

**FEDERAL ENERGY REGULATORY COMMISSION**

**Erie Boulevard Hydropower, L.P.**

**Project No. 2047-049**

**NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT**

**(July 26, 2011)**

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission or FERC) regulations, 18 CFR Part 380, Commission staff has reviewed the application for amendment of license for the Stewarts Bridge Project (FERC No. 2047) and has prepared an environmental assessment (EA). The project is located on the Sacandaga River in Saratoga County, New York.

The EA contains the Commission staff's analysis of the potential environmental effects of the proposed addition of new generating capacity and concludes that authorizing the amendment, with appropriate environmental protective measures would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at [FERCOnlineSupport@ferc.gov](mailto:FERCOnlineSupport@ferc.gov) or toll-free at (866) 208-3676, or for TTY contact (202) 502-8695.

**Kimberly D. Bose,  
Secretary**

**FINAL ENVIRONMENTAL ASSESSMENT  
FOR A NON-CAPACITY RELATED AMENDMENT TO LICENSE**

**Stewarts Bridge Hydroelectric Project—FERC Project No. 2047-049  
New York**



**Federal Energy Regulatory Commission  
Office of Energy Projects  
Division of Hydropower Administration and Compliance  
888 First Street, NE  
Washington, DC 20426**

**July 2011**

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## **ACRONYMS AND ABBREVIATIONS**

<b>cfs</b>	<b>cubic feet per second</b>
<b>Commission</b>	<b>Federal Energy Regulatory Commission</b>
<b>CRMP</b>	<b>Cultural Resources Management Plan</b>
<b>EA</b>	<b>Environmental Assessment</b>
<b>Erie</b>	<b>Erie Boulevard Hydropower, LP</b>
<b>ESA</b>	<b>Endangered Species Act</b>
<b>FERC</b>	<b>Federal Energy Regulatory Commission</b>
<b>FMPEIS</b>	<b>Final Multiple Project Environmental Impact Statement</b>
<b>fps</b>	<b>feet per second</b>
<b>FWS</b>	<b>U.S. Fish and Wildlife Service</b>
<b>mg/l</b>	<b>milligrams per liter</b>
<b>MWh</b>	<b>Megawatt-hours</b>
<b>NRHP</b>	<b>National Register of Historic Places</b>
<b>NPCC</b>	<b>Northeast Power Coordinating Council</b>
<b>NYDEC</b>	<b>New York State Department of Environmental Conservation</b>
<b>RM</b>	<b>river mile</b>
<b>Settlement</b>	<b>March 27, 2000, Upper Hudson/Sacandaga River Offer of Settlement</b>
<b>Tribe</b>	<b>St. Regis Mohawk Tribe</b>
<b>WQC</b>	<b>Water Quality Certificate</b>

## **EXECUTIVE SUMMARY**

Erie Boulevard Hydropower, L.P. (licensee) proposes a new powerhouse with a 2.55 megawatt (MW) unit to be constructed immediately downstream of the existing powerhouse and near the project tailrace for the Stewarts Bridge Project (FERC Project No. 2047). The Stewarts Bridge Project is located on the Sacandaga River in the town of Hadley, Saratoga County, New York. The project does not occupy any federal lands.

Under the licensee's proposal the new unit will use a base flow of 325 cubic feet per second (cfs) required to be released from the project pursuant to Article 405 of the project license. Pursuant to Article 405 the required base flow may vary from 350 cfs to 300 cfs when the elevation of the upstream Great Sacandaga Lake (FERC Project No. 2318) is below elevation 752 feet. With the addition of this new base flow unit the maximum installed capacity for the project will increase from 30,000 kilowatts (kW) to 32,550 kW and the maximum hydraulic capacity will increase from 5,650 cfs to 6,000 cfs an increase of less than 15 percent. Therefore, this proposal does not constitute a capacity related amendment as described in 18 CFR §4.201(b).

The licensee will continue to operate the project in accordance with the March 27, 2000 Upper Hudson/Sacandaga River Offer of Settlement (Settlement), the current project license (issued September 25, 2002), and the Federal Water Pollution Control Act section 401 Water Quality Certificate (WQC) for the project. The analysis in this document is limited to the potential impacts related to construction activities and any impacts of routing the required base flow through the new turbine instead of discharging the base flow through the spillway gates under the current project license.

The powerhouse for the new base flow unit would occupy approximately 1,500 square feet of the area downstream of the project dam. This area has been previously disturbed, is sparsely vegetated, and provides little in the way of wildlife habitat. Ground disturbance for construction of the new powerhouse would create the potential for rainfall and storm events to erode this area resulting in turbidity and sedimentation of the tailwaters and downstream thus affecting water quality and aquatic habitat. These impacts are expected to be short term and minor. The licensee proposes to implement measures to minimize these construction related impacts. Impacts to fish resulting from impingement and entrainment may increase as a result of higher approach velocities with the base flow unit and the main unit in operation but effects on the fish populations are not expected to be significant. No impacts have been identified to aesthetics, land use, cultural resources, and socioeconomics resulting from implementation of the proposed action.

For those resources that would be affected by construction of the new powerhouse the licensee proposes to implement protection measures to ensure the safety of recreational users of the tailrace during construction of the new powerhouse and erosion

**control and revegetation of disturbed areas. Further, the licensee, in consultation with the U.S. Fish and Wildlife Service (FWS), has developed a plan with measures to protect wintering bald eagles during project construction. In addition to these measures, staff recommends that the licensee periodically check the FWS website for current updated information regarding listed species and notify the Commission and the FWS in the event that new information suggests that listed species could be affected by the proposed action.**

**Based on our analysis, staff recommends approval of the amendment of license as proposed by the licensee with staff's one additional measure to protect any listed species described above. Staff finds that approval of this amendment of license would not constitute a major federal action significantly affecting the quality of the human environment.**



**FINAL ENVIRONMENTAL ASSESSMENT**  
**Federal Energy Regulatory Commission**  
**Office of Energy Projects**  
**Division of Hydropower Administration and Compliance**  
**Washington, DC**

**Stewarts Bridge Hydroelectric Project**  
**FERC Project No. 2047-049-NY**

**1.0 INTRODUCTION**

**1.1 APPLICATION**

**Application Type:** Amendment of license

**Date Filed:** January 6, 2011; additional information filed on April 25 and June 30, 2011

**Applicant's Name:** Erie Boulevard Hydropower, L.P.

**Water body:** Sacandaga River

**County and State:** Saratoga County, New York

**Federal Lands:** None

**1.2 PURPOSE OF ACTION AND NEED FOR POWER**

**1.2.1 Purpose of Action**

The Stewarts Bridge Project is the lowermost dam on the Sacandaga River, located about three miles upstream from the confluence of the Sacandaga and Hudson Rivers. The E.J. West Project (No. 2318), which impounds Great Sacandaga Lake, is located about three miles upstream from the Stewarts Bridge Project (Figure 1).

