FINAL MULTIPLE PROJECT ENVIRONMENTAL ASSESSMENT FOR HYDROPOWER LICENSES

RAQUETTE RIVER PROJECTS

Carry Falls Project
FERC Project No. 2060-005

Upper Raquette River Project
FERC Project No. 2084-020

Middle Raquette River Project
FERC Project No. 2320-005

Lower Raquette River Project
FERC Project No. 2330-007

Potsdam Water Power Project
FERC Project No. 2869-007

New York

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Environmental and Engineering Review
888 First Street, NE
Washington, D.C. 20246

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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
Advisory Council	Advisory Council on Historic Preservation
BIA	Bureau of Indian Affairs
cfs	cubic feet per second
CRMP	Cultural Resources Management Plan
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
DO	dissolved oxygen
Erie	Erie Boulevard Hydropower (Orion Power New York)
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
FWS	U.S. Fish and Wildlife Service
GWh	gigawatt-hour
IA	Ichthyological Associates
Interior	U.S. Department of the Interior
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
MPEA	multiple project environmental assessment
msl	mean sea level
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
NMPC	Niagara Mohawk Power Corporation
NYISO	New York Independent System Operator
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PA	programmatic agreement
RM	river mile
ROR	run-of-river
RRAC	Raquette River Advisory Council
SD1	scoping document 1

SD2	scoping document 2
Settlement	Settlement Offer dated March 13, 1998
SHCC	System Hydro Control Center
SHPO	State Historic Preservation Officer
WQC	Water Quality Certification

SUMMARY

On December 24, 1991, Niagara Mohawk Power Corporation[1](NMPC) filed applications with the Federal Energy Regulatory Commission (FERC or Commission) for major new licenses for the 47,073-kilowatt (kW) Middle Raquette River Project (FERC No. 2320) and the 12,000-kW Lower Raquette River Project (FERC No. 2330). The projects each include four developments: Higley, Colton, Hannawa, and Sugar Island, and Norwood, East Norfolk, Norfolk, and Raymondville, respectively. The projects are located on the Raquette River in St. Lawrence County, New York. The current licenses for the projects expired on December 31, 1993. Erie proposes to construct a new powerhouse with a capacity increase of 2,328 kW at the Higley development of the Middle Raquette River Project. Erie does not propose any new capacity at the Lower Raquette River Project.

On January 28, 1999, Erie filed applications for major new licenses for the Carry Falls Project (FERC No. 2060) and the 102,389-kW Upper Raquette River Project (FERC No. 2084). The Carry Falls Project consists of one storage reservoir, and the Upper Raquette River Project includes five developments: Stark, Blake, Rainbow, Five Falls, and South Colton. The projects are located on the Raquette River in St. Lawrence County, New York. The current licenses for the projects expire on January 31, 2001, and January 31, 2002, respectively. No new capacity is proposed at either project.

During the pending proceedings for the Middle Raquette River and Lower Raquette River Projects, the New York State Department of Environmental Conservation (NYSDEC) denied, without prejudice, NMPC's applications for water quality certification (WQC) for these two projects, pursuant to section 401 of the Clean Water Act. NMPC appealed NYSDEC's denials through the state administrative hearing process beginning in 1992. This appeal led to settlement discussions to resolve issues that would enable NYSDEC to issue WQCs for the four Raquette River Projects.

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[1] On July 26, 1999, the Commission issued an order approving the transfer of this project, along with others, from NMPC to Erie Boulevard Hydropower L.P. (Erie), 88 FERC ¶ 62,082.

By letter dated December 13, 1995, the Commission approved the proposal to proceed with settlement discussions, which were proposed to include the Carry Falls, Upper Raquette River, Middle Raquette River, and Lower Raquette River Projects. To allow the inclusion of the Upper Raquette River Project in the discussions, the Commission waived regulations barring notice of intent to file for relicense earlier than the 5½ years from the date of license expiration for the Upper Raquette River Project.

The settlement discussions that occurred between November 1995 and February 1998 culminated in a final settlement document entitled "Settlement Offer - March 13, 1998, Raquette River Projects, FERC Project Numbers 2060, 2084, 2320, and 2330" (Settlement) signed by 17 parties and filed with the Commission on April 22, 1998. Subsequent to the Settlement, NYSDEC issued section 401 WQCs for all four projects on June 11, 1998. NMPC adopted the provisions of the Settlement in its license applications for the Carry Falls and Upper Raquette River Projects. NMPC also revised its applications for the Middle and Lower Raquette River Projects according to the provisions of the Settlement filed on April 22, 1998.

In this multiple project environmental assessment (MPEA), we analyze and evaluate the effects associated with the issuance of new licenses for the existing hydropower developments, and recommend conditions for inclusion in any licenses issued. For any license issued, the Commission must determine that the project adopted will be best adapted to a comprehensive plan for improving or developing the waterway. In addition to the power and development purposes for which licenses are issued, the Commission must give equal consideration to energy conservation, the protection and enhancement of fish and wildlife, aesthetics, cultural resources, and the protection of recreational opportunities. This MPEA for the Raquette River Projects reflects the staff's consideration of these factors.

