Agreement, via the Recreation Management Plan, provides a general list of the proposed capital improvements at Mine Kill State Park, it provides no specifics about the improvements and it only specifies that NYPA will provide New York Parks with funding to complete them. Further, by stating that funding will be provided to New York Parks to complete the improvements, it implies that the onus for mitigating project effects to recreation (through capital improvements made to project recreation facilities) is placed on a party that is not under the Commission's jurisdiction. Revising the Recreation Management Plan to list the specific capital improvements that will be undertaken and remove reference to the funding of New York Parks would address the Commission's stated preference for specific measures and remove any ambiguity about who is ultimately responsible for implementing the measures. We note, however, that even if the specific measures are included within any new license, instead of the funding provision, this would not prevent NYPA from partnering with New York Parks outside of the licensing process to provide the funding to New York Parks for completing the required improvements. Finally, including within the plan a schedule for completing these improvements would assist with planning and tracking the capital improvements and when they will be available for the public's enjoyment.

Recreation Monitoring

As part of the Recreation Management Plan, NYPA proposes to monitor recreation use at the project every six years in accordance with FERC Form 80.[50] Via the

[50] The Licensed Hydropower Development Recreation Report, designated as FERC Form No. 80 (Form 80) solicits information on the use and development of recreation facilities at hydropower projects licensed by the Commission under the Federal Power Act.

Form 80, NYPA will record recreation use and capacity at project recreation sites. NYPA states that the Form 80 will provide the Commission and other agencies with a regular assessment of whether public recreation needs are being accommodated by the existing recreation facilities and where, if needed, additional efforts could be made to meet future needs.

Our Analysis

Monitoring use at the project recreation sites would help to ensure the project is meeting the needs of the recreating public. However, on May 17, 2018, the Commission proposed eliminating the use of the Form 80.[51] Although the Commission may decide to no longer require the Form 80 every 6 years, it is still important for NYPA to monitor and report on recreation use at the project. If NYPA revised the Recreation Management Plan to include a plan to monitor recreation at the project, including a report of its findings, then NYPA, the Commission, and other agencies would continue to be able to regularly assess project recreation use and where additional efforts could be made to meet demand. Conducting this monitoring every 10 years after license issuance, instead of the six required by the Form 80, would still provide the necessary information on a regular schedule, but decrease the burden from the Form 80 requirements.

Access to Schoharie Creek

On March 6, 2018, American Whitewater filed comments in response to the REA notice and NYPA's Settlement Agreement. In its comments, American Whitewater claims that the Settlement Agreement and associated Recreation Management Plan do not sufficiently mitigate the impact of project operations on recreational boating in the project boundary. American Whitewater claims that the project obstructs navigation on Schoharie Creek because there is no hand-carry portage around the lower dam. Additionally, American Whitewater maintains that the informal boating access below the lower dam is hampered by steep and eroding embankments, and long, muddy, overgrown trails to the river. American Whitewater recommends that because Schoharie Creek is navigable, the licensee should be required to construct a viable hand-carry portage route around its project facilities to enable boaters to carry canoes and kayaks around the lower dam. American Whitewater argues that "to the extent [NYPA] claims that there is a lack of suitable hand-carry portage option due to safety or security concerns, then these unavoidable project impacts need to be properly mitigated."

[51] *See* May 17, 2018 Notice of Proposed Rulemaking: *Elimination of Form 80 and Revision of Regulations on Recreational Opportunities and Development at Licensed Hydropower Projects*. 163 FERC ¶ 61,122.

Our Analysis

As part of the Recreation Use/User Contact Study, NYPA evaluated existing recreational sites at the project and projected future demand. When respondents to the User Contact Survey were asked if the recreation site/facility served their interests, 100 percent answered yes. When asked to rate the condition of project recreation sites, 98 percent rated it favorably. When asked to rate the variety of facilities and amenities at the project, 88 percent rated it highly. Of the 160 respondents to that survey who identified the recreational activity in which they participated, only four identified boating. Further, boating at the project accounted for less than 2 percent of recreation use and none of the respondents to the survey indicated a desire for additional boating opportunities or additional access points to waters above or below the lower dam.

Based on our analysis, the project currently is meeting demand for boating and should continue to meet demand through the term of any license issued. While providing portage around the dam may encourage additional users, there already are numerous recreational boating opportunities on Schoharie Creek within 50 miles of the Blenheim-Gilboa Project. In addition, NYPA provides many other types of recreation opportunities at the project, including interactive museum exhibits, swimming opportunities, and hiking trails, that provide access to project lands and waters. Although additional boating below the lower dam may be desired by a few members of the public, our analysis does not indicate that the demand exists to warrant the creation of a portage around the dam.

Regarding access below the lower dam, NYPA's proposed enhancements, as detailed in the Recreation Management Plan, include providing portable toilets and implementing area improvements at the Schoharie Creek Fishing Access site. In addition, NYPA recently improved access to the site, allowing individuals to drive further downstream to access the shoreline. Although some access to Schoharie Creek could be hampered by steep banks and muddy trails, NYPA's enhancements at the Schoharie Creek Fishing Access site, including those proposed in the Recreation Management Plan, would increase individuals ability to access the creek and enjoy the opportunities it provides.

Recreational Boating Feasibility

As part of the Recreation Use/User Contact Study, NYPA conducted a desktop assessment of the feasibility of providing recreation boating flows in Schoharie Creek downstream of the project's lower dam. Based on the results of that study, NYPA found that diverting water from available project storage for boating releases would adversely impact its ability to replenish storage lost through evaporation and seepage, and to continue to provide downstream flows, as currently required by the project license. As a result, NYPA states that it is not feasible to provide whitewater boating at the project.

In its comments, American Whitewater states that the Blenheim-Gilboa Project has adverse impacts on whitewater boating opportunities in the project boundary by not providing sufficient flows below the project and by inundating rapids between the upstream Gilboa Dam and the project's lower dam. American Whitewater maintains that Schoharie Creek is a valuable boating resource when sufficient flows are available, mostly commonly during the spring freshet and when there is spillage from Gilboa Dam. It recommends that NYPA release up to 725 cfs from the lower dam at times that are most likely to be used by recreational boaters. It also recommends that NYPA schedule releases that would support local community events and river festivals, which would provide positive economic benefits. American Whitewater states that New York DEP is proposing to release conservation flows of between 15 and 23 cfs from Gilboa Dam to support conservation and recreation on the creek. American Whitewater states these releases would favorably impact the ability of NYPA to reserve sufficient water for scheduled recreational releases. American Whitewater points out that under current operations, NYPA releases 10 cfs below the project, utilizing flows from tributaries located between Gilboa Dam and the project's lower dam. With the proposed additional releases by New York DEP of between 15 and 23 cfs from the Gilboa Dam, American Whitewater asserts that NYPA can provide periodic recreational releases during the summer boating months simply by passing the Gilboa Dam conservation releases downstream in place of the 10 cfs that is currently released from storage.

Our Analysis

NYPA's desktop assessment of the feasibility of providing recreation boating flows included a literature review, a hydraulic analysis, and structured interviews of individuals who have experience boating on Schoharie Creek downstream of the project from the lower dam to Max V. Shaul State Park, a reach of approximately 9.2 miles. The results of that assessment indicated that river depths of over 1.5 feet were better for boating that stretch of river, and flows sufficient to provide that depth (350 to 1,000 cfs) typically occur only during the spring freshet (April and May) when there is snowmelt/runoff and water is spilled over Gilboa Dam. Flows sufficient to provide that depth during the remaining months of the boating season (June – October) are limited to significant storm events. The results of the structured interviews also suggest that boating in this reach is not optimal due to insufficient water depth throughout much of the boating season. The respondents indicated that at flows below 1,000 cfs, travel downstream can be difficult in spots, and may require portage.

Stream flows in Schoharie Creek are primarily influenced by New York DEP water supply withdrawals from Schoharie Reservoir. Throughout much of the boating season, New York DEC does not release a sufficient amount of water for NYPA to both replenish storage lost through evaporation and seepage and provide recreational boating. Although New York DEP is considering plans to release conservation flows of 15 to 23 cfs from Gilboa Dam, it has not finalized that proposal.

While it may be technically feasible for NYPA to provide whitewater boating flows over select weekends during the post-spring freshet boating season (June – October), NYPA's Recreation Use/User Contact Study indicates a lack of demand for whitewater boating at the Blenheim-Gilboa Project. Further, because of the availability of other boating opportunities, including Class II and III waters, on Schoharie Creek within 50 miles of the Blenheim-Gilboa Project, providing whitewater boating at the project is not warranted. However, if and when New York DEC finalizes its plan for conservation releases from Gilboa Dam, it may be appropriate to reevaluate the demand for whitewater boating releases from the lower reservoir. As part of the Recreation Management Plan, NYPA proposes to monitor recreation use and consult with agencies if new recreation management issues arise. The introduction of increased flows in Schoharie Creek resulting from New York DEP releasing conservation flows from Gilboa Dam would constitute a change that could necessitate modifying the Recreation Management Plan and including provisions for adding whitewater boating flow releases below the lower reservoir.

Finally, regarding American Whitewater's claim that the project inundates rapids between the upstream Gilboa Dam and the project's lower dam, we note that the environmental baseline on relicensing is the condition as it exists at the time of relicensing. Therefore, the inundation of rapids that occurred when the project was first constructed is considered to be a past adverse effect of project construction, not a current adverse effect of the relicensing proposal.

Land Use

The Land Management Plan, filed with the Settlement Agreement, includes a variety of measures to address land use within the project boundary. While most of the measures deal with roadway and vegetation management and minimizing impacts to sensitive species (as discussed above in section 3.3.3 *Terrestrial Resources* and section 3.3.4 *Threatened and Endangered Species*), the plan also includes a provision for continued management of a 1,600-acre wildlife management area, including 2 acres of created wetlands and an eastern bluebird trail, and the Cooperative Archery Hunting Area.

In the Settlement Agreement, NYPA also proposes to remove a 53-acre parcel of land from within the project boundary because it is surplus land that is not needed for a project purpose. The parcel, which is located adjacent, but outside, Mine Kill State Park, is separated from the rest of the project lands due to its location on the west side of State Highway 30. It is heavily wooded and while Mine Kill runs through the parcel, NYPA states that project operations do not influence water levels in this reach of Mine Kill because it is well upstream of the lower reservoir. NYPA also consulted with the New York SHPO about the removal, who stated that there would be no effect to cultural

resources in or eligible for inclusion in the state register of historic places or the National Register (NYPA, SA).

Our Analysis

As NYPA 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. The Land Management Plan provides for roadway and vegetation management and continued management of the wildlife management area. These measures would ensure that public access to project lands and recreation opportunities is not hampered by unsafe roadways and overgrown vegetation. Continued management of the wildlife management area would ensure this land remains a productive wildlife area.

Regarding the proposal to remove the 53-acre parcel of land from the project boundary, the land is surplus and not needed for project operation. It encompasses undeveloped lands composed of steep topography that is heavily wooded. It contains no recreation sites nor does it contain any cultural resources. Because it does not serve a project purpose and is separated from the rest of the project boundary by New York State Route 30, removing it from the project boundary would not affect land use resources.

Aesthetics

NYPA is not proposing any specific measures to enhance aesthetic resources at the project. As part of the Settlement Agreement's Ecological Enhancement Plan, NYPA proposes to enhance one of four existing constant level ponds located at the upper reservoir with the least amount of habitat and topographic diversity (pond 3, *see* figure 6). NYPA proposes these enhancements in order to provide habitat diversity and wetland edge habitat within the upper reservoir. As part of the enhancement, NYPA proposes to retain a consistent water level to promote shoreline wetland plant establishment, and enhance approximately 1.0 acre of habitat in the upper reservoir.