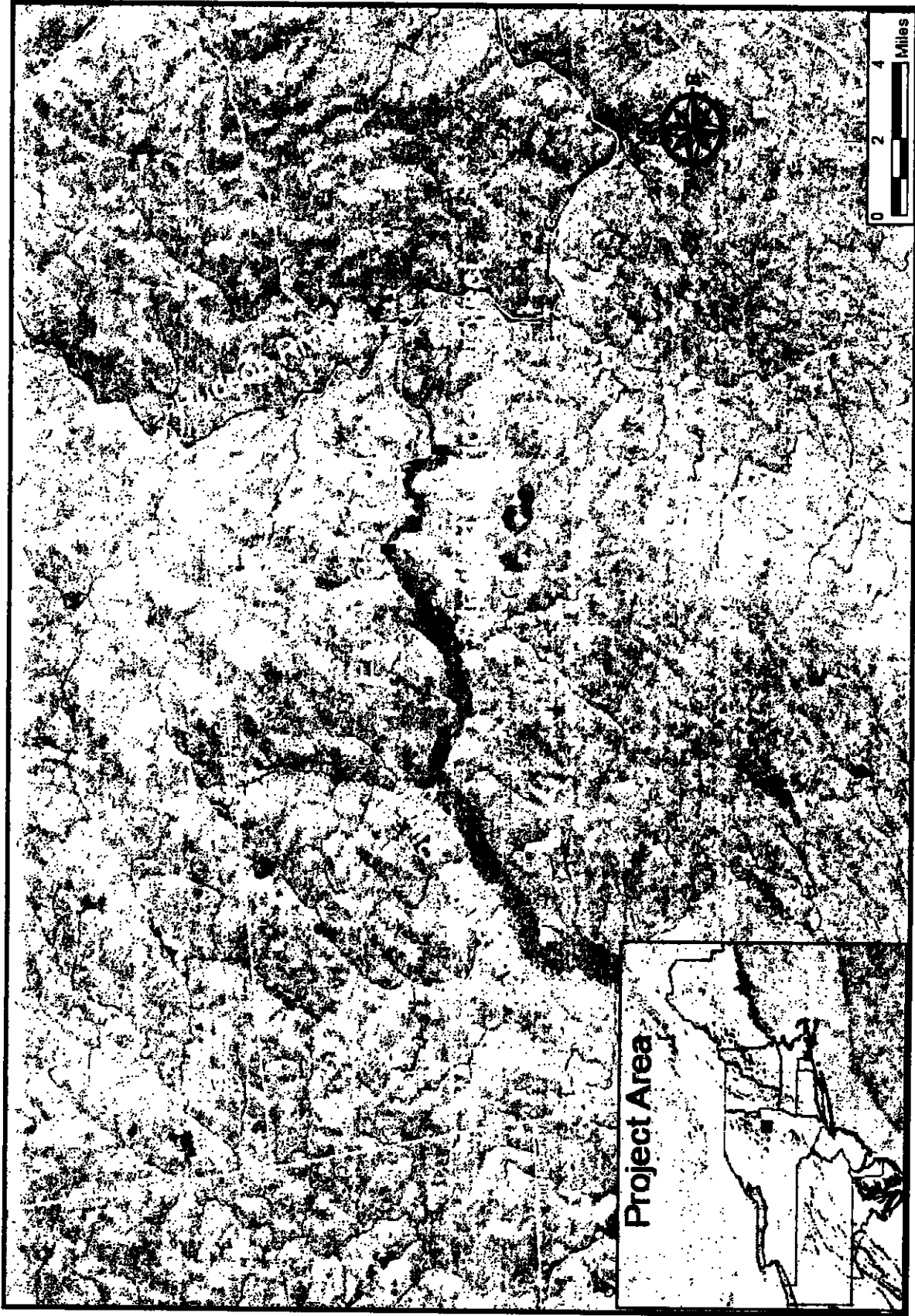


Figure 1. Location of the Stewarts Bridge Project in Saratoga County, New York. (Source: staff)

Article 405 of the project's license requires the licensee to maintain an instantaneous base flow immediately below the project's dam beginning January 1, 2013. This flow can vary between 350 cubic feet per second (cfs) and project inflow dependent upon the elevation of Great Sacandaga Lake and flow in the Hudson River. The base flow requirement is below the minimum hydraulic capacity of the project's existing turbine. Therefore, the licensee proposes to install a second, smaller turbine to increase the installed capacity of the project and generate electricity from the required base flow releases.

### **1.2.2 Need for Power**

The Stewarts Bridge Project is located within the Northeast Power Coordinating Council (NPCC) region of the North American Electric Reliability Corporation. Within the NPCC, the project is located in the New York sub region. The NPCC estimates that demand in the New York sub region will increase at an annual compound growth rate of 0.64 percent from 2010 to 2019 (NERC, 2010).

The New York sub region of the NPCC region is heavily dependent on fossil-fueled capacity, with 63 percent fueled by gas and oil, either together or separately, and seven percent available from coal. Nuclear power provides about 14 percent, with 11 percent attributed to conventional hydroelectric facilities and about four percent provided by pumped storage hydroelectric facilities. The remainder is from a variety of other renewable and non-renewable sources. While some older facilities will be retired over the next 10 years, and new facilities are expected to come on-line, the fuel source mix percentages of the NPCC region are expected to change only slightly.

The New York State Renewable Portfolio Standard requires that 30 percent of the power sold in New York come from renewable resources (e.g., solar, hydro, wind) by 2015.<sup>1</sup> The power from the proposed expansion of the Stewarts Bridge Project may qualify as renewable power under those standards.

The proposed expansion of the Stewarts Bridge Project would increase installed capacity by 2.55 megawatts (MW) and increase average annual generation by 11,440 megawatt-hours (MWh), which would help the state of New York achieve its renewable resource goals and provide needed energy that might otherwise be provided by fossil-fueled generation.

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<sup>1</sup>The New York State Public Service Commission voted on September 24, 2004 to adopt a Renewable Portfolio Standard, with the goal of increasing the proportion of renewable electricity used by New York consumers.