Based on our consideration of all developmental and nondevelopmental resource interests related to the projects, the following measures to protect and enhance environmental resource values should be included in any licenses issued for the Raquette River Projects: (1) prepare site-specific erosion and sediment control plans for proposed construction activities; (2) operate the projects in a store and release mode; (3) maintain instream flows, and seasonal flows for walleye, in all the developments except Higley, Norwood, and Raymondville; (4) limit normal reservoir fluctuations at all developments: (5) implement a new rule curve at Carry Falls that

limits drawdowns to the 1,355.0 foot elevation; (6) maintain a base flow below Raymondville of at least 560 cubic feet per second (cfs) in wet and normal years, 290 cfs in dry years, and inflow in drought years; (7) plan and implement a streamflow monitoring system; (8) provide final flow structures and other specific measures to facilitate downstream fish movement at all developments; (9) install 1-inch trashracks to replace existing trashracks at all developments except Sugar Island; (10) provide scheduled whitewater releases based on an annual whitewater budget and a flow notification system at the Colton, Hannawa, and Sugar Island developments; (11) develop and implement a final recreation plan that includes canoe portage around all developments of all four projects, the cooperative development of primitive and whitewater access trails, modification of project boundaries to include all lands occupied by Erie's recreational facilities, and measures to minimize disturbance to potential bald eagle habitat; and (12) amend and implement the provisions of the Programmatic Agreement for the protection of cultural resources.

We recommend these environmental measures to protect and enhance water quality, fisheries, terrestrial, recreational, and cultural resources. In addition, the electricity generated from the projects would be beneficial because it would continue to reduce the use of fossil-fuel, electric generating plants; conserve nonrenewable energy resources; and continue to reduce atmospheric pollution.

Pursuant to section 10(j) of the Federal Power Act (FPA), we determine that the recommendations of the federal and state fish and wildlife agencies are consistent with the purposes and requirements of Part I of the FPA and applicable law. Section 10(j) of the FPA requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies, for the protection and enhancement of fish and wildlife resources. The U.S. Department of the Interior (Interior) filed section 10(j) recommendations on September 9, 1999. All recommendations made by Interior within the scope of section 10(j) have been incorporated into the Settlement. Thus, we have addressed the concerns of the federal and state fish and wildlife agencies and made recommendations consistent with those of the agencies.

Under section 18 of the FPA, Interior requested that the Commission reserve Interior's authority to prescribe the construction, operation, monitoring, and maintenance of fishways at the projects. The fishway conditions included measures to evaluate the need for fishways and to determine, ensure, or improve the effectiveness

of such fishways, for any fish species to be managed, enhanced, protected, or restored to the basin during the term of the licenses.

Based on our independent analysis of the projects, including our consideration of all relevant economic and environmental concerns, we conclude that: (1) the Carry Falls, Upper Raquette River, Middle Raquette River, and Lower Raquette River Projects, as proposed in the Settlement and with other special license conditions, would be best adapted to a comprehensive plan for the proper use, conservation, and development of the Raquette River; and (2) issuance of a new license for each project would not constitute a major federal action significantly affecting the quality of the human environment.

This MPEA also considers the merits of amending the exemption held by the village of Potsdam (Potsdam) for the Potsdam Water Power Project. On June 22, 1998, Potsdam filed an amendment to its exemption proposing to construct a new powerhouse on the West dam and add new installed capacity of 700 kW. Potsdam filed additional information on January 4, 1999, and again on August 24, 1999. The Potsdam Water Power Project backwaters the Sugar Island development of the Middle Raquette River Project. NYSDEC and Interior filed terms and conditions on October 12 and 14, 1999, respectively, that require no change in the current run-of-river (ROR) operation and reservoir elevations as a result of any Commission action on the proposed amendment. We analyze the effects of issuing an amendment to Potsdam on the ability of Erie to implement the provisions of the Settlement. We conclude that use of a 1-foot-high inflatable flashboard on the West dam, as proposed by Potsdam, would enable Potsdam to implement the proposed capacity upgrade while maintaining the current reservoir levels for the protection of aquatic habitat downstream of Erie's Sugar Island development.