Our Analysis

Although the upper reservoir experiences, and will continue to experience, water level fluctuations resulting from project operation, NYPA's proposal to continue maintaining the constant-level ponds and enhance pond 3 would provide aesthetic benefits that would benefit the natural look of the ponds and offset the impacts of fluctuation on the upper reservoir.

NYPA is proposing enhancements at project recreation sites that could impact aesthetics of the project during construction. These impacts, however, would be short-term. Further, once complete, the enhancements would most likely improve visitors' experiences and the aesthetics of the Lansing Manor Complex and Mine Kill State Park because of the upgrades and modernization of the facilities. NYPA is not proposing any

changes at the Mine Kill Overlook, so the overlook will continue to provide a scenic view of Mine Kill and the surrounding environment.

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. An undertaking means a project, activity, or program funded in whole, or in part, under the direct or indirect jurisdiction of a federal agency, including, among other things, processes requiring federal permit, license, or approval. In this case, the undertaking is the issuance of a new license for the Blenheim-Gilboa Project. Potential effects associated with these undertakings include project-related effects associated with any new construction activities associated with the project, and the day-to-day operation and maintenance of the project.

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 the 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 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 also requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties.

On June 4, 2014, the Commission designated NYPA as the non-federal representative for carrying out day-to-day consultation regarding the licensing effort pursuant to section 106 of the NHPA. The Commission, however, remains ultimately responsible for all findings and determinations regarding project effects on any historic property, pursuant to section 106.

To identify cultural resources eligible for listing on the National Register, NYPA conducted two studies: a Phase IA archaeological survey (precontact and historic archaeological resources) and a historic structures survey.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property within the project's APE could be affected by the issuance of a new license. According to the Advisory Council's regulations, 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" (36 CFR 800.16[3]). The APE encompasses the likely extent of project operations and project-related environmental measures that could be undertaken during the term of any new license issued for the project. For the Blenheim-Gilboa Project, the APE includes the lands enclosed by the project's boundary. The New York SHPO concurred with the APE by letter dated January 2, 2015. The APE is shown on figure 16.

Regional History

The Blenheim-Gilboa Project is located on the Schoharie Creek in the towns of Blenheim and Gilboa, New York, approximately 40 miles southwest of Albany in the northern Catskill Mountains. The lower dam of the Blenheim-Gilboa Project is located 53 miles upstream of the confluence of Schoharie Creek with the Mohawk River at Fort Hunter, New York. From there, the Mohawk River flows east for approximately 44 miles before emptying into the Hudson River at Cohoes, New York.

Although a large amount of archaeological investigation has focused on the Hudson River valley, little has been conducted near the Blenheim-Gilboa Project APE. The archaeological record of New York dates back to approximately 12,000 years before present (B.P.) and archaeologists have divided this record into three major periods known as the Paleoindian, Archaic, and Woodland cultural periods, as synthesized by Ritchie (1980).

Paleoindian Period (ca. 12,000 – 9,000 Years B.P.).

The earliest occupation of New York State began approximately 12,000 years ago, when people from the south and perhaps west began moving into the state after retreat of the Laurentide Ice Sheet, an ice mass that once covered the project area (Ritchie, 1980). The first people in New York 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. Some of the best known and documented Paleoindian period sites in the Northeast are located in the mid-Hudson River valley, including West Athens Hill, the Kings Road, and Dutchess Quarry Cave. Research on these sites by Funk (1976) indicates that a large exchange network of hunter and gatherer bands was active in the Hudson River watershed.

Figure 16: Map showing Blenheim-Gilboa Project APE (Source: license application).

Archaic Period (ca. 9,000 – 3,000 Years B.P.).

The Archaic period is typically divided into three sub-periods: Early, Middle, and Late. Their archaeological expression varies by region, but in general, the Archaic period is defined in terms of broad-spectrum foraging patterns and settlement patterns adapted to modern environments of the Holocene Epoch. Funk (1976) observes that Archaic period sites in the Hudson River valley tend to be small and characterized largely by lithics with few preserved organic remains. No Early or Middle Archaic period sites are known from the mid-Hudson River valley, but archaeological sites from the Late Archaic period are more abundant throughout the region. Laurentian tradition sites are the most common Late Archaic manifestation, and sites containing Vergennes phase artifacts (Otter Creek points, gouges, ground slate points, ulus, and plummets) are well known in the Hudson River valley.

Woodland Period (ca. 3,000 B.P. – Contact).

Regional diversification increased during the Woodland period with the adoption of agriculture introduced from the south; new technologies, such as the manufacture of pottery; and the origins of Native American groups reported at the time of contact with Europeans and in existence today. Like the Archaic period, it is subdivided into Early, Middle, and Late subperiods. In broad outline, the earliest culture in eastern New York is identified as Adena. It is followed by Point Peninsula, Owasco, and finally Iroquois in the Late Woodland period.

Few Early Woodland period sites are reported from the mid-Hudson River valley. Important and well-documented sites from the region are predominately Middle Woodland period in age. For example, the Tufano site (Greene County, New York) is a rich, Middle Woodland habitation site with numerous burials, pit features, hearths, and post molds, with a radiocarbon date of Anno Domini (A.D.) 700 +/- 100 years. Faunal and floral remains from the numerous pit features provided data on subsistence practices and primary and secondary food sources (Funk, 1976). Another well-documented Middle Woodland location is the Black Rock Site, which is a large, open-air site near the Hudson River in Athens, Greene County. The site is known from extensive surface collections from disturbed contexts, and from excavations in a dense midden component. As with the Tufano site, the Black Rock site contained numerous burials and pit features, assignable “almost exclusively” to the late Middle Woodland period. A radiocarbon date of A.D. 850 +/- 95 years supports the late Middle Woodland designation (Funk, 1976).

Late Woodland period sites are not unknown from the mid-Hudson River valley, but they appear to be much less common than Middle Woodland sites. Of particular note is the Bronck House Rockshelter, where the uppermost cultural stratum was designated Late Woodland II (historic Iroquoian), based on the presence of trade goods and diagnostic Iroquoian pottery. According to Funk, rockshelter sites located along the

mid-Hudson River valley were "probably a briefly and intermittently occupied camp for parties of hunter-gatherers and later agriculturists, who exploited the animal food resources of the surrounding terrain during the fall and winter" (Funk, 1976: 123).

Native American Occupation at the Time of Contact

As reported by Hartgen Archeological Associates, Inc. (1987), the Schoharie Creek valley was a borderline between the Mohawks to the west and the Mohicans (or Mahicans) to the east. This changed in the mid-1600s, when the Mohicans relinquished all of their lands to the west of the Hudson to the Mohawks. During the French and Indian Wars and the American Revolution, the Iroquois fought on the side of the British in the Schoharie County area. After defeat of the British, the Mohawks resettled in Canada, leaving the Schoharie County area open to further European settlement that had begun in the late 1600s.

Initial Agricultural Settlement (1600s – 1800)

By the late 1600s, Dutch fur traders were traveling through the area to hunt and barter for skins, while scouts and woodsmen in the 1700s used the region as a short cut between the Hudson River valley and the Niagara Frontier (Hartgen et al., 1976). In 1738, a 40,000-acre tract of land located in southern Schoharie County, which comprised parts of the present townships of Blenheim, Gilboa, and Jefferson in Schoharie County and a small portion of the northeast corner of the township of Stamford in Delaware County, was surveyed for the first time. In 1769, King George II granted title to the 40,000 acres of land that became known as the Blenheim Patent (Manly, 1974; Sherwood, 1992).

By the early 1800s, several turnpikes crossed the southern part of Schoharie County, which opened the area to settlement. The Susquehanna Turnpike from Catskill to Unadilla, a primary western route from the Hudson River valley, crossed Schoharie Creek at Gilboa and was joined just west of Gilboa by a well-traveled alternative route known as the Windham Turnpike. The Delaware and Albany Turnpike crossed Schoharie Creek at North Blenheim (formerly Patchin Hollow) and continued west through Schoharie County as the Blenheim and Jefferson Mountain Turnpike. The Gilboa and Jefferson Turnpike linked these primary routes, following Minekill Creek northwest from Gilboa (LoRusso, 2004).

By 1800, through inheritance and land transactions, the original 40,000 acres of the Blenheim Patent was in the hands of four owners (John Lansing, Cornelius Ray, John Tayler, and Francis Bloodgood), with each owner having some acreage in hill and valley areas, timber and field, and along water courses. These owners began selling individual lots to settlers, as well as leasing land (Sherwood, 1992). John Lansing granted a leasehold to Abraham Shoemaker from ca. 1800 to 1804 for the land on which Lansing Manor is currently located. The Tenant House on the Lansing Manor property was most

likely constructed at this time because the building is comparable to other Schoharie Valley farmhouses built during the first decade of the nineteenth century (Sherwood, 1992).

Development of Lansing Manor (1819 – 1860s)

On November 8, 1827, John Lansing conveyed the 120 acres of land formerly occupied by Abraham Shoemaker, including a barn, to the Honerable Jacob Sutherland and his wife (Lansing's daughter), to occupy the land in order to manage Lansing's estate (Rennenkampf, 1973). The Sutherlands had begun to reside on the property in 1819, and the Manor House was built for them by Lansing (Sherwood, 1992). The Sutherlands resided at the Manor House from at least 1819 to 1836, when they moved to Geneva, New York. At that time, they liquidated their outright holdings in the Blenheim Patent by sale, and as leases expired, lands held by them were sold (Sherwood, 1992).

Numerous roads were built across Mine Kill Creek in the 1830s and 1840s as farm-to-market connectors to the turnpikes. By the 1850s, a road from North Blenheim to the Gilboa-Jefferson Turnpike crossed the creek just west of Mine Kill Falls, on the general course of present day Route 30. Historic maps show that this road approached the creek near the existing crossing, but jogged sharply to the west to cross the shallows above the falls. The dwelling of Peter Mattice, a saw mill, and the Mine Kill Post Office were located at the crossings in the 1850s and 1860s, at the southern point of the former Lansing Manor land within the Blenheim-Gilboa Project boundary (Wenia and Lorey, 1856; Stone and Stewart, 1866). A family cemetery, which is still in existence, was established on a hill overlooking the north side of the creek (LoRusso, 2004). Just south of the Mattice Property was the Lansing Turnpike, which ran eastward crossing over the Schoharie Creek. Remnants of the bridge abutments and road bed can be found at various points along the former route.

Emergence of Dairy Farming and the Modern Period (1870s – 1973)

Just north of the project boundary is the town of North Blenheim. By the early 1870s, the village was a center that serviced farm families for miles around with two churches, two schools, two hotels, two stores, two wagon shops, two blacksmith shops, a harness shop, a shoemaker shop, a tailor shop, a paint shop, a grist mill, two saw mills, a sash and blind factory, and approximately 50 dwellings. Wheat, butter, hops, wool, and broomcorn were important agricultural products (Manly, 1974).

Following the opening of the Ulster and Delaware Railroad through Grand Gorge in 1879, dairy farming emerged as the primary economic product on farms in the region because milk and other dairy products could be shipped to metropolitan markets. This switch to dairy farming is evidenced by the large Dairy Barn (present Visitors Center) at Lansing Manor. Erected by Olney J. Spring in 1881, the barn is one of the oldest, large dairy barns in the Schoharie-Delaware County area (Sherwood, 1992). Aside from the

corn crib, which dates from the early years of the twentieth century, the large barn and the Harder silo (1896-1911) are the most recent structures built in connection with Lansing Manor's operation as a dairy farm. Following the building of the large barn, the Spring family razed several of the older buildings on the property and relocated others to integrate them with the needs of the dairy economy, which was a typical practice on large dairy farms in the area during the last years of the nineteenth century (Sherwood, 1992).

The next shift in the agricultural system began around the turn of the twentieth century. After 1910 and continuing throughout the twentieth century, farm numbers dropped and the average farm size rose, coinciding with a major shift from farm butter-making and diversification, to relatively specialized fluid milk dairying. (Uhl, Hall and Rich, 1972). Places such as North Blenheim were no longer commercial trading centers but became small residential centers (Manly, 1974).