### **1.3 STATUTORY AND REGULATORY REQUIREMENTS**

A non-capacity amendment for the Stewarts Bridge Project is subject to numerous requirements under the Federal Power Act (FPA) and other applicable federal and state statutes 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 of such fishways by a licensee as may be prescribed by the Secretaries of the U.S. Department of Commerce or the U.S. Department of the Interior. Article 409 of the project license reserves the Commission's authority under Section 18 as per the request by the Secretary of the Department of Interior. No new fishway prescriptions were filed by either agency for the proposed amendment.

##### **1.3.1.2 Section 10(j) Conditions**

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the proposed project. No recommendations were filed by any federal or state fish and wildlife agencies pursuant to section 10(j).

#### **1.3.2 Clean Water Act**

By letter dated January 7, 2011, the licensee submitted to the New York State Department of Environmental Conservation (NYDEC) a request for a Clean Water Act Section 401 WQC for the proposed new base flow unit at the Stewarts Bridge Project or modifications to the existing WQC. To date no action has been taken by NYDEC on licensee's request for a WQC.

#### **1.3.3 Coastal Zone Consistency Determination**

Section 307 (c)(3) of the Coastal Zone Management Act requires that all federally licensed and permitted activities be consistent with approved state coastal zone management programs. If the project is located within a coastal zone boundary, or if a project affects a resource located in the boundaries of the designated coastal zone, the applicant must certify that the project is consistent with the state coastal zone management program.

The Stewarts Bridge Project is not located within the jurisdiction of the New York State coastal zone management program. Therefore, our assessment is that no coastal zone consistency certification is needed for the Stewarts Bridge license amendment.

#### **1.3.4 Endangered Species Act**

There are two endangered species which are listed as known or potentially occurring in Saratoga County: the Indiana bat (*Myotis sodalist*) and the Karner blue butterfly (*Lycaeides melissa samuelis*) (FWS, 2011). By letter to the licensee dated December 1, 2010, the U.S. Fish and Wildlife Service (FWS) concluded that Indiana bats and Karner blue butterflies are unlikely to occur at the site and that no further consultation pursuant to the ESA is required.

In comments filed April 20, 2011, the FWS recommended that the FWS website be checked every 90 days until the project is complete to ensure that information regarding listed species is current. In section 5.1.2 we recommend that any order approving the license amendment include a provision for the licensee to periodically check the FWS website for current information regarding listed species and notify the Commission and FWS in the event that new information suggests that listed species could be affected by the proposed action.

#### **1.3.5 National Historic Preservation Act**

Section 106 of the National Historic Preservation Act 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 (NRHP).

License Article 410 requires the licensee to implement the Cultural Resources Management Plan (CRMP) and associated Programmatic Agreement for the project. As per the CRMP, the licensee consulted with the New York State Historic Preservation Office (SHPO), the Bureau of Indian Affairs and the St. Regis Mohawk Tribe (Tribe) regarding the proposed amendment. The licensee concluded that there are no archaeological sites listed in or eligible for the NRHP and the proposed amendment would not have any adverse impact on cultural or historical properties. By letters dated March 23, 2011 and February 15, 2011, the SHPO and Tribe, respectively, concurred with the licensee's findings. No further consultation pursuant to Section 106 is necessary.

### **1.4 PRE-FILING PUBLIC REVIEW AND CONSULTATION**

The Commission's regulations (18 CFR, §4.38(a)(6)(v)(C)) require that licensees consult with appropriate resource agencies, tribes, and other entities before filing an

application for a capacity amendment to a license. Pre-filing consultation must be complete and documented according to the Commission's regulations. While the application for the proposed base flow unit is a non-capacity amendment, it is subject to section 4.38 regulations because of the addition of a new turbine.

#### **1.4.1 Consultation**

In its pre-filing consultation, the licensee consulted with relevant resource agencies and potentially interested parties, including all signatories to the March 27, 2000 Upper Hudson/Sacandaga River Offer of Settlement (Settlement) and the project service list.<sup>2</sup> The licensee held a public meeting on August 26, 2010, to share information with stakeholders and interested members of the public. No issues were raised during pre-filing consultation. The licensee received several comments in support of the proposed action. Generally, comments reflected that the proposed amendment would not change the operation of the project and no entity opposed the proposed action.

#### **1.4.2 Comments on the License Amendment Application and Interventions**

On February 23, 2011, the Commission issued a notice that the licensee's application for amendment of license had been accepted for filing and solicited motions to intervene and comments, recommendations, terms and conditions, and fishway prescriptions. The deadline for filing was 60 days from the issuance date of the notice (April 25, 2011) and reply comments were due 105 days from the issuance date of the notice (June 8, 2011). The following entities filed motions to intervene and comments:

<b>ENTITY</b>	<b>DATE OF FILING</b>	<b>TYPE OF FILING</b>
New York State Department of Environmental Conservation	March 28, 2011	Intervention
U.S. Department of the Interior	April 20, 2011	Intervention
U.S. Department of the Interior	April 20, 2011	Comments

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<sup>2</sup> A comprehensive list of consulted entities is included on pgs 21-22 of the amendment application.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 NO-ACTION ALTERNATIVE**

Under the no-action alternative the licensee's amendment application would be denied and the license-required base flow would be passed over the spillway when the project is not generating. There would be no impacts from construction activities and no increase in generation at the project.

#### **2.1.1 Existing Project Facilities**

The Stewarts Bridge Project consists of: an intake structure equipped with one-inch clear-spaced trashracks; a 22-foot-diameter steel penstock, a gated spillway with five tainter gates and a concrete roadway bridge; an earthen embankment dam with roadway; and a powerhouse. The powerhouse is located approximately 225 feet downstream of the intake structure and discharges to the boulder and cobble substrate tailrace, which extends approximately 450 feet downstream from the powerhouse and ranges in depth from 2 to 15 feet. The gated spillway discharges into a stilling basin adjacent to the powerhouse. A large pool, which is present at all flows including non-operating periods, is located immediately below the powerhouse and extends approximately 200 feet downstream.

#### **2.1.2 Existing Project Operation**

The project operates in a modified peaking mode in tandem with the licensee's upstream E.J. West Project (FERC Project No. 2318) which is located at the outfall of the Great Sacandaga Lake. Article 403 of the license for the Stewarts Bridge Project (FERC Project No. 2407) requires the licensee to limit daily fluctuations in the project impoundment to one foot (i.e., maintain the impoundment between 704 and 705 feet National Geodetic Vertical Datum). When the existing unit is generating, flows through the powerhouse are typically 4,000 cfs and a continuous minimum flow of 25 cfs is provided at the dam for downstream fish movement. Article 405 of the license requires that the licensee begin releasing base flows up to 350 cfs on January 1, 2013. Under the existing license, the base flows would be released through the project tainter gates in the spillway.