FINAL MULTIPLE PROJECT ENVIRONMENTAL ASSESSMENT
FEDERAL ENERGY REGULATORY COMMISSION

OFFICE OF ENERGY PROJECTS
DIVISION OF ENVIRONMENTAL AND ENGINEERING REVIEW

Carry Falls Project
FERC Project No. 2060-005

Upper Raquette River Project
FERC Project No. 2084-020

Middle Raquette River Project
FERC Project No. 2320-005

Lower Raquette River Project
FERC Project No. 2330-007

Potsdam Water Power Project
FERC Project No. 2869-007

INTRODUCTION

The Federal Energy Regulatory Commission (Commission) issued the Raquette River Projects Draft Multiple Project Environmental Assessment (MPEA) for comment on June 16, 2000. In response, we received five comment letters. The comment letters are listed in section IV.B, Comments on the Draft MPEA. All timely-filed comment letters were reviewed by the staff. We include the comment letters, and identify the sections of the MPEA that have been modified as a result of the comments received, in Appendix A.

I. APPLICATION

A. Carry Falls Project

On January 28, 1999, Niagara Mohawk Power Corporation (NMPC or Niagara) filed an application for a new license for its Carry Falls Project, FERC No. 2060. The existing storage reservoir is located between river miles (RM) 75 and 68 on the Raquette River in the town of Colton in St. Lawrence County, New York. The

existing license for the project expires on January 31, 2001.

B. Upper Raquette River Project

On January 28, 1999, NMPC filed an application for a new license for its Upper Raquette River Project, FERC No. 2084. The project consists of five developments with a total installed capacity of 102,389 kilowatts (kW) located between RM 68 to 52 on the Raquette River in the towns of Colton and Parishville in St. Lawrence County, New York. The existing license for the project expires on January 31, 2002. Niagara proposes no new capacity at this project.

C. Middle Raquette River Project

On December 24, 1991, NMPC filed an application for a new license for its Middle Raquette River Project, FERC No. 2320. The project consists of four developments with a total installed capacity of 47,073 kW located between RM 47 and 38 on the Raquette River in the towns of Colton, Pierrepont, and Potsdam in St. Lawrence County, New York. The project license expired on December 31, 1993. The project is now operating under an annual license which went into effect when the original license expired, pursuant to section 15(a) of the Federal Power Act (FPA). Erie proposes to construct a new powerhouse with a capacity increase of 2,328 kW at the Higley development of the Middle Raquette River Project.

D. Lower Raquette River Project

On December 24, 1991, NMPC filed an application for a new license for its Lower Raquette River Project, FERC No. 2330. The project consists of four developments with a total installed capacity of 12,000 kW located between RM 28 and 20 on the Raquette River in the towns of Potsdam and Norwood in St. Lawrence County, New York. The project license expired on December 31, 1993. The project is now operating under an annual license which went into effect when the original license expired, pursuant to section 15(a) of the FPA. Erie proposes no new capacity at the Lower Raquette River Project.

E. Potsdam Water Power Project

On February 27, 1997, the village of Potsdam (Potsdam) filed an application for an original license for the construction of a new intake and powerhouse on the West dam. The Commission determined that the West dam is part of the "complete unit of development" of the Potsdam Water Power Project (FERC No. 2869) for which the Commission granted an exemption on May 15, 1981. Therefore, the Commission

directed Potsdam to refile its request as an amendment to the exemption. On June 22, 1998, Potsdam filed an application for amendment of its exemption, and subsequently filed additional information on January 4, 1999, and on August 24, 1999. The exempted project has an installed capacity of 800 kW and is located on the Raquette River at RM 35 in the town of Potsdam in St. Lawrence County, New York. Potsdam proposes to construct a new powerhouse to house a new generating unit with a capacity of 700 kW.

None of the projects occupy any lands of the United States. Figure 1 shows the locations of the five projects, and figure 2 shows the profile of the Raquette River with the elevations of Erie's projects.

During the pending proceedings on the Lower Raquette River and Middle Raquette River Projects, in November 1992, the New York State Department of Environmental Conservation (NYSDEC) had denied, without prejudice, NMPC's applications for water quality certification for these two projects. NMPC appealed NYSDEC's denials through the state administrative hearing process beginning in 1992 . This led to settlement discussions, which began in 1995, to resolve issues that would enable NYSDEC to issue water quality certificates (WQCs) for each of the four Raquette River Projects.[2] By letter dated December 13, 1995, the Commission approved the proposal to proceed with settlement discussions. To allow inclusion of the Upper Raquette River Project in the discussions, the Commission waived regulations barring notice of intent to file for relicense earlier than 5 ½ years from the date of license expiration for the Upper Raquette River Project.

The settlement discussions that occurred between November 1995 and February 1998 culminated in a final settlement document entitled "Settlement Offer - March 13, 1998, Raquette River Projects, FERC Project Numbers 2060, 2084, 2320, and 2330" (Settlement) signed by seventeen parties and filed with the Commission on April 22,

[2] NYSDEC's role in initiating and facilitating the settlement discussions for the Raquette River Projects is detailed in the Filing of Settlement Offer and This Separate Explanatory Statement filed by NMPC with the Commission on April 22, 1998.