The Blenheim-Gilboa Project

On August 15, 1968, NYPA applied to the Federal Power Commission (FPC, the predecessor to FERC) for a license to construct the 1,000-MW Blenheim-Gilboa Pumped Storage Power Project. On June 6, 1969, the FPC issued a license to NYPA and on July 12, 1969, NYPA broke ground to begin construction of the project. In 1972, NYPA acquired Lansing Manor (then known as Beechwood Farm) as part of the development of the project. On July 5, 1973, the Blenheim-Gilboa Project generated its first power, and on December 17, 1973, the Blenheim-Gilboa Project reached full power production.

Cultural Resource Surveys

Phase IA Archaeological Survey

NYPA conducted a Phase IA Archaeological Survey within the project APE in 2015 (NYPA, 2016b). The objectives of the survey were to: identify known archaeological resources listed in, or potentially eligible for listing in, the National Register within the APE; review archaeological and other related data that are pertinent to the formulation of a sensitivity model for determining where archaeological resources may be located; and offer a field strategy for archaeological testing to determine whether such properties are present. These objectives resulted in a three-part methodology: review of known archaeological sites from both maps and literature; develop a sensitivity model to determine potential locations for unknown sites; and conduct a field reconnaissance of selected portions of the study area based on the results of the modeling.

Review of Existing Archaeological Information

NYPA's review of the New York State archaeological file database found there are few archaeological sites recorded in the Blenheim-Gilboa Project APE. One precontact period site (A095-08-011) is recorded from within the lower reservoir, but

there is no information about what was found at the site or to which cultural time period it belongs. Four historic-period archaeological sites have been reported in the Blenheim-Gilboa Project APE: two cellar holes (A09501.000099 and A095-08.0008), a selection of "scattered pieces of field stone that appear to be foundation stone" (A09508.000011), and Lansing Manor. The remnants of the cellar holes, located on the floodplain of the Schoharie Creek prior to inundation, were previously recorded based on historic map review and cultural resources survey, but the cellar holes have never been field checked because their exact locations are not known. The two cellar holes and the stone scatters are not considered eligible for the National Register. Lansing Manor is considered eligible for the National Register as both a Historic-period archaeological site, as well as a Historic Structure.

For its map review, NYPA reviewed three different mapped datasets to determine the likelihood of archaeological sites: the Blenheim-Gilboa Project environment prior to the start of construction, soil information, and bedrock geology. A 1903 USGS topographic map demonstrates the steepness of the Schoharie Creek valley walls for almost all of the project area. The map shows that the pre-inundated geographical and cultural landscape is of a very rural environment that was topographically controlled to the east and west by steep terrain, and farmed in areas along the creek where wide bends in the creek created arable lands largely on the east side of the lower reservoir. These topographic controls also influenced where Native American land use could have occurred within the Blenheim-Gilboa Project's APE. People generally do not live in steep areas, nor did they live far from water bodies. The places where Native American occupation may have occurred are generally the same places where Euroamericans would have farmed in the project area.

To examine the soil information, NYPA examined data to evaluate whether some soils were more or less better for occupation (USDA, 1969). For Native American use, this would include locations where soils were well drained or beneficial to farming. Soils good for crop growing were the important factor for Euroamericans. Three soils dominate the Blenheim-Gilboa Project APE and all three are reasonably deep, well-drained soils that are valuable for agricultural use. Because all soil in the project area are reasonably deep and well-drained, the soil data provided little information to distinguish where people may have lived.

NYPA also reviewed surficial geology to determine the likelihood of archaeological sites (Caldwell and Dineen, 1987). All of the rock outcrops mapped in the Blenheim-Gilboa Project APE consist of Paleozoic sedimentary rocks that are draped with glacial till (Fisher et al., 1970). None of these shales and sandstones would have been useful for making either chipped stone tools or ground stone tools, which implies the surficial geology of the project would not have lent itself to Native American use of the area.

Sensitivity Model

NYPA's sensitivity model identified the following environmental variables that correlated with the locations of known archaeological sites: steepness of terrain, proximity to a waterbody, and presence of arable soils. The variables were scored as either low or high for archaeological sensitivity depending on their value for assisting to predict where archaeological resources might be located. The sensitivity model was used to determine which portions of the Blenheim-Gilboa Project APE were visited in the field reconnaissance visit. Most of the lands within the APE scored low for both precontact period and Euroamerican archaeological sensitivity due to the steepness of the terrain. The area around Schoharie Creek, where there is level land adjacent to the waterbody and where arable soils are present, scored high for both precontact period and Euroamerican archaeological sensitivity. The mouth of Mine Kill Creek also scored high because it is an area where two waterbodies come together and where terrain is level.

Field Reconnaissance

Once NYPA identified areas that scored highly for archaeological sensitivity, it conducted a field reconnaissance to calibrate the sensitivity model and eliminate areas from further survey, as warranted. The field reconnaissance focused on visual examination of those portions of the APE with landforms that have the greatest potential to contain archaeological resources, as well as confirmed areas of disturbance, steep slope, and wetlands, which would have little potential to contain in situ buried archaeological resources. During the field reconnaissance, NYPA also examined conditions in the fluctuation zone of the lower reservoir in order to determine whether Native American and Euroamerican people may have lived in any areas other than the bottomlands around the former course of Schoharie Creek.

NYPA conducted field reconnaissance of the Blenheim-Gilboa Project on October 15, 2015. At the Lansing Manor Complex, NYPA found that a Phase IB testing program to locate additional sites is not justified because there are no areas sensitive for testing except in the fluctuation zone. Shovel test pits in that zone could yield artifacts or uncover foundation stones, but none of these discoveries would produce archaeological materials in primary context because all of the original soils have been reworked. Additionally, because NYPA did not propose any ground-disturbing activities in connection with the Blenheim-Gilboa Project relicensing, it did not recommend conducting additional archaeological investigations of the area.

The sensitivity model predicted that the Mine Kill and lower reservoir areas had the potential to be archaeologically sensitive, but that sensitivity assessment had to be revised due to the field observation that no intact soils remain in the area due to erosion. None of the areas observed on the west side of the lower reservoir appeared suitable for precontact Native American settlement. If settlement by Native Americans occurred on

lands beneath the lower reservoir at high water, then they are likely to have been plowed during the historic period or entirely reworked and secondarily deposited after dam construction. The upper reservoir was not identified as archaeologically sensitive. This was verified by the road-side visit that confirmed extensive alteration of the landscape by project construction except at its far western end. Based on these findings, NYPA concluded that no further archaeological investigation of the Blenheim-Gilboa Project's APE is needed.

Consultation with New York SHPO

NYPA provided a draft of its Phase IA Archaeological Survey to the New York SHPO in January 2016. By letter dated March 1, 2016, the New York SHPO concurred that Phase IB archaeological testing is not warranted within the APE. In April 2016, NYPA provided the New York SHPO with the final Phase IA Archaeological Survey Report. By letter dated April 8, 2016, the New York SHPO stated it had no comments or concerns on the report (NYPA, license application).

Historic Buildings and Structures

In 2015, NYPA conducted a Historic Structures Survey, which consisted of consultation with the New York SHPO, background research, a field survey of all architectural resources 50 years or older within the APE, historic context development, and National Register evaluation of the eligibility of architectural resources located within the APE (NYPA, 2016a). The final report for the Historic Structures Survey was filed with the New York SHPO in May 2016.

The survey documented two previously-identified resources, including the National Register-listed Lansing Manor (90NR02671) and the Mattice Cemetery. The survey also documented five newly identified architectural resources in the APE, including the Baldwin House, Lansing Turnpike, Coyne Cottage, the Blenheim-Gilboa Project, and Mine Kill State Park.

Based on the results of the Historic Structures Survey, NYPA recommends that Lansing Manor continues to remain eligible for listing in the National Register. Lansing Manor was originally listed on the National Register in 1973 with an early nomination that lacked the detailed building descriptions, integrity evaluations, and historic context that is expected from modern nominations. Most notably, the original nomination did not include a full inventory or assessment of the property's eight historic outbuildings. As part of the 2015 Historic Structures Survey, the entire property was comprehensively surveyed and reevaluated with its outbuildings, as well as additional modern buildings and structures that were built to adaptively reuse the property as a Visitors Center and museum. Lansing Manor is considered eligible for listing in the National Register under Criterion A and C at the local level in the areas of Settlement and Architecture. The property has a period of significance from circa 1804 – circa 1910, which includes the

construction date of its earliest extant building, the Tenant House, and the year that the final additions were made to the Dairy Barn/Visitors Center.

NYPA evaluated the Blenheim-Gilboa Project as a potential historic district and currently does not recommend that it be considered eligible for the National Register because it is not yet 50 years of age. NYPA applied Criterion Consideration G during the evaluation and while the Blenheim-Gilboa Project does possess significance under Criteria A and C, and it retains integrity, it does not have "exceptional importance" in the history of hydroelectric power production. Therefore, NYPA recommends the Blenheim-Gilboa Project be considered eligible for listing in the National Register when it reaches 50 years of age.

NYPA also evaluated Mine Kill State Park as a potential historic district and currently recommends that it is not eligible because it also is not yet 50 years of age. NYPA applied Criterion Consideration G during the evaluation and while the state park does possess significance under Criteria A and C, and it retains integrity, it does not have "exceptional importance" in the history of recreational facilities associated with hydroelectric power production. Therefore, NYPA recommends that Mine Kill State Park be considered eligible for listing in the National Register when it reaches 50 years of age.

The Mattice Cemetery, Baldwin House, Lansing Turnpike, and Coyne Cottage are not eligible for listing in the National Register due to a lack of historic significance, a lack of physical integrity, or both. Table 17 lists the identified Historic Structures within the APE, their location, and the National Register eligibility recommendation.

Consultation with New York SHPO

By letter dated February 22, 2016, the New York SHPO concurred with the findings of the draft Historic Structures Survey (architectural) Report. Following its review of the final report, the New York SHPO had no comments or concerns, as stated in a letter dated June 15, 2016 (NYPA, license application).

Table 17: Identified Historic Structures within the Blenheim-Gilboa Project APE (Source: license application).

Site Name	Address/Location	Construction Date	National Register Status/Recommendation
Lansing Manor (90NR02671)	1378 NY-30, Blenheim, New York	ca. 1804 – ca. 1910	National Register-Listed in 1973
Mattice Cemetery	West Side of NY-30, South of	1840s – 1870s	Not Eligible

	Overlook Road at Mine Kill Falls (Gilboa)		
Baldwin House	Off of Power Plant Access Road on North Side of Fishing Access Road (Blenheim)	ca. 1850, 1874	Not Eligible
Lansing Turnpike	Between Valenti Road and Kingsley Reservoir (Blenheim/Gilboa)	ca.1850	Not Eligible
Coyne Cottage	Within Blenheim-Gilboa Project at South End of Power Plant Road (Gilboa)	1966	Not Eligible
Blenheim-Gilboa Pumped Storage Power Project	397 Power Plant Access Road, Gilboa, New York	1969 – 1973	Recommended as Eligible in 2019, when it Reaches 50 Years of Age
Mine Kill State Park	161 Mine Kill Road, Blenheim/Gilboa, New York	1971 – 1973	Recommended as Eligible in 2019, when it Reaches 50 Years of Age

Tribal Resources

As part of the Phase IA Archaeological Survey, NYPA attempted to identify areas that Native Americans and Euroamericans might have inhabited. While the region has a rich precontact history, NYPA did not identify any precontact archaeological sites warranting further investigation or with intact integrity that were identified within the APE and did not recommend further archaeological investigation of the APE.