## **2.2 LICENSEE'S PROPOSAL**

### **2.2.1 Proposed Project Facilities and Construction Activities**

The following new facilities are proposed by the licensee for this amendment:

- A new 6.5-foot-diameter, 250 to 270-foot-long penstock would be connected to the existing penstock

- A new 44-foot-long, 34-foot-wide, 18-foot-high concrete and steel powerhouse would be constructed mostly below grade immediately downstream of the existing powerhouse
- An additional tailrace between 8 and 20-feet-wide and 95-feet-long would be excavated into the river bank
- The new powerhouse would contain a 2,550 kilowatt vertical turbine with a hydraulic capacity between 275 cfs and 350 cfs

### **2.2.2 Proposed Operational Modifications**

- The base flow, when above 275 cfs, would be released through the new turbine
- The maximum hydraulic capacity of the entire project would increase from 5,650 to 6,000 cfs

### **2.2.3 Construction Schedule**

Construction activities started with the licensee designing facilities, sending the work out for bids, and awarding the job to contractors. This began in the third quarter of 2010 and is expected to last until the third quarter of 2011. Following that, the licensee expects fabrication of the proposed equipment to take another six months and construction of the new facilities to be completed in November 2012. The licensee expects to have the proposed turbine and appurtenances in-service by January 1, 2013, the date on which the base flow requirement is effective.

### **2.2.4 Modifications to Licensee's Proposal—Mandatory Conditions**

No mandatory conditions have been provided at this time.

## **2.3 OTHER ALTERNATIVES**

Commission staff did not identify any other reasonable alternatives.

## **3.0 ENVIRONMENTAL ANALYSIS<sup>3</sup>**

### **3.1 GENERAL SETTING**

The Stewarts Bridge Project is located on the Sacandaga River, at about river mile (RM) 3 above its confluence with the Hudson River in the town of Hadley, Saratoga

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<sup>3</sup> Unless otherwise noted, the information in this section was derived from the application for amendment of license for this project and additional information filed by the licensee on April 25 and June 20, 2011 (Erie, 2011).



County, New York (Figure 1). The Sacandaga River basin is about 64 miles long and is located in the northern part of New York. The drainage basin above the Stewarts Bridge Project is 1,044 square miles of which 1,034 square miles contributes to the Great Sacandaga Lake of the upstream E.J. West Project. The headwaters of the Stewarts Bridge reservoir extend upstream to the tailwaters of Conklingville Dam which impounds the Great Sacandaga Lake at RM 6.

The Sacandaga River watershed lies partly within the Adirondack State Park boundary and the Adirondack Mountains which is characterized as being mostly undeveloped with large forested areas occupying most of the drainage basin with a small number of areas in agricultural production. The Stewarts Bridge Project is located within the southeastern section of the Adirondack State Park boundary. This area is characterized by low mountain ranges with numerous small lakes and tributaries providing a diversity of habitat types (FERC, 2001). Elevations within the Sacandaga River basin average 1,612 feet and varies from 667 feet to 3,566 feet. The topography of the basin varies from flat areas mostly in the lower areas to steep, exposed bedrock.

The Stewarts Bridge Project area provides good quality habitat for a diverse assemblage of terrestrial species (mammals, birds, reptiles, and amphibians). The project reservoir and tailwaters downstream provide habitat for several species of game and non-game fish. Many recreational activities are available in the project area; however, the major recreational opportunities are water-based with the reservoir and the project tailwaters providing access. The Sacandaga River downstream of the project is a popular and regionally renowned whitewater boating reach to the confluence with the Hudson River. Project discharges enhance this whitewater boating activity.

### **3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS**

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (50 CFR §1508.7), an action may cause cumulative effects on the environment if its effects overlap in space and/or time with the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities.

Based on information in the license application, agency comments, other filings related to the project, and preliminary staff analysis, we have not identified any resources that have the potential to be cumulatively affected by the proposed action.

### **3.3 PROPOSED ACTION**

In this section, we discuss the effect of the proposed action on environmental resources. For each resource, we first describe the affected environment, which is the

baseline against which we measure effects. We then discuss and analyze the site-specific environmental issues. The license requires the new base flow discharge and the environmental impacts of this requirement were analyzed in the 2001 Final Multiple Project Environmental Impact Statement (FMPEIS) which was prepared for relicensing the project. Therefore, the analysis in this document is limited to the potential impacts related to construction activities and to the change of routing the required base flow through the new turbine instead of discharging the base flow through the spillway gates under the current project license.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this environmental assessment (EA). We have not identified any substantive issues related to aesthetics, land use, cultural resources, and socioeconomics associated with the proposed action and, therefore, these resource areas are not assessed in this EA. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

### **3.3.1 Geology and Soils**

#### **3.3.1.1 Affected Environment**

The Stewarts Bridge Project is located in the eastern Adirondack foothills ecoregion (EPA, 2011). The area around the project is underlain by a series of metaigneous and metasedimentary rocks, all of Precambrian age. The mountains surrounding the Sacandaga River gorge in the area are largely medium and coarse grained granites (part of the Adirondack syenite-granite series) with some mixtures of granites and Grenville series rocks (i.e., schists, gneisses, quartzites, and crystalline limestone). Some large-scale north-northeast trending paleo-faults traverse this region, and numerous minor paleo-faults also cross the general region.

The Stewarts Bridge Project dam was sited to take advantage of a northerly trending ridge of glacial and post-glacial deposits that lay within the valley of the Sacandaga River and partly restricted its flow. Incorporating this ridge into the structure substantially reduced the amount of fill required to construct the left abutment. In general, geology of the Stewarts Bridge Project consists of gray granitic gneiss overlain by fine-grained glacial lake and stream deposits and above those by sandy glacial till.

The soil in the immediate vicinity of the proposed project is described as an allagash fine sandy loam. This is a very deep, well-drained soil with moderate susceptibility to erosion (NRCS, 2009). The new powerhouse would be located in a parking area which the licensee expects to be comprised of course sand, gravel, and boulder fill placed there during project construction in the 1950's.