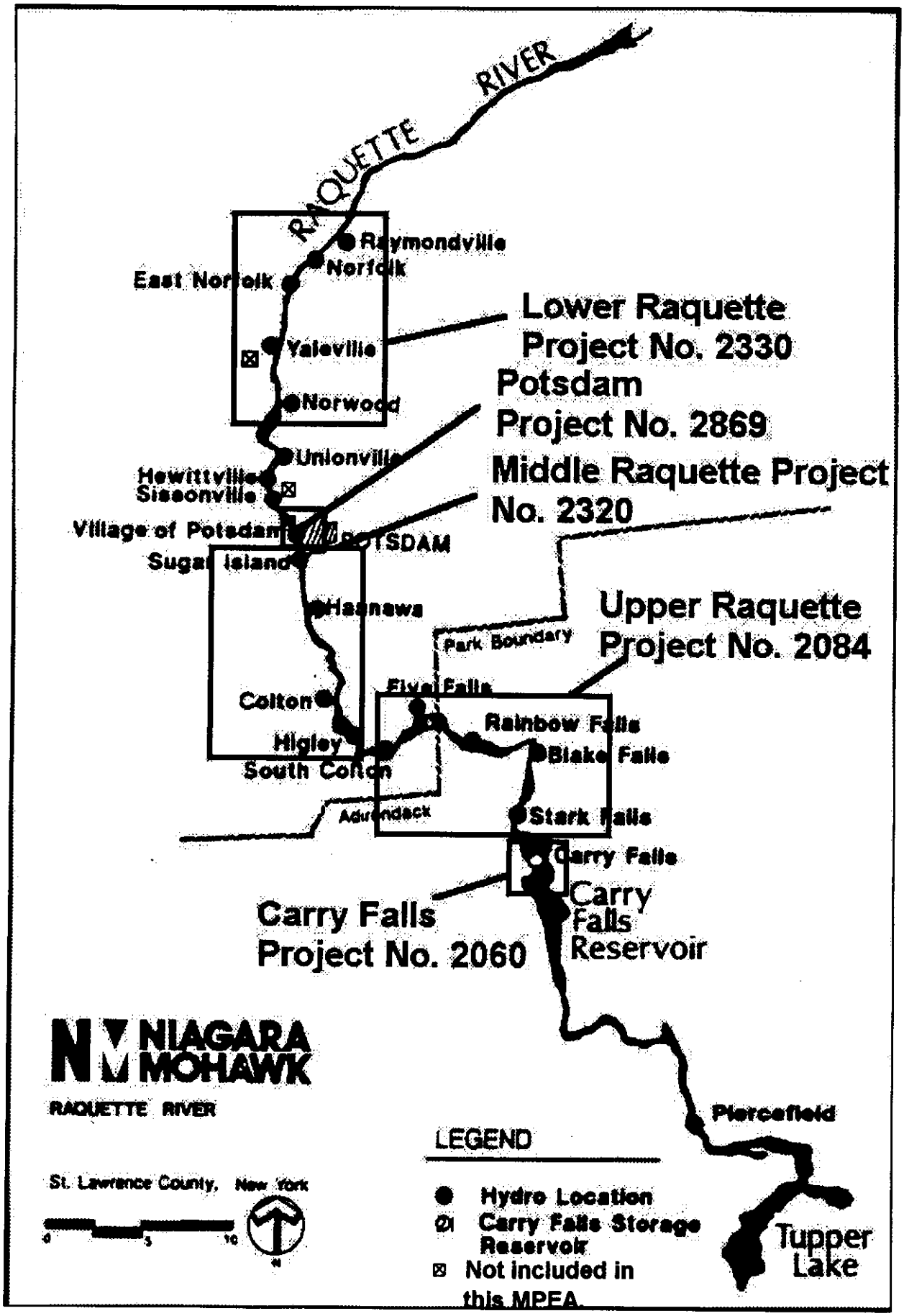
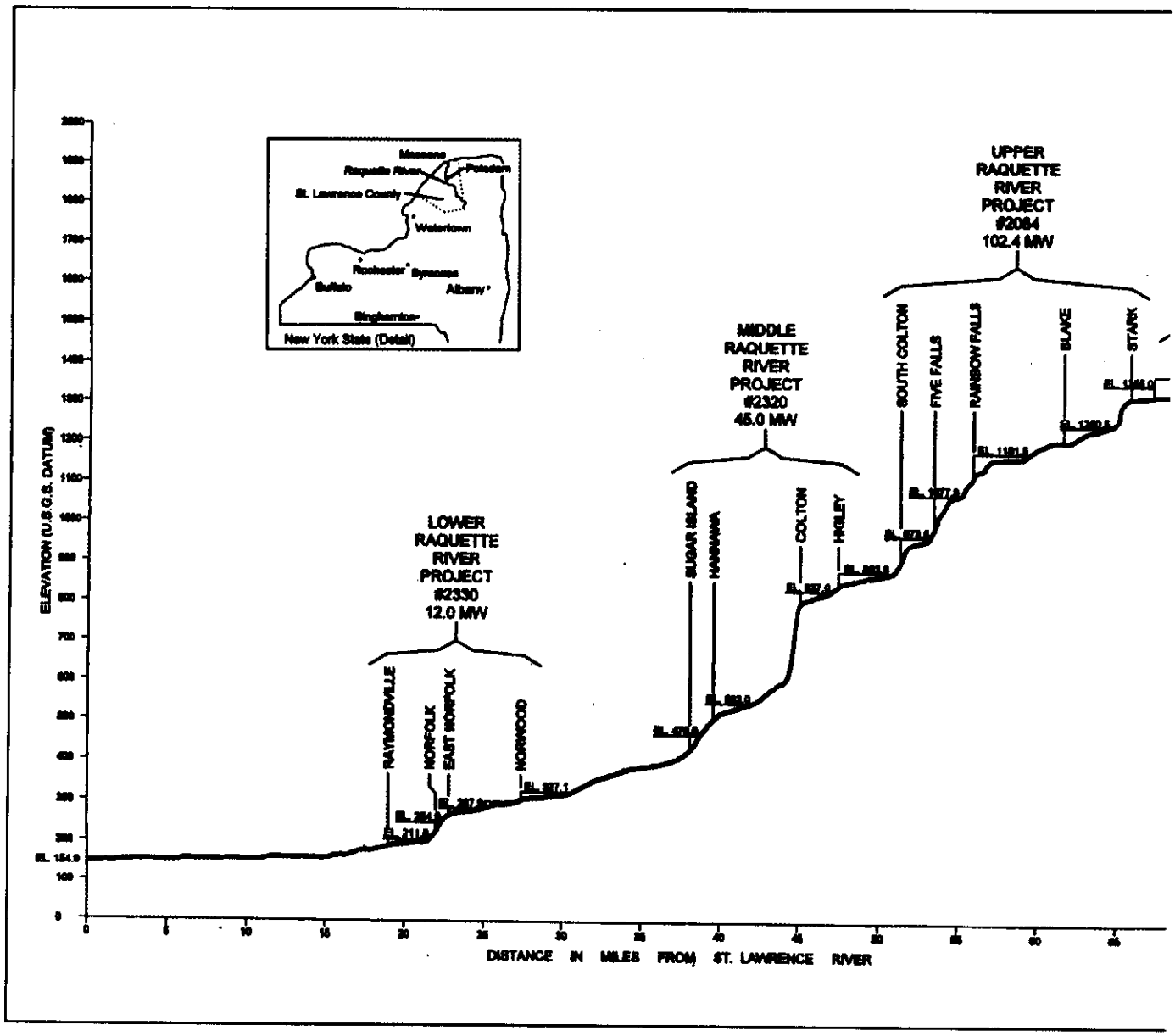