In order to identify tribal resources and/or traditional cultural properties within the APE that may be affected by the project, the Commission contacted the following federally recognized Native American Nations by letter issued January 23, 2013: the Cayuga Nation of New York, the Delaware Nation, the Delaware Tribe of Indians, the Mohawk Nation Council of Chiefs, the Oneida Indian Nation, the Onondaga Nation of New York, the St. Regis Mohawk Tribe, the Seneca Nation of Indians, the Shinnecock Indian Nation, the Stockbridge Munsee Band of Mohican Indians, the Tonawanda Band

of Seneca Indians of New York, and the Tuscarora Nation of New York. In a letter filed with the Commission May 8, 2014, the Stockbridge Munsee Band of Mohican Indians stated that it did not have any concerns with the proposed relicensing but requested to be notified if new construction is proposed. In a letter filed May 19, 2014, the Delaware Nation stated that the location of the Blenheim-Gilboa Project does not endanger cultural or religious sites of interest to the Delaware Nation and to proceed as planned, but also requested to be notified immediately should an archaeological site or object be inadvertently uncovered. In a letter filed May 19, 2014, the Delaware Tribe stated that it did not wish to be a consulting party in the project relicensing. No comments were received from the other tribes.

3.3.5.2 Environmental Effects

Currently, project operation does not affect archaeological sites and historic resources located within the APE. However, continued operation and maintenance of the project has the potential to adversely affect archaeological and historic resources during the term of any new license issued. Maintenance of project facilities, recreation, vandalism, and mitigation measures associated with other project resources could affect cultural resources located with the APE. Project effects are adverse when an activity directly or indirectly alters the characteristics of a historic property that qualifies it for inclusion in the National Register. Any adverse effects must be resolved in consultation with the New York SHPO. At the Blenheim-Gilboa Project, three archaeological sites, six historic structures, and one site that is both an archaeological site and historic structure are eligible for listing on the National Register. Of those 10 sites, 1 site is listed on the National Register and recommended to remain listed, 2 sites are currently considered ineligible, but will be recommended as eligible when they reach 50 years of age in 2019, and the remaining 7 sites are ineligible.

To address project-related effects, NYPA developed a draft HPMP in accordance with the Guidelines for the Development of Historic Properties Management Plans for FERC Projects, established by the Advisory Council and the Commission. The purpose of the HPMP is to set forth specific actions and processes to manage historic properties within the APE during the term of a new license. It is intended to serve as a guide for NYPA's operating personnel when performing necessary activities and to prescribe site treatments designed to address ongoing and future effects to historic properties. The HPMP also describes a process of consultation with state and federal agencies, training of staff, appointment of an HPMP coordinator, and periodic review and revision of the HPMP. Implementation of the HPMP will ensure the adequate protection and management of historic properties as part of the continued operation of the Blenheim-Gilboa Project during the term of any new license.

As discussed in section 3.3.5 *Recreation, Land Use, and Aesthetics*, NYPA is proposing to make improvements to the Lansing Manor Complex. At the Lansing Manor House Museum, NYPA states that work is necessary to stabilize and upgrade the structures, which include the Manor House, Tenant House, Carriage House, Land Office, Privy, and Wood Shop. These structures range in age from 135 to 200 years old and require attention to building aspects such as structure, electrical, plumbing, mechanical, finishes, architectural details, and general maintenance. Because these structures are historic, the services of historic artisans and specialists will be required.

At the Visitors Center, NYPA states it will upgrade the facilities, which have been in operation for over 40 years. As part of the upgrade, NYPA proposes to modernize the building systems (e.g., electrical, plumbing, mechanical, and security) and ensure the building is ADA-accessible. NYPA also proposes to overhaul the exhibits and renovate the building. NYPA's proposed building renovations include a new entrance signage system, a new reception area, and an interactive event calendar. NYPA also states it will completely renovate the Visitor Center's theater to include a new sound system and an updated audio visual system, with an integrated lighting system and new project screen. NYPA also will produce a new 10 to 15 minute film highlighting the history of the Blenheim-Gilboa Project and its contributions to the community.

Our Analysis

In accordance with section 106, NYPA has consulted with the New York SHPO and Native American tribes to determine the effects of project operation on cultural resources. Current operations do not affect cultural resources and NYPA is not proposing any changes to project operation, nor is NYPA proposing any major construction projects. However, through regular project operation and maintenance, as well as because of any necessary project upgrades that may be required in the future, there is a potential for adverse effects on historic properties throughout the term of any license issued. In order to protect cultural resources that are eligible for the National Register, NYPA developed an HPMP to mitigate any adverse effects that may arise over the term of any license issued. The measures provided in the HPMP provide direction for the management of historic properties and is consistent with the Advisory Council's and Commission's 2002 HPMP guidelines.

While NYPA is not proposing any changes to project operation, it is proposing upgrades to the Lansing Manor Complex. While these upgrades will effect a National Register-listed property, they will be done in consultation with the New York SHPO. The HPMP provides a framework for this consultation to ensure that the required approvals are received and appropriate measures are taken to protect the integrity of the historic properties.

3.3.6 Socioeconomic Resources

3.3.5.1 Affected Environment

The project is located in Schoharie County, approximately 40 miles southwest of Albany in the towns of Blenheim and Gilboa, New York. It is bordered by Albany, Schenectady, Montgomery, Otsego, Delaware, and Greene counties. Much of Schoharie County is rural in nature. According to the 2010 United States (U.S.) Census, 83 percent of the population lives in a rural area, with 17 percent inside an urban cluster. The area where the project is located is characterized by the U.S. Census as 100 percent rural.

As part of this licensing proceeding, NYPA conducted a socioeconomic study that included an evaluation of the socioeconomic effects of the project on local and neighboring communities, the Blenheim-Gilboa region, and the State of New York. The local communities are the taxing entities in which the project is located including the towns of Blenheim and Gilboa, the Gilboa-Conesville Central School District (CSD), and Schoharie County. The neighboring communities are those that provide first responder services (the towns of Conesville, Roxbury, Jefferson, and Middleburgh),[52] and the Blenheim-Gilboa region includes Schoharie County and its six adjacent counties. Various socioeconomic characteristics of the area are described below as they relate to different geographic levels.[53]

Demographics, Population, and Housing

The population of the Blenheim-Gilboa region grew by about 6 percent between 1970 and 2014 compared to 8 percent growth of the New York Statewide population. Schoharie County, however, experienced more rapid growth, with a population increase of 28 percent over the same period, with most of the growth occurring between 1970 and 1990. The towns of Blenheim and Gilboa experienced about 43 percent and 50 percent increase in population, respectively, and the neighboring communities combined grew by 34 percent over the same time period.

Table 18 shows 2014 population and age distribution of the study area at different geographic levels. Schoharie County and the local and neighboring communities have populations that are older than that of the state. The median age for Schoharie County is 43.4 years old compared to 38.1 years old for the state. Within the study area, Gilboa and

[52] The town of Blenheim also provides first-responder services, but was grouped under the local communities for the socioeconomic modeling purposes.

[53] Unless otherwise indicated, the socioeconomic data discussed here are from NYPA's final license application filed on April 27, 2017, and the socioeconomic study report filed on September 15, 2016.

Jefferson have the largest percentages of the population under 18 years old, at 21.4 percent.

Table 18. Population and age distribution of the study area, 2014 (Source: license application, as modified by staff).*

Place	Population	Under 18 (percent)	18 to 64 (percent)	65 and over (percent)
New York State	19,746,000	21.8	64.1	14.1
Blenheim-Gilboa Region	700,927	20.0	64.1	15.9
Local Communities				
Town of Blenheim	371	17.0	55.8	27.2
Town of Gilboa	1,277	21.4	61.0	17.6
Gilboa-Conesville CSD**	2,703	17.2	60.9	21.9
Schoharie County	31,566	19.3	63.5	17.2
Neighboring Communities				
Town of Conesville	710	16.8	57.5	25.7
Town of Jefferson	1,377	21.4	59.8	18.8
Town of Middleburgh	3,607	20.5	61.8	17.7
Town of Roxbury	2,427	18.8	58.2	23.0

* The 2014 population data is from the U.S. Census Bureau's Population Estimates Program that produces intercensal estimates of the population of the United States, its states, counties, cities, and towns. The age distribution data is from the U.S. Census Bureau's American Community Service (ACS) Program that publishes data as an average of the previous five years (i.e., 2010-2014).
** The total population of Gilboa-Conesville CSD was for 2010.

The populations of the local and neighboring communities are predominantly white, with less than 5 percent of the population identifying as minorities. In comparison, more than one-third of the state of New York as a whole identifies as a minority race.

The housing units of the towns typically were built in the 1970s, with Conesville and the Gilboa-Conesville CSD having slightly newer housing units. The area's housing is younger than New York State's housing as a whole, which has a median year built of 1956. Housing units in the local and neighboring communities tend to be owner-occupied, rather than renter-occupied. Table 19 presents the general housing characteristics of the project area.

Table 19. Housing characteristics of the area, 2014 (Source: license application, as modified by staff).*

Place	Housing Units	Median Year House Built	Occupied Housing	Percent Owner-Occupied
New York State	8,153,309	1956	7,255,528	54
Blenheim-Gilboa Region	337,598	Not Available	274,455	65
Local Communities				
Town of Blenheim	353	1975	155	85
Town of Gilboa	1,023	1978	506	87
Gilboa-Conesville CSD	2,378	1980	1,092	86
Schoharie County	17,239	1972	12,739	76
Neighboring Communities				
Town of Conesville	779	1983	329	89
Town of Jefferson	985	1978	635	83
Town of Middleburgh	1,871	1972	1,499	79
Town of Roxbury	2,197	1973	1,002	73

* The housing data is from the U.S. Census Bureau's ACS Program that publishes data as an average of the previous five years (i.e., 2010-2014).

Blenheim, Gilboa, the Gilboa-Conesville CSD, Conesville, and Roxbury all have occupancy rates of less than 50 percent. Although the occupancy rates of Schoharie County and the towns of Jefferson and Middleburgh are higher than the other local and neighboring communities, they are still lower than that of the region and the state. The majority of the vacant housing units in the local and neighboring communities are vacant because they are in seasonal or recreational use.

Employment, Income, and Poverty Levels

According to the U.S. Bureau of Labor Statistics, in February 2016, Schoharie County had a labor force of 15,070 persons, which is less than 5 percent of the Blenheim-Gilboa region's labor force. The unemployment rate of the county was at 6.4 percent, which was higher than that of the New York State at 5.4 percent and the Blenheim-Gilboa region at 4.8 percent, respectively. According to the U.S. Census Bureau's ACS Program, workers in the local and neighboring communities are most frequently employed in the educational services, and health care and social assistance industry. Table 20 summarizes the industries of employed workers within the state, the region, and the local and neighboring communities. Construction, manufacturing, and retail trades

were the other more frequent employment categories in the local and neighboring communities.

The median family income for Schoharie County was $66,272 for 2010-2014 according to the U.S. Census Bureau's ACS Program. The majority of the local and neighboring communities had a family income lower than the state's median of $71,419. Only the town of Gilboa's median family income of $72,426 exceeded the state median. All of the communities and the Blenheim-Gilboa region as a whole experienced lower per capita incomes than the state's average of $32,829. The town of Gilboa also had the fewest people living below the poverty level (9.3 percent). New York State, the Blenheim-Gilboa region, and the town of Roxbury all had 15.6 percent of the population below the poverty level. Schoharie County's poverty rate was lower than that of the state. Table 21 shows income and poverty levels of the area.

Project Employment and Expenditures

In 2014, the Blenheim-Gilboa Project employed 150 people at project facilities, including the adjacent Visitors' Center. Fifty-seven percent of the employees were residing in Schoharie County and more than nine out of ten employees were residing in the Blenheim-Gilboa region. The project had a total payroll of approximately $12.4 million in 2014, with employees in Schoharie County accounting for 55.3 percent of the total payroll.