### **3.3.1.2 Environmental Effects**

The proposal would affect geology and soils primarily through construction of the new penstock, the powerhouse, and the associated tailrace. Because the powerhouse, tailrace, and portion of the new penstock would be constructed below the current ground level, approximately 8,800 cubic yards of materials would need to be excavated from the project site. This material would be recycled or disposed of off-site. Additionally, about 3,000 square feet of grass covered hillside would be disturbed for penstock construction and approximately 12,000 to 15,000 square feet may be disturbed for construction staging areas. To reduce the likelihood of adverse impacts on geology and soils, the licensee states it will utilize erosion control measures such as silt fences, straw bale dikes, sedimentation basins, and turbidity curtains. The licensee also intends to utilize a cofferdam during final excavation of the new tailrace. To mitigate long term effects, the licensee proposes to seed the construction and staging areas with grasses and herbaceous plants similar to those already present.

#### *Our Analysis*

The construction of the new facilities would have a minor short term impact on the geology and soil resources of the project. These effects would primarily occur through erosion of disturbed soils while excavation is being performed for the new powerhouse, penstock, and tailrace. The erosion control measures proposed by the licensee and placed at the perimeter of the disturbed sites and in the Sacandaga River downstream of the proposed tailrace should reduce any possible impacts from the proposed action. Erosion control measures are required by the conditions of the existing WQC and the licensee states it will utilize the above described measures to comply with those conditions. Also, as standard procedure, the Commission's New York Regional Office will require the licensee to file plans and specifications that will include the proposed erosion control measures before allowing construction to proceed. Additionally, the licensee's intent to revegetate disturbed soils will reduce any long term erosion potential.

### **3.3.2 Aquatic Resources**

#### **3.3.2.1 Affected Environment**

The Stewarts Bridge Project is located on the Sacandaga River in the town of Hadley, New York. The 480-acre project reservoir is 3.5 miles long and extends upstream to the tailwaters of licensee's E.J. West Project which is located at the Conklingville Dam at RM 6 on the Sacandaga River. Project operations as well as the quality of Stewarts Bridge waters are influenced by releases from Conklingville Dam. There is no intervening river reach between the Stewarts Bridge reservoir and the tailwaters of the E.J. West Project (FERC, 2001). The Stewarts Bridge Project operates as a peaking facility in tandem with the E.J. West Project.

## **Water Quantity**

The United States Geological Survey gage no. 1325000 located about one mile downstream of the project has recorded Sacandaga River flows since before project construction. After the project began operation in 1952, the highest recorded flow was 14,200 cfs and the average annual flow is 2,187 cfs.

Inflow to the 480-acre Stewarts Bridge impoundment is primarily governed by releases from the E.J West powerhouse. One hour prior to start-up of the E.J West powerhouse, the Stewarts Bridge impoundment is drawn down by one foot to enable a stable impoundment level to exist at full pond once the E.J. West powerhouse comes on line (FERC, 2001). The releases from the E.J. West and Stewarts Bridge Projects typically achieve a maximum of 4,000 cfs on an hourly basis. However, actual generating releases from the two projects ordinarily range between 3,900 and 4,500 cfs. During these releases, the three mile stretch of the Sacandaga River between the Stewarts Bridge dam and the Hudson River has two main sets of rapids separated by a one mile reach of swift flowing water (FERC, 2001).

## **Water Quality**

The water quality of the Stewarts Bridge reservoir and the 3-mile stretch of the Sacandaga River downstream to the Hudson River is designated class C by the State of New York. The best usage of these waters is for fishing. FERC (2001) reports no exceedences of state standards in waters entering the Stewarts Bridge reservoir from the E.J. West powerhouse.

No recent water quality data is available for the Stewarts Bridge Project area. However, a 1997 report on water quality report and included in the FMPEIS provides some water quality data collected from the Stewarts Bridge Project reservoir and downstream (KA, 1997). For the sampling sites within the project reservoir: dissolved oxygen (DO) ranged from 1.4 milligrams per liter (mg/l) to 8.7 mg/l<sup>4</sup>; temperature ranged from 9.0° Centigrade (C) to 24.5°C; and pH ranged from 6.9 to 7.2. The lower readings for DO (< 2.0 mg/l) and temperature (9.0°C) indicate that the project reservoir was thermally stratified at the time these low readings were taken. The pH did not vary much over depth ranging from 6.9 to 7.2. In regard to nutrients, the Stewarts Bridge reservoir is nutrient poor particularly for phosphorus and nitrate + nitrite (FERC, 2001).

For the tailwaters below the Stewarts Bridge Project and the Sacandaga River downstream, 1997 data indicated the measured DO levels were well above standards

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<sup>4</sup> For non-trout waters, the state standard is a minimum daily average of not less than 5.0 mg/l and at no time shall DO levels be less than 4.0 mg/l. For trout waters these values are 6.0 mg/l and 5.0 mg/l, respectively.

even during periods of non-generation (KA, 1997). The basis for this is that the powerhouse intake draws water from the top 25 feet of the project impoundment where DO depletion does not occur (FERC, 2001). For downstream waters pH varied little with a recorded range of 7.0 to 7.2.

### **Fisheries Resources**

Common game species reported from the Stewarts Bridge Project reservoir include smallmouth bass, rock bass, and yellow perch; non-game species include carp and various minnow species (FERC, 2001). Spawning habitat is abundant along the reservoir shoreline for centrarchids (sunfishes) and yellow perch. However, spawning habitat for walleye is limited and along with low primary productivity of the project reservoir contributes to the small population in the project reservoir. The best walleye spawning habitat is reported to occur in the tailrace of the E.J. West powerhouse and tributaries to the project reservoir (FERC, 2001).

Collections of fish taken from the tailwaters of the Stewarts Bridge Project revealed 27 specimens from nine species, with smallmouth bass and longnose dace being the most abundant (FERC, 2001). Some trout are reported to occur in the project tailwaters even though this reach is not classified as "trout waters" by the NYDEC. It is suspected that these trout entered this reach from tributaries or from stockings upstream of the E.J. West Project.

#### **3.3.2.1 Environmental Effects**

The installation of the second proposed turbine would increase the maximum hydraulic capacity of the project by 350 cfs or about six percent. However, the best gate hydraulic capacity for the new turbine would be 325 cfs, which, when combined with the 25 cfs downstream fish passage flow released through the spillway, provides the maximum baseflow required under Article 405. Even with the greater hydraulic capacity, the licensee intends to continue to release a target flow of 4,000 cfs when the main unit is operating, though the flow may be passed through the main turbine only or through a combination of both powerhouses.