RAQUETTE RIVER
Raymondville
Norfolk
East Norfolk
Yaleville
Norwood
Unionville
Hewittville
Sissonville
Village of Potsdam
POTSDAM
Sugar Island
Hannawa
Colton
Higley
South Colton
Park Boundary
Adirondack
Rainbow Falls
Blake Falls
Stark Falls
Carry Falls
Lower Raquette
Project No. 2330
Potsdam
Project No. 2869
Middle Raquette Project
No. 2320
Upper Raquette
Project No. 2084
Carry Falls
Project No. 2060
Carry
Falls
Reservoir
Piercefield
Tupper
Lake
NIAGARA MOHAWK
RAQUETTE RIVER
St. Lawrence County, New York
LEGEND
Hydro Location
Carry Falls Storage Reservoir
Not included in this MPEA

Figure 1. Project location map (Source: NMPC, 1991a, as modified by staff)



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[3] The parties to the agreement are the Adirondack Mountain Club (ADK), American Canoe Association, American Rivers, American Whitewater, the National Audubon Society, the National Park Service, the New York State Adirondack Park Agency, the New York State Conservation Council, NYSDEC, New York Rivers

Figure 2. Raquette River profile (Source: NMPC, 1991a, as modified by staff)

1998.[3] NMPC adopted the provisions of the Settlement in its license applications for the Carry Falls and Upper Raquette River Projects. On June 11, 1998, NYSDEC issued WQCs, consistent with the provisions of the Settlement, for all four of Erie's Raquette River Projects.

We note that the Settlement resolves the outstanding issues identified during the scoping process for the Lower and Middle Raquette River Projects. Through the Settlement, Erie withdraws its proposals for new generating units at seven of the eight developments of the Lower and Middle Raquette River Projects (Settlement, section 2.16.1). The effects of the installation of and operation with these capacity upgrades on environmental resources are, therefore, not addressed. The Settlement also resolves the quantity and method of instream flow releases, the nature and extent of fish passage facilities, and the type and general location of recreational facilities at these projects.