The project contributed about $17.7 million in total direct expenditures to the local economies in 2014. Labor and benefits, including overtime and training for employees was the largest category, representing more than 77 percent of spending. Materials purchased were the next largest expenditure at 8.6 percent of spending in 2014. NYPA also compensates New York Parks for the maintenance of Mine Kill State Park, paying over $4.6 million in operation and maintenance, and $2.5 million for capital projects between 2005 and 2016.

Table 20. Employment by industry, 2014 (Source: license application, as modified by staff).*

Place	Industry Category** (percent)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
New York State	0.6	5.6	6.7	2.5	10.8	5.1	2.9	8.2	11.1	27.4	9.0	5.1	4.8
Blenheim-Gilboa Region	1.1	5.5	6.6	2.0	11.9	4.2	2.0	6.5	8.9	28.0	8.9	4.4	10.0
Local Communities													
Town of Blenheim	0.7	12.4	11.7	8.0	13.1	5.1	0.0	4.4	5.1	23.4	7.3	5.8	2.9
Town of Gilboa	3.9	13.9	8.8	3.9	8.3	6.2	0.0	5.9	5.7	30.3	4.2	5.2	3.6
Gilboa-Conesville CSD	3.1	18.7	9.4	2.5	12.1	6.8	0.0	6.0	5.1	18.8	8.9	3.7	4.9
Schoharie County	3.9	8.0	6.9	2.4	15.5	5.0	1.1	5.6	6.6	26.8	7.2	4.5	6.4
Neighboring Communities													
Town of Conesville	2.4	14.7	11.5	3.8	17.8	10.1	0.3	2.8	3.1	14.7	7.3	4.9	6.3
Town of Jefferson	3.4	7.3	16.6	0.4	9.5	6.3	2.3	5.8	5.7	23.0	3.3	6.9	9.4
Town of Middleburgh	2.8	7.9	6.0	1.6	12.0	5.5	2.5	7.1	7.7	26.2	8.2	5.4	7.2
Town of Roxbury	6.7	12.1	4.7	4.4	12.4	0.8	3.2	1.9	5.1	26.9	13.5	2.2	6.1

* The employment data is from the U.S. Census Bureau's ACS Program that publishes data as an average of the previous five years (i.e., 2010-2014).

** Industry: Category 1 - *agriculture, forestry, fishing and hunting, and mining*; Category 2 - *construction*; Category 3 - *manufacturing*; Category 4 - *wholesale trade*; Category 5 - *retail trade*; Category 6 - *transportation and warehousing, and utilities*; Category 7 - *information*; Category 8 - *finance and insurance, and real estate and rental and leasing*; Category 9 - *professional, scientific, and management, and administrative and waste management services*; Category 10 - *educational services, and health care and social assistance*; Category 11 - *arts, entertainment, and recreation, and accommodation and food services*; Category 12 - *other services, except public administration*; and Category 13 - *public administration*.

Table 21. Income and poverty levels of the area, 2014 (Source: license application, as modified by staff).*

Place	Median Family Income	Per Capita Income	Persons Below Poverty Level
New York State	$71,419	$32,829	15.6%
Blenheim-Gilboa Region	Not Available	$29,035	15.6%
Local Communities			
Town of Blenheim	$59,231	$23,543	13.2%
Town of Gilboa	$72,426	$28,398	9.3%
Gilboa-Conesville CSD	$58,958	$25,144	14.7%
Schoharie County	$66,272	$26,097	12.9%
Neighboring Communities			
Town of Conesville	$60,000	$25,180	17.5%
Town of Jefferson	$60,800	$26,037	13.1%
Town of Middleburgh	$62,668	$25,596	17.8%
Town of Roxbury	$55,042	$22,318	15.6%

* The income and poverty data is from the U.S. Census Bureau's ACS Program that publishes data as an average of the previous five years (i.e., 2010-2014).

Expenditures at the project also include payments that NYPA makes to support first responder organizations (i.e., Blenheim Hose Company, Conesville Fire/Emergency Management Service (EMS), Grand Gorge Fire/EMS (in the town of Roxbury), Jefferson Fire/EMS, and Middleburgh Fire) that provide first responder services to the project. During 2009-2011 and 2013, the total payments to the first responder organizations were $55,000, and ranged from a low of $10,000 in 2011 to a high of $18,000 in 2010. Payments in 2012 were $182,526 and reflect the assistance NYPA provided to the local and neighboring communities to support recovery efforts from the effects of Tropical Storm Irene.

3.3.5.2 Environmental Effects

The presence of the project affects the socioeconomic conditions of the area in terms of direct effects such as project employment and spending, as well as the indirect (business to business spending) and induced (spending related to changes in customer income) effects. The project also has an influence on the power market of the New York state.

NYPA does not propose any direct socioeconomic measures for the project. During the pre-filing stage of this relicensing proceeding, a number of local entities, organizations, and individuals commented about the tax-exempt status of the project, and requested that NYPA provide monetary compensation to the local communities because the tax-exempt status negatively affects local revenues. In its comments on the license application, the town of Fulton states that NYPA should offer a settlement package to help the host communities in providing emergency services, and with infrastructure, and provide relief to taxpayers of Schoharie County due to the project's tax-exempt status. The Middleburg Fire Department requests funding for its support to NYPA, and for the purchase of fire rescue equipment. Schoharie County comments that the project's tax-exempt status has a significant impact on the local tax base.

Our Analysis

To evaluate the potential socioeconomic effects of continued project operation, NYPA conducted a socioeconomic modeling study using the Integrated Planning Model (IPM)[54] and the Regional Economic Models, Inc. (REMI)[55] Model (NYPA, 2016). Various socioeconomic data of the area such as population, employment, and earnings, including New York electric power markets data (i.e., energy, capacity, and ancillary services) were used in the modeling. The IPM model was used to determine the potential effects of continued project operation through 2060 on New York's power markets, and state and regional retail electric rates. The REMI modeling involved determination of the potential project effects on employment, income, and gross regional product (GRP)[56] at different geographic levels (e.g., local, regional, etc.) if the project continues to operate through 2060. In addition, it was used to evaluate the potential socioeconomic effects of the project's tax-exempt status on the local communities. The REMI modeling included inputs from the IPM model (e.g., changes in electricity prices and capacity requirements due to the presence of the project), as well as project specific information (e.g., project

[54] The IPM is a production cost simulation model, developed by ICF Resources, LLC, focused on analyzing whole sale electric power markets and competitive market prices of electrical energy based on an analysis of the fundamentals relating to supply and demand.

[55] The REMI model is a regional economic impact model, developed by Regional Economic Models, Inc., for dynamic forecasting and policy analysis. The specific REMI model used for the study is called Policy Insight Plus (Pl+). The model uses various equations and variables to forecast the impact that economic/policy change has upon an economy.

[56] GRP is a monetary value of all final goods and services produced in a region in a given time.

supported jobs, expenditures, etc.), and tax related data from Schoharie County for the analysis.

New York Power Markets, and Retail Electric Rates

The IPM modeling involved developing a market study of the NYISO wholesale electric markets (energy, capacity, and ancillary services) through 2060 to evaluate the effect of the Blenheim-Gilboa Project on the New York electricity costs. The project's effects on the electricity market was determined by simulating and comparing the results of two scenarios, i.e., continued project operation through 2060 versus a hypothetical scenario where the project ceases to operate in 2019. With respect to the wholesale energy markets, the project would reduce power prices, particularly on-peak electric energy prices. Between 2019 through 2060, the continued operation of the project would reduce the total electric energy costs in the wholesale markets by $62 million, and would reduce the capacity costs by $6.5 billion on a present-value basis, which are the value of the savings that the project would provide to New York consumers. In addition, the project would provide benefits to the ancillary markets, with $33 million savings by providing operating reserves.

The project would also affect retail rates of electricity. It is predicted that, between 2019 through 2060 annual savings on electricity bills would be approximately $12 million and $267 million on a present-value basis for Schoharie County, and the Blenheim-Gilboa region, respectively.

Employment, Income, and Gross Regional Product

The REMI modeling predicted the project's socioeconomic effects by assuming that the project would be operating through 2060 and comparing the results with that of a hypothetical no project scenario. To model the project's effects on area employment, income, and GRP, it is assumed that the project's employment would remain the same at the 2014 level. The modeling indicates that throughout the assessment/modeled period (2019 through 2060) the economies of the state, region, county, and local and neighboring communities would experience a greater number of jobs, income gains, and higher GRPs with the Blenheim-Gilboa Project in operation than if the project were to cease operation.

The modeling predicts that in 2020 the project would support 22 jobs in the towns of Blenheim and Gilboa, and with increasing contribution over the modeling period, the project would support about 34 jobs in 2060 in the towns. The neighboring communities would also benefit from the presence of the Blenheim-Gilboa Project in the area because of its contribution to the economic base and economic activities in the wider region. For example, in the town of Middleburgh, the project would support about 50 jobs in 2020, and close to 80 jobs in 2060. The project is predicted to support approximately 420 jobs in 2020 and 680 jobs in 2060 within Schoharie County.

The Blenheim-Gilboa Project is expected to generate additional disposable annual income of about $3 million in 2020 for the towns of Blenheim and Gilboa. Income gains are projected to continue to rise throughout the modeled period, culminating in about $16 million in 2060 for the towns. For the neighboring communities, the project would help generate additional income of about $4.3 million in 2020 and $24.4 million in 2060. For Schoharie County, the project is expected to generate economic activities that result in additional income of about $28.9 million in 2020, and reaching $165.9 million in 2060. These figures translate to roughly a 2 percent increase in income in 2020, and a 7 percent increase in income in 2060 for the county.

The project would also have effects on GRP of the localities through two types of benefits to area residents: lower electricity bills and higher economic activity. In 2020, the project would support an annual GRP of about 3.7 million in Blenheim and about $5.4 million in Gilboa. By 2060, Blenheim is expected to have project-supported GRP of $7.5 million, with Gilboa having $11.2 million. The neighboring communities would also gain in GRP with the operation of the Blenheim-Gilboa Project. For Schoharie County, the project is expected to support increasing annual GRP ranging from roughly $76 million in 2020 to more than $156 million in 2060. These increases in GRP translate to about 8 to 9 percent of the county's current economic output. These projected increases in GRP are larger than those projected for income, which suggests that the jobs supported by continued operation of the project (both direct jobs and secondary effects) are likely to have higher outputs (or GRP) than the average jobs in the county.

Project's Tax-Exempt Status

Under section 1012 of the New York State Public Authorities Law and other provisions of law, NYPA is exempt from state and local taxation. To determine the potential socioeconomic effects of the project's tax-exempt status on the communities, NYPA evaluated a hypothetical scenario where the project would pay taxes to the taxing jurisdictions (i.e., the towns of Blenheim and Gilboa, the Gilboa-Conesville CSD, and Schoharie County). The study evaluated the effect on the tax rates of the jurisdictions from the hypothetical tax payments for the project as well as the effects of such payments on employment, income, and GRPs of the communities. To determine such effect, it was assumed that the Blenheim-Gilboa Project lands are subject to property taxes and total levies collected by each taxing jurisdiction would remain constant for the assessment period. For calculating the hypothetical tax for the project, the study used a project value of approximately $101.7 million based on an assessment by the Schoharie County Real Property Tax Services Office. Approximately $100.6 million worth of the project lies within Blenheim and the rest lies within Gilboa, representing 72.7 percent and 0.3 percent of the total tax base of each town, respectively.