#### *Our Analysis*

The installation of the new turbine will not change flow releases required by the project license and therefore the licensee's proposal would have no impact upon water quantity. However, releasing the required baseflow through a turbine rather than through the spillway or other means may affect water quality and fisheries as discussed below.

## **Water Quality and Fisheries**

### **Construction Effects**

Construction of the new powerhouse for the base flow generating unit will occur downstream of the existing powerhouse and adjacent to the tailrace in a previously disturbed area with sparse vegetation. A tap off of the existing penstock will supply flow to the new base flow unit. Construction activities for these facilities will take place downstream of the project dam and reservoir.

Construction of the powerhouse for the base flow unit and penstock will necessitate excavation of about 8,800 cubic yards of material. Additional excavation of the tailrace is proposed. These exposed areas have the potential during runoff events to contribute sediments to the tailwaters resulting in turbidity thereby affecting water clarity with the potential to exceed state water quality standards for turbidity. Deposition of these sediments would affect aquatic habitat and the fish resource. Further, during construction activities spills of fuel and other petroleum products and wet concrete could enter and contaminate the tailwaters and downstream. The licensee is proposing to adhere to the conditions of the existing WQC regarding construction activities that would include sediment analysis, placement and maintenance of erosion and sediment control measures, to include silt fences, straw bale dikes, and sedimentation basins and sediment monitoring. Turbidity curtains could be used during the excavation of the tailrace area.

### *Our Analysis*

The licensee proposes to excavate an area of about 46.5 feet long by 36 feet wide for the new base flow unit powerhouse and conduct additional excavation of the tailrace ranging from 8 to 20 feet wide by 95 feet long adjacent to the existing tailrace. A sheetpile cofferdam to provide a dry work area will be used during final excavation of the powerhouse foundation and the tailrace; this cofferdam will be removed once construction is completed for these facilities. There would be no dewatering of the tailrace during construction of the base flow unit powerhouse. Therefore, there would no potential stranding of fish and associated mortality.

Any construction related impacts to water quality would occur downstream of the project dam and reservoir. Since the proposed amendment would not require any construction activity on the project dam and intake, there would be no impacts to the water quality of the project reservoir. The licensee's implementation of the conditions of the current WQC and compliance with Article 19<sup>5</sup> of the license would minimize impacts

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<sup>5</sup> Form L-3 54 FPC 1817 (October 1975), Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States.

to water quality, aquatic habitat, and fisheries from turbidity and sedimentation. Therefore, any impacts to water quality and fisheries caused by construction of the base flow unit would be short-term and minor.

### Operational Effects

Operation of the project with the proposed base flow unit is not expected to affect the water quality of the project reservoir nor the water quality in the tailwaters and downstream.

### *Our Analysis*

Operation of the base flow unit would not require changes to the project intake works as licensed; therefore, the project would continue to withdraw water from the top 25 feet of the project reservoir for generation. DO depletion does not occur in this top 25 feet of the reservoir and as a result, release of this water through the existing project turbine/generator and the proposed base flow unit is not expected to affect water quality standards downstream for DO and temperature. Further, operation of the base flow unit when the main project unit is off-line may help prevent stagnation, i.e. the degradation of water quality downstream of the project. Thus, there would be no expected adverse impact to water quality within the project impoundment and downstream of the project caused by operation of the base flow unit.

Release of the required base flow pursuant to Article 405 through the new unit would not adversely impact habitat conditions for fish and aquatic invertebrates in the tailwaters and downstream of the project. Habitat stability and quality would be improved along with an increase in habitat quantity with this continuous release.

### **Fish Entrainment**

In order to protect against entrainment of resident fish into the project turbines the licensee has installed, pursuant to license Article 404, a 1-inch clear spaced trash rack on the existing intake structure. This feature was the result of negotiations among the participants in the Settlement. The existing structure will also serve as the intake for the new base flow unit. In order to protect the fishery resource from entrainment and potential mortality, an approach velocity of 2.0 feet per second (fps) is usually required by the resource agencies. However, at times, operation of the base flow unit in combination with the main unit at maximum hydraulic capacity may cause approach velocities exceeding 2.0 fps. Approach velocities in excess of 2.0 fps could contribute to an increase in impingement and entrainment related mortalities. Fish that are able to escape the high intake approach velocities could pass downstream via one of the Tainter gates modified to serve as a passage way for downstream movement for fish. The licensee is currently required to release 25 cfs through this facility.

## *Our Analysis*

Operation of the single main unit in combination with the new base flow unit will increase the volume of water passing through generating units thereby increasing the potential for fish entrainment injury and mortality. Currently, the approach velocity with the main unit operating is about 2.0 fps, one foot in front of the trashracks at a normal average flow of 4,000 cfs. This flow would increase to 4,325 cfs with the combination of the main unit and base flow unit operating with some minor increase in approach velocity. However, operation of the project (both units) at the maximum hydraulic capacity of 6,000 cfs could increase the approach velocity to 3.0 fps or greater. The licensee has provided generation data for the years 2008 to 2010 which showed that turbine discharge above 5,000 cfs occurred only 0.4 percent of the time during this period and at no time did turbine discharge exceed the licensed maximum hydraulic capacity of 5,650 cfs. Further, the licensee adds that operating the project in the maximum hydraulic capacity range is not desirable from an efficiency and equipment maintenance standpoint.

The 1-inch screens over the trashracks should prevent most size fish from entering the intake; however, the smaller and weaker swimming fish may not be able to escape entrainment or being impinged on the screens. If the project is operated in maximum hydraulic capacity range, approach velocities would likely reach 3.0 fps or greater and contribute to an increase in entrainment and impingement mortalities. However, the licensee points out that operating the project in the maximum hydraulic capacity range is not desirable. Further, the project is equipped with a downstream passage facility and the project intake is not located in a cul desac (dead end). These features would provide a means for fish to escape impingement and entrainment. For most of the year approach velocities under normal operation should be less than the 2.0 fps. While there may be some incremental increase in entrainment and impingement mortality when both units are operating at maximum hydraulic capacity, this increase is not expected to be significant because project operation at this level would be rare, and undesirable from an operations standpoint.<sup>6</sup> The FWS in a letter dated September 2, 2010, stated that since the base flow unit is served by the same water conveyance intake with 1 inch clear-spaced trashracks to the main existing unit it has no concerns regarding fish protection or downstream passage.

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<sup>6</sup> The 2001 FMPEIS analyzes turbine mortality occurring at the project.