The Settlement does not resolve cultural resource issues related to the St. Regis Mohawk Tribe.

The Settlement proposes recreational enhancements that are slightly different from, but generally consistent with, those originally proposed by NMPC for the Middle and Lower Raquette River Projects. Specifically, NMPC withdraws its original proposals for new or expanded fishing platforms, car-top boat launches and associated parking, and trash facilities in favor of the less intrusive primitive trails and canoe portages recommended in the Settlement. For the purposes of this final MPEA, we will consider the proposed enhancements contained in the Settlement to supersede the proposed enhancements in the license applications filed for the Middle and Lower Raquette River Projects.

United, Erie, the North Country Raquette River Advocates, St. Lawrence County, The Adirondack Council, The Association for the Protection of the Adirondacks, The Jordan Club, and the U.S. Fish and Wildlife Service (FWS). While not signatories to the Settlement, the New York Power Authority and Trout Unlimited had no objection to the Settlement provisions (letters from Thomas Matias, Trout Unlimited, and Beverly Ravitch, Principal Authority, New York Power Authority, New York, NY, to Betty Ann Hughes, NYSDEC, Albany, NY, dated March 3, 1998, and February 17, 1998, respectively).

II. PURPOSE AND NEED FOR ACTION

A. Purpose of Action

In deciding whether to issue any license, 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 development purposes for which licenses are issued, the Commission gives equal consideration to the purposes of energy conservation; protection of, mitigation of damage to, and enhancement of fish and wildlife; protection of recreational opportunities, and preservation of other aspects of environmental quality.

This final MPEA analyzes and evaluates the effects associated with the continued operation of the four projects owned and operated by Erie and the amendment to the one exempted project owned and operated by Potsdam, and recommends conditions for inclusion in any licenses issued or amendments granted.

B. Need for Power

To assess the need for power, we reviewed Erie's use of the project power for more than 70 years to date and in the future, together with that of the operating region in which the project is located.

The Raquette River Projects and the Potsdam Water Power Project are in the New York Independent System Operator (NYISO) area of the Northeast Power Coordinating Council (NPCC) Region of the North American Electric Reliability Council (NERC, 1998). NYISO forecasts an average annual growth rate of 1.0 percent for the 1998 to 2007 planning period.

The Raquette River Projects have historically generated an annual average of 831 gigawatt-hours (GWh) of power. Power has been sold to Erie's customers and would continue to be sold to customers regardless of future ownership of the projects by Erie. In addition, the projects displace nonrenewable fossil-fired generation and contribute to diversification of the generation mix in the NYISO area.

We conclude that present and future use of the projects' power, its displacement of nonrenewable fossil-fired generation, the contribution to a diversified generation mix, and the likelihood of shrinking reserve margins support a finding that the power from the Raquette River Projects will help meet a need for power in the NYISO area

in the short and long terms.

III. PROPOSED ACTIONS AND ALTERNATIVES

A. Carry Falls Project

1. Description of Existing Project

The existing Carry Falls Project consists of the following features: (1) an 826-foot-long dam consisting of: (a) a 568-foot-long and 76-foot-high concrete gravity spillway with a crest elevation of 1,386 feet U.S. Geological Survey (USGS) datum[4]; and (b) a 258-foot-long and 63-foot-high concrete gated non-overflow spillway with two 14.5-foot by 27-foot Taintor regulating gates, two 10-foot by 10-foot low-level sluice gates, and an intake structure with two 15-foot by 15-foot openings for future power installation; (2) five earth dikes totaling 2,500 feet in length, with lengths varying from 320 feet to 1,015 feet, maximum heights varying from 12 feet to 31 feet, and each with a crest width of 12 feet at elevation 1,392 feet; (3) a 7-mile-long reservoir with a 3,000-acre surface area and a 104,463-acre-foot usable storage capacity at normal maximum pool elevation 1,385 feet; and (4) appurtenant facilities (figure 3). The project has no installed generating capacity.

Carry Falls Project currently operates as a non-generating storage reservoir. The project provides seasonal and daily flow regulation to facilitate the peaking and load following operation of the Upper Raquette River Project, and to optimize efficient energy generation at the Colton development of the Middle Raquette River Project. The existing project operates within a range of 53 feet from elevation 1,385.0 feet to elevation 1,332.0 feet, based on a guide curve which provides a series of target elevations over the course of the year. As modified in 1971, the guide curve allows a spring drawdown to elevation 1,332.0 feet and a fall drawdown to elevation 1,352.0 feet. The downstream Stark development of the Upper Raquette River Project has a crest elevation of 1,355.0 feet (see figure 2). Therefore, drawdowns below 1,355 feet at the Carry Falls reservoir require drawdowns at the Stark reservoir. The existing license requires a minimum flow of 50 cubic feet per second (cfs), which is exceeded on a daily basis. Erie's System Hydro Control Center (SHCC), located in Liverpool, New York, regulates the existing operation of, and flows from, the project.