The study showed that the addition of the project to the local communities' tax rolls while maintaining revenue neutrality would result in lower tax rates in each

jurisdiction. For example, the tax rates (per $1,000 taxable value) of the towns of Blenheim and Gilboa would decrease by about 73 percent and 0.34 percent, respectively, as the project comprises 72.7 percent of the total tax base of Blenheim compared to only 0.3 percent of the total tax base of Gilboa. For Gilboa-Conesville CSD, the tax rate would decrease by 15.2 percent, while for Schoharie County the hypothetical tax payment would reduce the county tax rate by 4.3 percent. The taxes on the project would have a positive effect on employment in the region due to lower effective property tax rates, thereby making the region more attractive for businesses. For Schoharie County, employment would increase from about 22 jobs in 2020 to about 173 jobs in 2060, representing less than 1 percent to 1.13 percent increase of total jobs in Schoharie County. Similar small gains are projected in the local and neighboring communities. There would also be a positive effect on income and GRPs of the communities if the project were to pay taxes, with an additional income of $2.8 million in 2020 and increasing to $56 million in 2060 for Schoharie County. Increases in annual GRP are estimated to be close to $1.4 million in 2020 to $16 million in 2060 in the county. Although the property tax bills for the communities would decrease, and employment and income would increase in the area if the project were to pay taxes, it would also mean that a higher cost for operating the project, which would then be passed on to the Blenheim-Gilboa Project's customers via higher wholesale rates. However, the modeling showed that the communities in the area would experience net increase in employment, income, and GRPs from the hypothetical tax payment for the project.

The project's presence has a positive effect on the socioeconomic conditions of the area as shown by the IPM and REMI modeling. The specific socioeconomic effects (e.g., employment, income, etc.) of the project discussed above are based on existing socioeconomic data and various assumptions used in the modeling, and may vary. The effect of the project's tax-exempt status on the taxing entities could also vary depending on the value of the project considered for the modeling. A higher project value would mean that the taxing entities' tax rates would be even lower than what is predicted if the project were to pay taxes. However, the modeling study demonstrates that the community in general benefits from the direct and indirect effect of the project, and would experience greater number of jobs, income gains, and higher GRPs from continued operation of the project.

The Town of Fulton requests that NYPA help the host communities in providing emergency services, and with infrastructure, and provide relief to taxpayers due to the project's tax-exempt status through a settlement package. The Middleburg Fire Department requests funding for purchasing fire rescue equipment. NYPA has entered into an off-license (i.e., outside of the Commission's jurisdiction) settlement agreement with the towns of Blenheim and Gilboa that provides for annual funding to the towns, including revenue sharing among other things.[57] Regarding the project's tax-exempt

[57] *See* NYPA's filing on the settlement agreement on March 20, 2018.

status, we recognize that there is a desire by various entities and jurisdictions for compensation for lost tax revenue. However, the Commission does not have the authority to adjudicate claims for, or to require a licensee, through license requirements or any other means, to establish payments in lieu of taxes. The tax-exempt status of NYPA is a matter of state law and beyond the Commission's jurisdiction.[58]

Although NYPA does not propose any direct socioeconomic measures for the project, it proposes a number of environmental protection and enhancement measures. Measures such as habitat and ecological enhancement projects would provide temporary employment during construction and generate longer-term economic gains due to improved water quality, increased fishery, aesthetic appeal, wetlands and habitat preservation, and green space. The project would continue to provide a variety of recreation amenities and recreation opportunities to the public, including picnicking, hiking, seasonal archery hunting, fishing, boating, and pool swimming. Various recreation enhancement measures at Mine Kill State Park (e.g., a new picnic pavilion, a new playground, a new canoe/kayak launch area, and rehabilitation of the boat launch area) and NYPA-operated recreation sites would enhance the attractiveness of the area for local recreationists and tourists, which in turn would have beneficial effects on the socioeconomics at or near the project. These enhancements would have direct effect on the local economy in terms of changes in employment, local expenditures, and tax revenue, as well as indirect influences on the local economy both in the short term for those involved in the construction of these improvements and in the long term as a result of increased recreation use of the sites and tourism in the area.

3.4 NO-ACTION ALTERNATIVE

Under the no action alternative, the Blenheim-Gilboa Project would continue to operate in its current manner. There would be no changes to the physical, biological, or cultural resources of the area.

[58] *See e.g., FPL Energy Maine Hydro, LLC,* 106 FERC ¶ 61,038 at P 58 (2004) (rejecting request that local government be compensated for loss of future tax revenues upon cessation of operations of project); *City of Tacoma,* 84 FERC ¶ 61,037 at 61,142, *reh'g denied*, 85 FERC ¶ 61,020 (1998) (declining to require licensee to compensate county for lost tax revenues).

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of Schoharie Creek for pumped storage hydropower purposes to see what effects various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[59] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

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

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 22 summarizes the assumptions and economic information used in our analysis. NYPA provided this information in its license application and subsequent submittals. We find that the values provided by NYPA are reasonable for the purposes of our analysis. Cost items common to all alternatives include: (1) insurance cost; (2) estimated future capital investment required to maintain and extend the life of plant equipment and facilities; (3) licensing costs; and (4) normal operation and maintenance cost. All dollars in Table 22 are year 2017. Values were provided by NYPA in its license application and subsequent submittals.

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

Table 22. Parameters used for the economic analysis of the Blenheim-Gilboa Project (Source: license application, as modified by staff).

Economic Parameter	Value[a]	Source
Installed capacity	1,160 MW	NYPA
Average annual generation	374,854 MWh	NYPA
Average annual pumping	540,217 MWh	NYPA
Annual O&M cost [b]	$66.17 million	NYPA
Commission fee [c]	$770,187 per year	Staff
Cost to prepare license application [d]	$9.2 million	NYPA
Net investment	$229.52 million	NYPA
Period of economic analysis	30 years	Staff
Term of financing	20 years	Staff
Cost of capital (Long-term interest rate)	7.2%	NYPA
Short-term interest rate (during construction)	7.2%	Staff
Insurance rate	Included in O&M cost	Staff
Energy rate [e]	$33.34/MWh	NYPA
Pumping rate [e]	$24.12/MWh	NYPA

[a] Values provided by NYPA in the license application unless otherwise noted.
[b] Average annual value from 2008 to 2016.
[c] Value from the FERC website.
[d] Excludes protection, mitigation, and enhancement measures.
[e] Values from 2016 real-time market locational-based marginal pricing on the NYISO website (www.nyiso.com).

4.2 COMPARISON OF ALTERNATIVES

Table 23 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EA: no action, NYPA's proposal, and the staff alternative.

Table 23. Summary of the annual cost of alternative power and annual cost for alternatives for the Blenheim-Gilboa Project (Source: Staff).

	No-Action Alternative	NYPA's Proposal	Staff Alternative
Installed capacity (MW)	1,160	1,160	1,160
Annual generation (MWh)	374,854	374,854	374,854
Annual pumping (MWh)	540,217	540,217	540,217
Dependable Capacity (MW)	1,160	1,160	1,160
Annual cost of alternative power ($/MWh)	$148,007,353 394.84	$148,007,353 394.84	$148,007,353 394.84
Annual project cost ($/MWh)	$94,560,670 252.26	$97,248,373 259.43	$97,117,174 259.08
Difference between cost of alternative power and project power ($/MWh)	$53,446,683 142.58	$50,758,980 135.41	$50,890,179 135.76

4.2.1 No-Action Alternative

Under the no-action alternative, the Blenheim-Gilboa Project would continue as currently operated. The project would have a total capacity of 1,160 MW, a dependable capacity of 1,160 MW, an average annual generation of 374,854 MWh, and pumping energy requirements of 540,217 MWh. The average annual cost of alternative power would be $148,007,353, or about $394.84/MWh. In total, the average annual project cost would be $94,560,670, or about $252.26/MWh. Overall, the project would produce power at a cost that is $53,446,683, or $142.58/MWh, less than the cost of alternative power.

4.2.2 NYPA's Proposal

Under NYPA's proposal, the Blenheim-Gilboa Project would have a total capacity of 1,160 MW, a dependable capacity of 1,160 MW, an average annual generation of 374,854 MWh, and pumping energy requirements of 540,217 MWh. The average annual cost of alternative power would be $148,007,353, or about $394.84/MWh. In total, the average annual project cost would be $97,248,373, or about $259.43/MWh. Overall, the project would produce power at a cost that is $50,758,980, or $135.41/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative would include the respective staff-recommended additions, deletions, and modifications to NYPA's proposed environmental protection and enhancement measures.

Based on a total capacity of 1,160 MW, a dependable capacity of 1,160 MW, an average annual generation of 374,854 MWh, and pumping energy requirements of 540,217 MWh. The average annual cost of alternative power would be $148,007,353, or about $394.84/MWh. In total, the average annual project cost would be $97,117,174, or about $259.08/MWh. Overall, the project would produce power at a cost that is $50,890,179, or $135.76/MWh, less than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 24 gives the cost of each of the environmental enhancement measures considered in our analysis. All dollars in Table 24 are year 2017. 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 24. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of the Blenheim-Gilboa Project (Source: Staff).

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Geology and Soils					
1. Monitor rates of landslide movement, per the Land Management Plan	NYPA, FWS, New York DEC, Staff	$0	$50,000	$50,000	
Aquatic Resources					
2. Implement the Water Management Plan	NYPA, FWS, New York DEC, Staff	N/A	N/A	$0	a
3. Provide aeration for releases between 5 cfs and 700 cfs, per the Water Management Plan	NYPA, FWS, New York DEC, Staff	$0	$0	$0	a
4. Continue to provide funding for eight existing USGS streamflow gages, per the Water Management Plan	NYPA, FWS, New York DEC, Staff	$0	$139,000	$139,000	
5. Provide funding for construction, operation, and maintenance of seven new USGS streamflow gages, per the Water Management Plan	NYPA, FWS, New York DEC, Staff	$0	$121,695	$121,695	b

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
6. Continue fish stocking in reservoirs, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC, Staff	$0	$18,500	$18,500	
7. Maintain four constant-level ponds in upper reservoir, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC, Staff	$0	$1,000	$1,000	
8. Enhance and monitor one constant-level pond in the upper reservoir, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC, Staff	$1,300,000	$2,200	$101,900	
9. Install and monitor fish attraction structures in the upper reservoir, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC, Staff	$580,000	$1,100	$45,580	
10. Establish a $2 million Blenheim-Gilboa Ecological Enhancement Fund for enhancement projects in the Schoharie Creek watershed, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC	$2,000,000	$0	$153,380	
11. Establish a Blenheim-Gilboa Ecological Enhancement Committee (composed of NYPA, FWS, and New York DEC) to administer the Ecological Enhancement Fund, per the Ecological Enhancement Plan	NYPA, FWS, New York DEC	$0	$0	$0	

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Terrestrial Resources					
12. Implement the Land Management Plan	NYPA, FWS, New York DEC, Staff	N/A	$0	$0	a
13. Continue management of the approximately 1,600-acre wildlife management area (including 2 acres of created wetlands and the bluebird trail), per the Land Management Plan	NYPA, FWS, New York DEC, Staff	$0	$0	$0	c
14. Conduct ground-disturbing activities to avoid impacts to bald eagles and timber rattlesnakes, per the Land Management Plan	NYPA, FWS, New York DEC, Staff	$0	$0	$0	a
15. Procedures for roadway maintenance and vegetation management within the project boundary, per the Land Management Plan	NYPA, FWS, New York DEC, Staff	$0	$0	$0	a

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Threatened and Endangered Species					
16. Conduct ground-disturbing activities to avoid impacts to the northern long-eared bat, per the Land Management Plan	NYPA, FWS, New York DEC, Staff	N/A	$0	$0	a
Recreation, Land Use, and Aesthetics					
17. Implement the Recreation Management Plan	NYPA, New York Parks, Staff	N/A	$25,000	$25,000	
18. Operate and maintain Mine Kill State Park and fund capital improvements, per the Recreation Management Plan	NYPA, New York Parks, Staff	$4,300,000	$420,000	$749,770	
19. Operate and maintain the Lansing Manor Complex, including the Blenheim-Gilboa Visitors Center, and fund capital improvements, per the Recreation Management Plan	NYPA, New York Parks, Staff	$5,500,000	$700,000	$1,121,800	
20. Operate and maintain the Upper Reservoir Access areas and Schoharie Creek Fishing Access site, per the Recreation Management Plan	NYPA, New York Parks, Staff	N/A	$270,000	$270,000	

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
21. Add portable toilets and parking area improvements at the three Upper Reservoir Access sites, per the Recreation Management Plan	NYPA, New York Parks, Staff	$50,000	N/A	$3,835	
22. Add portable toilets and make parking area improvements at the Schoharie Creek fishing access site, per the Recreation Management Plan	NYPA, New York Parks, Staff	$15,000	N/A	$1,150	
23. Continue to maintain the Cooperative Archery Hunting Area, per the Land Management Plan and the Recreation Management Plan	NYPA, New York Parks, Staff	N/A	$7,500	$7,500	
Cultural Resources					
24. Implement the Historic Properties Management Plan	NYPA, New York Parks, Staff	N/A	$50,000	$50,000	

a Costs included in general operation and maintenance budget.

b Estimated by staff. Section 4.1.1 of the Settlement Agreement states that NYPA will support the construction, operation, and maintenance of seven new streamflow gages in the lower Schoharie Creek Basin. However, it appears that the USGS has recently constructed and brought online seven new gages in this area. Therefore, staff assumes that these new streamflow gages are those to be supported by NYPA under the Ecological Enhancement Plan.

c NYPA's May 25, 2018, additional information response states that operation and maintenance costs for management areas is included in annual operation and maintenance or special events' budgets for venues such as the Lansing Manor Complex.