### **3.3.3 Terrestrial Resources**

#### **3.3.3.1 Affected Environment**

##### **Vegetation**

The project lies in the southeastern portion of the Adirondack State park which is within the Oak-Northern Hardwood zone. Upland forest communities dominate the overall vegetative makeup in this area of the Sacandaga River. Cover communities consist of deciduous (hardwood) or coniferous (softwood) species or a mixture of the two. (FERC, 2001)

The proposed new powerhouse would be constructed in a small, previously-disturbed area near the existing powerhouse. This area is currently utilized as the Stewarts Bridge powerhouse parking area and is adjacent to the existing substation. This area is currently paved or mowed and the steep slope down from this area to the tailrace is covered with rip rap. The area that would be affected by construction activities is sparsely vegetated with grass, weeds, and herbaceous vegetation.

##### **Wildlife**

A diverse assemblage of wildlife is found on or near the project waters. Mammals found in the region include black bear, white-tailed deer, coyote, river otter, mink, fisher, beaver, raccoon, opossum, bobcat, bats, rodents, and rabbits. Reptile and amphibian wildlife include wood frog, redback salamander, northern dusky salamander, painted turtle, snapping turtle, and American toad.

In addition to the above wildlife, the FMPEIS concluded that the bald eagle has been documented within the project area. The 2010 New York State Bald Eagle Report states that the Upper Hudson River and associated tributaries, including the Sacandaga River from Lake Luzerne, NY (the nearest town to the Stewarts Bridge Project) to Albany, NY, host eagles each winter (NYDEC, 2010). According to the report, the 2010 mid-winter survey recorded 14 bald eagles in the area of the Upper Hudson River and associated tributaries.

#### **3.3.3.2 Environmental Effects**

##### **Vegetation**

The proposed new powerhouse would be constructed in a small, previously-disturbed area near the existing powerhouse. As described above, this area is currently paved or mowed and the steep slope down from this area to the tailrace is covered with rip rap. Construction activities would require excavation and removal of existing vegetation in the area of the new powerhouse and penstock. Areas up to 18,000 square

feet would be disturbed for staging and construction activities. The licensee states that no trees would be removed and that construction, including staging areas, would be confined to areas previously disturbed. The licensee states that following construction, the weedy and herbaceous vegetation will passively reestablish and will be maintained similar to current conditions (mowed). The licensee has identified a potential site for additional staging, if necessary. This area would require grading and removal of grass. If used, the licensee states that it would be regraded and revegetated following completion of construction.

### *Our Analysis*

The area for the new powerhouse and penstock is currently either paved or mowed. Therefore construction activities will have only minor temporary impacts to existing vegetation which is of a grass and weedy herbaceous nature. If additional clearing of vegetation is necessary, the licensee has identified an area that is currently vegetated with grass which would be revegetated following construction. Based on this, the proposed action will not have an adverse impact on vegetation in the project area.

### **Wildlife**

The licensee states that construction activities associated with the new powerhouse and penstock extension will utilize the existing access road and suitable lay down area adjacent to the existing powerhouse. The licensee would comply with the impoundment fluctuation restrictions of the license during construction and states that there would be no impacts to shoreline habitat. The licensee states that impacts to wildlife during construction would be from noise and construction traffic.

In comments on the amendment application, the FWS stated that the licensee should implement measures and educational signage to protect any wintering bald eagles during the proposed construction activities. The licensee developed a Bald Eagle Protection Plan, in consultation with the FWS, to address any potential impacts to wintering bald eagles. The plan includes adhering to FWS guidelines for the construction activity and specifically avoiding construction activities within 660 feet of a bald eagle nest. There are no known bald eagle nests within 660 feet of the proposed construction area. The licensee proposes to conduct visual scans of the area within 660 feet of construction activities monthly (November through March) and contact the FWS and NYDEC if a bald eagle nest or communal roost area is identified.

The plan also includes placing educational signage at three public-access locations at the project. The licensee includes in its proposed plan draft language for the signs and states that the design would be finalized in consultation with the FWS and NYDEC. The licensee proposes to install the signs by October 31, 2011.

## *Our Analysis*

The immediate area where the new penstock and powerhouse will be constructed is actively used as a parking lot and for other project structures. Therefore, this area does not represent suitable habitat for wildlife and construction activities would not result in any habitat loss. Construction activities have the potential to affect wildlife with the presence and movement of heavy equipment. The noise related with construction has the potential to scare wildlife away from the immediate area, but this impact would be minor and temporary with wildlife likely to return following completion of construction activities. Implementing the proposed Bald Eagle Protection Plan would protect bald eagles during construction activities and educate visitors about bald eagles.

### **3.3.4 Recreational Resources**

#### **3.3.4.1 Affected Environment**

Recreational facilities at the project include a canoe take-out and put-in portage trail, a raft launch area and a raft take-out area, two day-use areas, and campsites. Downstream from the Project, a popular and regionally significant reach of Class II-III whitewater exists on the Sacandaga River (FERC, 2001). The reach consists of 3 miles of free-flowing river from the Stewarts Bridge dam to the confluence with the Hudson River. Numerous commercial rafting outfitters provide access to whitewater rafting activities on this segment of the Sacandaga River. The typical project discharge during periods of generation, 4,000 cfs, makes this downstream reach of the Sacandaga River suitable for more experienced paddlers. As such, the generation schedule for Stewarts Bridge is dictated in part by the schedule for the provision of whitewater releases outlined in license Article 408 and Section 5.5 of the Settlement.

#### **3.3.4.2 Environmental Effects**

The licensee states that use of the tailrace area for recreational fishing is mostly precluded by terrain and access. If any angler use of the river downstream of the existing powerhouse does occur, access could be restricted during construction for safety reasons. The licensee states that recreational access would be restored following completion of construction.

The licensee held an informational meeting on August 26, 2010. During the meeting, several commercial whitewater outfitters expressed concern about potential disruptions to whitewater operations through construction-related flow disruptions or water quality impacts, or as the result of construction traffic near put-ins. The licensee states that because there are no anticipated disruptions to flows during construction, impacts to whitewater release schedules or water quality are not expected to result from construction or operation of the base flow unit.

It is possible that the licensee would have to limit access to certain areas in the immediate area of construction for safety related issues. The licensee states that it will maintain close communication and coordination with the commercial outfitters during construction planning and execution. The licensee would identify any potential disruptions to recreational access or public safety associated with construction activities; deploy physical public safety measures, as appropriate; and notify the public of any anticipated disruptions to recreational access. The licensee states that any disruptions to recreational use of the Sacandaga River associated with construction activities would be limited to the immediate construction area and would be short-term in nature.