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[4] Throughout the remainder of this document, unless otherwise stated, all elevations are given in USGS datum.

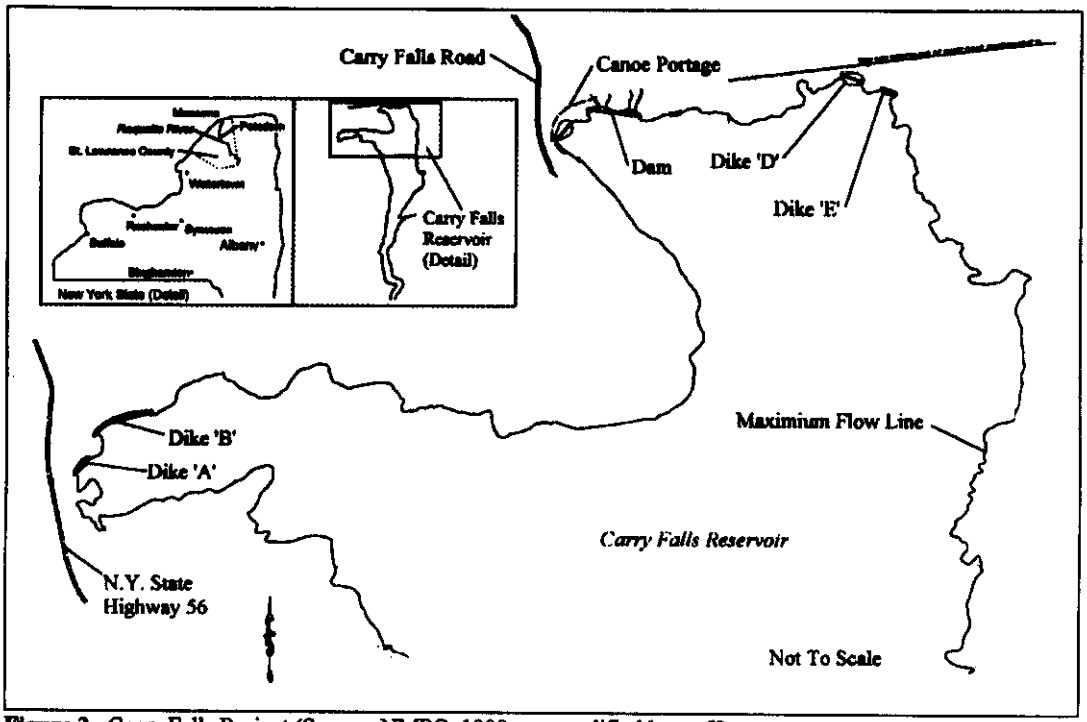

Figure 3. Carry Falls Project (Source: NMPC, 1999a, as modified by staff)

2. Applicant's Proposed Enhancement Measures

Erie, consistent with the Settlement, proposes to continue operating the Carry Falls Project as a storage reservoir with changes in operation according to the following proposed measures:

- implement a new guide curve that limits drawdowns as part of normal operations to 1,355.0 feet and that eliminates the need to draw down the Stark reservoir to achieve a drawdown at Carry Falls;

- discontinue site-specific instream flows and remove welded blocks that currently exist on the bottom of one of the low-level sluice gates; and

- maintain a tiered base flow below the Raymondville development[5] of 560 cfs during wet and normal conditions (outflows greater than 650 cfs and at elevations at or above 1,357.0 feet at Carry Falls), 290 cfs during dry conditions (daily average outflows less than 650 cfs and elevations at or above 1,357.0 feet at Carry Falls), and daily average inflow as measured at the Piercefield USGS gage during drought conditions (low flow and depleted storage at Carry Falls).

In addition, to protect and enhance project-related environmental resources, Erie proposes the following environmental measures for the Carry Falls Project:

- canoe portage from the right bank of the Jordan River to the right shore of the Carry Falls reservoir; and

- canoe portage around the Carry Falls dam and modification of the project boundary as necessary to include all Erie lands occupied by the portage trail.

3. Additional Staff-recommended Measures

The staff has not identified any reasonable action alternatives to the proposed

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[5] The Raymondville development (Lower Raquette River Project) is the most downstream hydroelectric development on the Raquette River.

project, other than various additional environmental measures, for assessment. The additional environmental measures that we evaluated, which are not part of Erie's proposal, include: (a) site-specific Erosion and Sediment Control Plans (ESCPs); (b) measures to minimize the effects of increased recreational boating use in the vicinity of potential bald eagle habitat; and (c) an amended Programmatic Agreement (PA) for the protection of cultural resources. We evaluate these measures, as appropriate, in section V.C.