5.0 CONCLUSION 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 all uses of the waterway on which a project is located. When we review a hydropower project, we consider water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions, a hydropower project should be licensed, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing the waterway. We weigh the costs and benefits of our recommended alternative against other proposed measures. This section contains the basis for, and a summary of, our recommendations for relicensing the Blenheim-Gilboa Project.

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 Blenheim-Gilboa Project. We recommend this alternative because: (1) issuing a new license for the project would allow NYPA to continue to operate the project and provide a beneficial and dependable source of electric energy; (2) generation from the Blenheim-Gilboa Project, with a total installed capacity of 1,160 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 projects.

In the following section, we make recommendations as to which environmental measures proposed by NYPA, or recommended by agencies or other entities, should be included in any license issued for the project. In addition to NYPA'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 NYPA

Based on our environmental analysis of NYPA's proposal, as discussed in section 3, *Environmental Analysis*, and the costs presented in section 4, *Developmental Analysis*, we recommend including the following environmental measures proposed by NYPA in any license issued for the Blenheim-Gilboa Project:

- Implement the Water Management Plan filed as part of the Settlement Agreement to operate the project in a manner that protects water quality

within Schoharie Creek, and when applicable, manages downstream flows during high-water events using alternative procedures.

- Implement the Land Management Plan filed as part of the Settlement Agreement to identify maintenance practices within the project boundary, continue management of 1,600 acres of project lands for the benefit of wildlife, and avoid impacts to timber rattlesnake, bald eagle, and northern long-eared bat habitat.
- Implement the HPMP filed as part of the Settlement Agreement to protect archaeological and historic resources at the project.
- Remove a 53-acre parcel of land from the project boundary.

5.1.2 Additional Measures Recommended by Staff

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

- Implement the Ecological Enhancement Plan filed as part of the Settlement Agreement, with the exception of establishing an Ecological Enhancement Fund;
- Modify the Recreation Management Plan to remove the $4 million dollar payment to New York Parks, paid annually in payments of $500,000 for the first eight years of the new license; and instead list the specific capital improvements that will be made at Mine Kill State Park, including upgrading the pool complex, renovating the bathhouse, reconditioning the boat ramp and providing a wash station and built-in storage, improving the trails, building new comfort stations and a picnic shelter, and upgrading the playground equipment, and a proposed schedule for completion for the capital improvements.

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

Water Management Plan

The Water Management Plan includes procedures for water releases from the lower dam during low-, moderate-, and high-flow periods. In our analysis in section 3.3.2.2, Effects of Project Operation on Downstream Flooding, we conclude that the implementation of the WMP would reduce potential flooding damages for Schoharie downstream communities. Also, minimum flow releases from the lower dam release works would continue to benefit downstream aquatic biota. We estimate that the total

levelized annual cost of implementing the Water Management Plan would be $260,695[60] and conclude that the benefits of this measure outweigh its cost.

Ecological Enhancement Plan

The Ecological Enhancement Plan includes measures to: continue maintaining the four constant-level ponds in the upper reservoir and enhance (deepen and create wetland and riparian habitat) and monitor one of these ponds (pond 3); install and monitor fish attraction structures in the upper reservoir; and continue current fish stocking practices in both the upper and lower reservoirs. Collectively, these measures would enhance fish habitat in the upper reservoir by increasing the amount of habitat complexity (vertical relief and sheltering habitat afforded by the fish attraction structures) and over-wintering habitat (by deepening a constant-level pond). In addition, continuing to maintain the four constant-level ponds and fish stocking practices would continue to support and maintain fisheries in the project area by providing a stable spawning and rearing habitat in the upper reservoir and supplementing fisheries for species that are unlikely to reproduce naturally in the project area (trout and walleye) due to a lack of spawning habitat. We estimate that the total levelized annual cost of implementing the Ecological Enhancement Plan, without inclusion of the Ecological Enhancement Fund (discussed in section 5.1.3 below), would be $166,980[61] and conclude that the benefits of this measure outweigh its cost.

Land Management Plan

The Blenheim-Gilboa Project boundary contains over 2,000 acres of land, used for energy generation at project facilities, or managed to protect or enhance terrestrial resources and recreation. The Land Management Plan, filed with the Settlement Agreement, includes a variety of measures to: monitor the rates of landslide movement within the project boundary (specifically, the South Access Road and Schoharie Creek's eastern shoreline); continue management of the 1,600-acre wildlife management area, including 2 acres of created wetlands and an eastern bluebird trail, and Cooperative Archery Hunting Area; conduct ground-disturbing and tree-clearing activities to avoid or minimize impacts to bald eagles, timber rattlesnakes, and the federally listed threatened northern long-eared bat; and specify procedures for roadway maintenance and vegetation

[60] This cost estimate represents the sum of levelized annual costs for the measures to be included in the Water Management Plan. There are no proposed capital costs associated with the plan.

[61] This cost estimate represents the sum of levelized annual costs for the measures to be included in the Ecological Enhancement Plan, but does not include the total capital costs, which would be $1,880,000.

management within the project boundary. Collectively, these measures would protect and enhance land resources and species within the project boundary, by continuing to monitor an area within the project boundary prone to landslide movement, managing habitat diversity for wildlife and game species, and specifying consultation procedures relating to state- and federally listed species. We estimate that the total levelized annual cost of implementing the Land Management Plan would be about $50,000,[62] and conclude that the benefits of this measure outweigh its cost.

Recreation Management Plan

As discussed in section 3.3.5, Recreation, Land Use, and Aesthetics, the Blenheim-Gilboa Project is a popular spot for recreation. To ensure that recreation opportunities are available for public enjoyment throughout the term of a new license, NYPA proposes to implement the Recreation Management Plan, filed as part of the Settlement Agreement, that describes the project recreation sites and how NYPA will continue to operate, maintain, and enhance them. The plan includes descriptions of the Lansing Manor Complex (including the Lansing Manor House Museum and the Blenheim-Gilboa Visitors Center), Mine Kill State Park, the three Upper Reservoir Recreation Access sites, Schoharie Creek Fishing Access Site, and the Cooperative Archery Hunting Area. It includes guidance on how the sites will be managed and maintained, how recreation use will be monitored, how the plan will be updated, and how NYPA will coordinate and cooperate with agencies. It also includes a list of improvements that will be undertaken over the term of the new license to enhance the sites. At the Lansing Manor Complex, NYPA proposes to rehabilitate and stabilize the historic structures and modernize and upgrade the visitors' center. At the three Upper Reservoir Access Sites, NYPA proposes to provide portable toilets and improve parking. At the Schoharie Creek Fishing Access site, NYPA proposes to provide portable toilets and implement area improvements. At Mine Kill State Park, NYPA proposes to provide New York Parks with annual payments of $500,000 for the first eight years of a new license to fund capital improvement projects that include upgrades to the pool complex, renovations to the bathhouse, reconditioning the boat ramp and providing a wash station and built-in boat storage, improvements to the trails, new comfort stations and a new picnic shelter, and replacing or updating existing playground equipment.

NYPA's Recreation Management Plan provides a framework for ensuring that recreation opportunities at the project are not only maintained, but enhanced. However, the plan stipulates that NYPA will provide payments to New York Parks to fund the proposed capital improvements at Mine Kill State Park. This approach is not consistent

[62] This cost estimate represents the sum of levelized annual costs for the measures to be included in the Land Management Plan.

with the Commission's guidelines for environmental measures, because it is the Commission's strong preference to require specific measures directed towards a specific project effect and/or purpose.[63] Further, we do not recommend including this funding because it is a de facto cost cap. The Commission does recommend cost caps because a licensee's obligation to complete a measure required by its license should not be limited to a particular dollar amount.[64] Instead, we recommend that NYPA revise the Recreation Management Plan to remove the $4 million dollar payment to New York Parks, and instead list the specific capital improvements that will be made at Mine Kill State Park, including upgrading the pool complex, renovating the bathhouse, reconditioning the boat ramp and providing a wash station and built-in storage, improving the trails, building new comfort stations and a picnic shelter, and upgrading the playground equipment, and a proposed schedule for completion for the capital improvements. This would not prevent NYPA from providing the funding to New York Parks, outside of any license that may be issued, for completing the capital improvements. In addition, the revised plan also should list the specific capital improvements that NYPA proposes to undertake at the Lansing Manor Complex and include a schedule for completing the proposed enhancements at all the project recreation sites.

Finally, the Recreation Management Plan includes a provision for reporting recreation use at the project via the FERC Form 80 schedule. We note, however, that the Commission has proposed eliminating the filing of the FERC Form 80. So that recreation use at the project continues to be monitored throughout the term of any new license issued for the project, we recommend that NYPA include, within the revised Recreation Management Plan, a provision to monitor recreation at the project and file a report with the Commission every 10 years after license issuance. We estimate the costs associated with staff's recommended modifications to the Recreation Management Plan would be minimal and conclude the benefits of enhancing and monitoring recreation justify the cost.

Historic Properties Management Plan

NYPA proposes to implement the HPMP filed with the Settlement Agreement, which provides background information on cultural resources at the project, including maps of the APE and archaeological sites, preservation goals and priorities, project

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

[64] Final EA at 113-114, and 187-188. *See Virginia Electric Power Co.*, 110 FERC ¶ 61,241 (2005) and *Portland General Electric Co. and Confederated Tribes of the Warm Springs Reservation of Oregon*, 111 FERC ¶ 61,450 (2005). *See also Settlements in Hydropower Licensing under Part I of the Federal Power Act*, 116 FERC ¶ 61,270, at P 21 (2006).

effects, mitigation measures, implementation procedures and a list of activities that do not require prior consultation with the SHPO.

We recommend implementing the HPMP as filed by NYPA. As operation of the Blenheim-Gilboa Project has the potential to adversely affect multiple historic sites that are listed on the National Register, implementation of the HPMP would ensure that any adverse effects on National Register eligible components of the project would be properly identified and resolved through consultation with the New York SHPO. To ensure that effects on eligible historic properties, and to any as-yet unidentified archaeological resources, are satisfactorily resolved over the term of any new license, we intend to execute a PA with the New York SHPO; the terms of the PA would ensure that NYPA addresses any adverse effects to historic properties identified within the Area of Potential Effects (APE) through the implementation of the Historic Properties Management Plan (HPMP) for the Blenheim-Gilboa Project The levelized annual cost of implementing the HPMP would be about $50,000 and we conclude that the benefits of this measure outweigh the costs.