### *Our Analysis*

Activities associated with the construction of the new powerhouse and penstock could result in temporary disruptions in access to the tailrace for fishing and to boat put-in and take-out sites near the dam and powerhouse. The boat put-in and take-out facilities appear to be sufficiently far away from the construction areas such that they will not be affected. However, traffic related to construction and the maneuvering of heavy equipment could require access to be interrupted temporarily. In addition, access to the tailrace during construction could present a safety risk. The licensee plans to identify any safety issues and use signage and physical barriers to ensure public safety. The licensee agrees to communicate with commercial outfitters and notify the public of any anticipated disruptions to recreational access. These measures should ensure that any impact to recreation would be short-term and temporary. The proposed action would not have a significant impact on recreational resources at the project.

## **4.0 DEVELOPMENTAL ANALYSIS**

In this section, we look at the licensee's proposed action and alternative to the proposed action to compare differences in the project's costs and power generation. In keeping with Commission policy as described in *Mead Corporation, Publishing Paper Division* (72 FERC ¶ 61,027, July 13, 1995), our economic analysis is based on current costs with no consideration for potential future inflation or escalation.

Our economic analysis helps to support an informed decision concerning what is in the public interest with respect to a proposed license amendment. However, our economic analysis is not a determination that any action is reasonable or prudent.

### **No-Action**

Under the No-Action Alternative, the base flow would be released through the spillway and the second powerhouse would not be constructed. Because this flow would not be used to generate electricity, the project would not realize the benefit of additional generation.

## **Proposed Action**

The licensee proposes to install a new powerhouse and turbine at an estimated capital cost of \$8,000,000. This capital cost results in an average, annualized cost of \$574,340.<sup>7</sup> The licensee did not provide an operation and maintenance cost for the proposed addition.

Operation of the new powerhouse and turbine would enable the licensee to produce power from the base flow, which would otherwise be lost to generation if the water was released through the spillway. The licensee estimates that project operation with the base flow turbine would result in an increase in annual generation of approximately 11,440 MWh. Using the same energy value of \$50.78/MWh as used in the no-action alternative, this additional generation would be valued at \$580,920 annually. Therefore, the net benefit of the licensee's proposed action, including total capital costs and generation benefits, would be approximately \$6,580 annually.

## **5.0 STAFF'S CONCLUSIONS**

### **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 the 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 will be best adapted to a comprehensive plan for improving or developing the waterway. This section contains the basis for, and a summary of, our recommendations for conditions to be included in any amendment to the license for the Stewarts Bridge Project.

Based on our independent review and evaluation of the environmental and economic effects of: the proposed action; the proposed action with additional staff modifications; and the no-action alternative, we recommend the proposed with additional staff recommended measures, as the preferred alternative. We recommend this alternative because: (1) issuing an amendment to the project license would allow the licensee to continue operating the project as a beneficial and dependable source of electric energy; (2) the project, with an increased installed capacity of 2.55 MW would eliminate the need for an equivalent amount of fossil-fuel-produced energy and capacity,

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<sup>7</sup> The capital cost was annualized over a 31 year period, which is the remaining term of the project license, using an interest rate of 6 percent.

which helps conserve these nonrenewable resources; and (3) the proposed and staff-recommended environmental measures would protect project resources.

### **5.1.1 Measures Proposed by the Licensee**

We recommend including the following environmental measures proposed by Erie, in any amended license issued by the Commission for the Stewarts Bridge Project:

The licensee proposes to minimize soil erosion and any resultant impacts to water quality and aquatic resources by implementing a plan with measures to control runoff from areas (powerhouse and penstock) disturbed by construction activities. As part of this plan the licensee proposes to revegetate disturbed areas. An erosion and sediment control plan would be required to be submitted to the Commission's New York Regional Office as part of the plans and specifications prior to commencement of construction.

Traffic related to construction and maneuvering of heavy equipment could require access to the tailrace for fishing and to the boat put-in and take-out sties near the dam and powerhouse to be interrupted temporarily. In addition, access to the tailrace during construction could present a safety risk. The licensee plans to identify any safety issues and use signage and physical barriers to ensure public safety. The licensee agrees to communicate with commercial outfitters and notify the public of any anticipated disruptions to recreational access during project construction.

Bald eagles have been documented to winter in the project area. To protect these wintering bald eagles the licensee should implement the measures included in their proposed Bald Eagle Protection Plan including installing educational signage and monitoring for nests during construction activities.

### **5.1.2 Additional Measures Recommended by Staff**

While no federally listed species have been identified in the project area, listed species could be discovered in the project area during construction. Therefore, to ensure the protection of listed species, the licensee should periodically check the FWS website for current updated information regarding listed species and notify the Commission and the FWS in the event that new information suggests that listed species could be affected by the proposed action. If listed species are affected by the proposed action, the licensee should stop construction activities until an evaluation is conducted and a determination is made on what protection measures are necessary, if any, before construction can resume.

## **5.2 UNAVOIDABLE ADVERSE EFFECTS**

None.

### **5.3 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 8 state and 2 federal plans that are applicable to the Stewarts Bridge Project, listed below. No inconsistencies were found.

Adirondack Park Agency. 1985. Adirondack Park state land master plan. Ray Brook, New York. January 1985. 78 pp.

Adirondack Park Agency. Undated. New York State wild, scenic, and recreational rivers system field investigation summaries. Albany, New York. 21 reports.

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.

New York State Department of Environmental Conservation. 1985. New York State Wild, Scenic, and Recreational River System Act. Albany, New York. March 1985. 22 pp.

New York State 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. 27 pp.

New York State Executive Law. 1981. Article 27 - Adirondack Park Agency Act. Albany, New York. July 15, 1981. 65 pp.

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.

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U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

### **6.0 FINDING OF NO SIGNIFICANT IMPACT**

Given the nature of the project area and scope of the proposed non-capacity related amendment to the Stewarts Bridge Project, approval of this amendment, with

measures proposed by the licensee and recommended by Commission staff, would not cause long term significant environment effects. Therefore, based on our independent analysis, approval of this amendment would not constitute a major federal action significantly affecting the quality of the human environment.

## **7.0 LITERATURE CITED**

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## **8.0 LIST OF PREPARERS**

John Novak—Project Coordination (B.S., Biology; M.S., Zoology)

Rachel Price—Terrestrial, Recreation, Cultural and Historic, Endangered Species (M.S., Environmental Science; Master of Public Affairs; B.S., Environmental Policy and Planning)

Steven Sachs—Geology and Soils, Water Quantity, Economics (B.S., Environmental Systems Engineering)



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