Project Boundary Modification

As noted in section 2.2.1, Existing Project Facilities and Project Boundary, NYPA proposes to remove from the project boundary a 53-acre parcel on the southwestern side of the project boundary, west of New York State Route 30. The parcel is adjacent to Mine Kill State Park, but is not part of the park. NYPA describes the parcel as surplus land. As the parcel is not needed for any project purpose, we recommend that it be removed from the project boundary, and estimate that the cost for the removal of the parcel would be minimal.

5.1.3 Measures Not Recommended by Staff

Ecological Enhancement Fund

As part of the Ecological Enhancement Plan, NYPA proposes to establish a $2 million fund, to be directed by an Ecological Enhancement Committee including NYPA, New York DEC, and FWS, to fund aquatic habitat improvement projects within the Schoharie Creek Watershed. In its May 25, 2018, additional information response, NYPA provided a list of 53 potential projects within the upper Schoharie Creek watershed, which were selected by NYPA, New York DEC, and FWS. The potential projects were scored to identify those most likely to achieve multiple goals within the watershed, such as improving aquatic connectivity, improving stream systems known to support trout, and other purposes.

We do not recommend establishing the fund because it is not associated with specific measures that define the types of improvements, enhancements, and maintenance needs to which the funds would be allocated. Although the list of potential projects

provided by NYPA is qualitatively scored according to a list of potential values (i.e., known trout presence, flood resiliency, connectivity restored, etc.) and seven projects obtain the highest score, there is little descriptive information provided about each of the potential projects, and no certainty that the seven highest-scored projects would receive funding. Therefore, we are unable to analyze the effectiveness or appropriateness of the measure. Because 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, the Commission might not require them in a license.[65] However, this would not prevent NYPA, New York DEC, and FWS from pursuing such funding for measures separate from any license that may be issued.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Continued operation of the Blenheim-Gilboa Project would result in some unavoidable fish entrainment. However, most fishes entrained at the project would be small juveniles, which experience low blade strike mortality. Pressure-induced mortality of juveniles is also low because rarely are the two reservoirs at depths that would lead to large pressure reductions and potential mortality during entrainment. The younger individuals in fish populations generally have high rates of natural mortality, even in the absence of hydropower operations, and fish populations have generally evolved to withstand losses of these smaller and younger individuals with little or no impact to long-term population sustainability. Thus, entrainment mortality of smaller fishes could occur, but is expected to be very low and have minimal consequences to the sustainability of the fish communities and associated fisheries at the project.

Under the continued operation of the project, reservoir fluctuations would continue, and would result in some unavoidable effects to littoral zone, wetland habitat, and aesthetics. Nevertheless, the continued maintenance and proposed enhancements of the constant-level ponds and wetland habitat within the project boundary would provide for, and enhance the amount of, stable spawning, rearing, and over-wintering habitat for fish species that prefer the littoral zone, thereby partially offsetting the effects of these fluctuations on fish populations, and beneficial habitat for wildlife.

5.3 SUMMARY OF SECTION 10(j) RECOMMENDATIONS

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

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

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 January 4, 2018, notice soliciting comments, recommendations, terms and conditions, and prescriptions, Interior filed three section 10(j) recommendations for the project on March 1, 2018. Table 25 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 25. Analysis of fish and wildlife agency recommendations for the Blenheim-Gilboa Project (Source: Staff).

Recommendation	Agency	Within the Scope of Section 10(j)	Levelized Annual Cost	Recommend Adopting?
1. Implement the Water Management Plan, to include:	Interior			
Providing aeration for releases between 5 cfs and 700 cfs for the purpose of enhancing downstream DO levels;		Yes	N/A	Yes
Continuing to fund eight streamflow gages for the purpose of informing NYPA's flow management for the project; and		No, providing funding is not a specific fish and wildlife measure	$139,000	Yes
Funding the construction and maintenance of seven additional streamflow gages in the lower Schoharie Creek watershed to enable better forecasting, situational awareness, planning, and mitigation of impacts of high-flow events.		No, providing funding is not a specific fish and wildlife measure	$121,695	Yes

2. Implement the Ecological Enhancement Plan, to include:	Interior			
Installing and monitoring fish attraction structures in the upper reservoir;		Yes	$45,580	Yes
Enhancing and monitoring one constant-level pond in the upper reservoir to enhance over-wintering habitat for fishes in the upper reservoir;		Yes	$101,900	Yes
Establishing an Ecological Enhancement Fund of $2 million to fund enhancement projects in the Schoharie Creek watershed, to be administered by an Ecological Enhancement Committee composed of one voting representative each from NYPA, New York DEC, and FWS;		No. This is not a specific fish and wildlife measure.	$153,380	No. Not a specific measure relating to, or mitigating, potential project effects.
Continuing to stock fish annually in the lower and upper reservoirs; and		Yes	$18,500	Yes
Continuing to maintain the four constant-level ponds in the upper reservoir to provide stable spawning		Yes	$1,000	Yes

and rearing habitat for littoral zone fishes.				
3. Implement the Land Management Plan, to include: Monitoring rates of landslide movement within the project boundary, specifically near the South Access Road and Schoharie Creek's eastern shoreline; Continuing management of the approximately 1,600-acre wildlife management area (including 2 acres of created wetlands and bluebird trail); and Conducting ground-disturbing activities to avoid impacts to bald eagles, timber rattlesnakes, and northern long-eared bats.	Interior	No, not a specific fish and wildlife measure Yes Yes	$50,000 $0 (cost included in annual operation and maintenance budget.) $0 (cost included in annual operation and maintenance budget.)	Yes Yes Yes

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 the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed eight comprehensive plans that are applicable to the Blenheim-Gilboa Project, located in New York.[66] No inconsistencies were found.

[66] (1) National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993. (2) New York Department of Environmental Conservation. 1979. Hudson River Basin water and related land resources: Level B study report and environmental impact statement. Albany, New York. September 1979. (3) New York Department of Environmental Conservation. 1985. New York State Wild, Scenic, and Recreational River System Act. Albany, New York. March 1985. (4) New York Department of Environmental Conservation. 1986. Regulation for administration and management of the wild, scenic, and recreational rivers system in New York State excepting the Adirondack Park. Albany, New York. March 26, 1986. (5) 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. (6) State of New York Hudson River Regulating District. 1923. General plan for the regulation of the flow of the Hudson River and certain of its tributaries. Albany, New York. June 7, 1923. (7) U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986. (8) U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

6.0 FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate the Blenheim-Gilboa Project, with our recommended measures, involves minimal land-disturbing or land-clearing activities. Our recommended measures would ensure the project would continue to operate while providing enhancements to fish and wildlife resources, improvements to recreation facilities, and protection of geologic, historic, and cultural resources in the project area.

Based on our independent analysis, issuance of a new license for the Blenheim-Gilboa Project, as proposed 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

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APPENDIX A: DRAFT LICENSE ARTICLES RECOMMENDED BY STAFF FOR THE BLENHEIM-GILBOA PUMPED STORAGE PROJECT NO. P-2685

Draft Article 2XX. *Administrative Annual Charges*. The licensee must pay the United States annual charges, effective the first day of the month in which the license is issued, and as determined in accordance with provisions of the Commission's regulations in effect from time to time, for the purposes of reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 1,160 megawatts.

Draft Article 2XX. *Exhibit Drawings*. Within 90 days of the date of issuance of this license, the licensee must file for Commission approval, revised Exhibit G drawings that revise the boundary to remove the approximately 53-acre portion of the project boundary that lies west of New York State Route 30.

The Exhibit G drawings must be stamped by a registered land surveyor and comply with sections 4.39 and 4.41 (h) of the Commission's regulations.

Draft Article 2XX. *Amortization Reserve.* Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project must be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee must set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee must deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee must set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee must maintain the amounts established in the project amortization reserve account until further order of the Commission.

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

Draft Article 2XX. *Headwater Benefits.* If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the licensee must reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations.

Draft Article 2XX. *As-built Exhibits*. Within 90 days of completion of construction of the facilities authorized by this license, the licensee must file, for Commission approval, revised exhibits A, F, and G, as applicable, to describe and show those project facilities as built. In addition, a courtesy copy must be filed with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer.

Draft Article 4XX. *Water Management Plan*. The Water Management Plan, filed February 23, 2018, is approved and made part of this license and may not be amended without prior Commission approval. Upon license issuance, the licensee must implement the Water Management Plan.

Draft Article 4XX. *Ecological Enhancement Plan*. The Ecological Enhancement Plan, filed February 23, 2018, with the removal of the provision to establish a $2 million Ecological Enhancement Fund, is approved and made part of this license and may not be amended without prior Commission approval. Upon license issuance, the licensee must implement the Ecological Enhancement Plan.

Draft Article 4XX. *Land Management Plan*. The Land Management Plan, filed February 23, 2018, is approved and made part of this license and may not be amended without prior Commission approval. Upon license issuance, the licensee must implement the Land Management Plan.

Draft Article 4XX. *Recreation Management Plan*. Within 6 months of license issuance, the licensee must file, with the Commission for approval, a revised Recreation Management Plan. The plan must include all of the provisions of the Recreation Management Plan filed February 23, 2018, with the following modifications:

(1) Remove the provision to pay New York State Office of Parks and Historic Preservation (New York Parks) a $4 million dollar payment, paid annually in payments of $500,000 for the first eight years of the new license; and instead list the specific capital improvements that will be made at Mine Kill State Park. Required capital improvements include:

a. replace the pool filtration systems at the pool complex (i.e., filter tanks and piping), resurface the pool deck and address critical replacement needs in the pools themselves (i.e., pool lining, gutters, steps, railings, etc.), and provide barrier free access to the Kiddie Pool;
b. renovate the bathhouse, including exterior work, as well as energy efficiency improvements;
c. recondition the boat ramp and construct a small pavilion near the boat launch with built-in storage for rental boats and space for the public to store their own canoes/kayaks;
d. complete trail improvements, including repaving paths and updating user orientation signage throughout the park;
e. renovate the interior of the existing comfort station and construct a new picnic shelter and comfort station by the soccer fields; and
f. replace and/or update the equipment at existing playgrounds.

(2) Include a list of the specific capital improvements to be undertaken at the Lansing Manor Complex, including those to be completed at the Lansing Manor House Museum and the Blenheim-Gilboa Visitors' Center.

(3) Include a schedule for implementing the required capital improvement projects at both Mine Kill State Park and the Lansing Manor Complex.

(4) To replace the Form 80 monitoring provision in the February 23, 2018 plan, include a new plan for monitoring recreation at the project recreation sites and filing a report with the Commission that includes the results of the monitoring every 10 years after the license is issued. Prior to filing that report, NYPA should consult with agencies as stipulated by section 6.2 of the Recreation Management Plan. If that report indicates changes are needed at existing recreation sites or additional recreation improvements are needed, the filing should detail these proposed changes for Commission approval.

All revisions to the Recreation Management Plan must be developed after consultation with New York Parks, U.S. Fish and Wildlife Service, and New York State Department of Environmental Conservation. The licensee must include with the plan, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies above, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

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

Draft Article 4XX. *Programmatic Agreement and Historic Properties Management Plan*. The licensee shall implement the "Programmatic Agreement Among the Federal Energy Regulatory Commission and New York State Office of Parks, Recreation and Historic Preservation for Managing Historic Properties That May Be Affected by a License Issuing to the Power Authority of the State of New York for the Continued Operation of the Blenheim-Gilboa Pumped Storage Power Project in New York (FERC No. 2685-029)," executed on [date], including but not limited to the approved Historic Properties Management Plan (HPMP), filed on February 23, 2018. In the event that the Programmatic Agreement is terminated, the licensee shall continue to implement the provisions of its approved HPMP.

Draft Article 4XX. *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior during the term of the license pursuant to section 18 of the Federal Power Act.

Draft Article 4XX. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to

protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file with the Commission a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or

public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project lands and waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings

(project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.