B. Upper Raquette River Project

1. Description of Existing Project

The existing Upper Raquette River Project consists of five developments, which have a total installed capacity of 102,389 kW.

The Stark Falls development consists of: (1) a 35-foot-high concrete gravity-type dam with a concrete overflow section and a control gate section flanked by earth dikes; (2) six earth saddle dikes; (3) a 1.5-mile-long reservoir at normal pool elevation 1,355.0 feet; (4) an intake; (5) a penstock; (6) a powerhouse containing a 23,872-kW generating unit; and (7) appurtenant facilities (figure 4).

The Blake Falls development consists of: (1) a 75-foot-high concrete gravity-type dam with a concrete overflow section; (2) an earth dike; (3) a 5.5-mile-long reservoir at normal pool elevation 1,250.5 feet; (4) an intake; (5) a penstock; (6) a powerhouse containing a 13,913-kW generating unit; and (7) appurtenant facilities (figure 5).

The Rainbow Falls development consists of: (1) a 75-foot-high concrete gravity-type dam with a concrete overflow section flanked by a 1,600-foot-long earth dike; (2) an earth saddle dike; (3) a 3.5-mile-long reservoir at normal pool elevation 1,181.5 feet; (4) an intake; (5) a penstock; (6) a powerhouse containing a 22,828-kW generating unit; and (7) appurtenant facilities (figure 6).

The Five Falls development consists of: (1) a 50-foot-high concrete gravity-type dam with a concrete overflow section flanked at each end by an earth dike; (2) a 1.0-mile-long reservoir at normal pool elevation 1,077.0 feet; (3) an intake; (4) a 1,200-foot-long penstock; (5) a powerhouse containing a 22,828-kW generating unit; and (6) appurtenant facilities (figure 7).

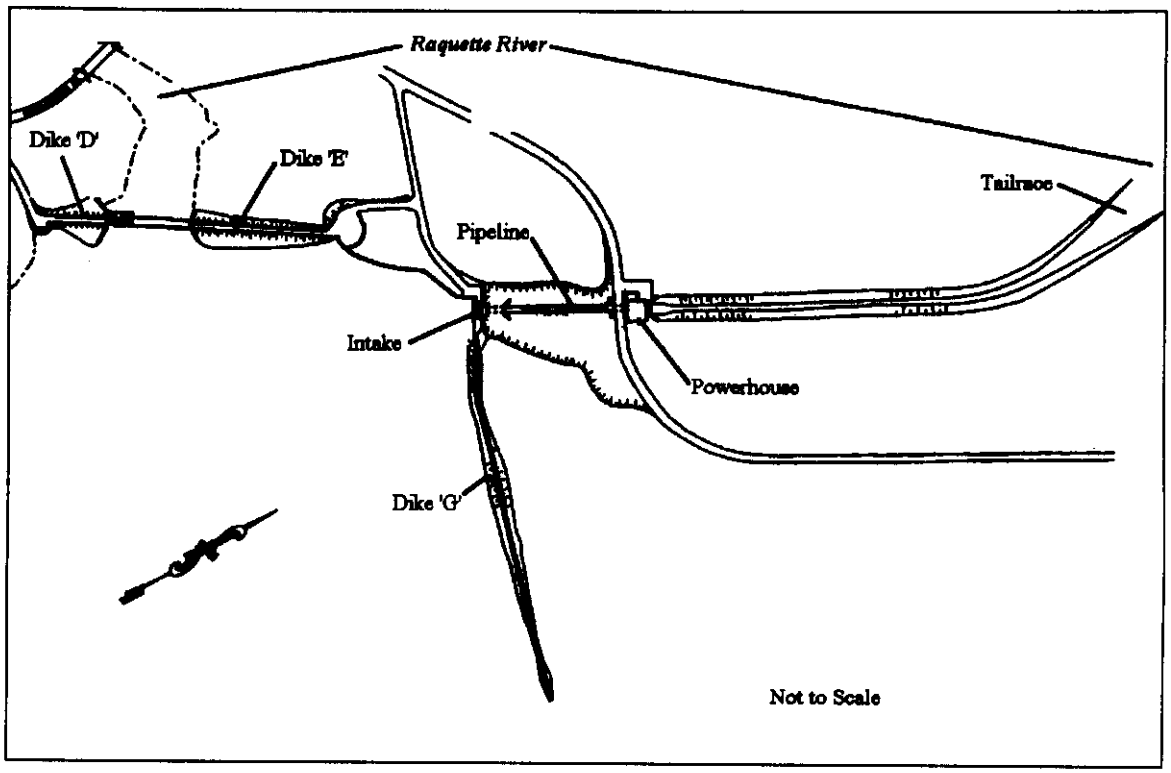
Raquette River
Dike 'D'
Dike 'E'
Tailrace
Pipeline
Intake
Powerhouse
Dike 'G'
Not to Scale

Figure 4. Upper Raquette River Project–Stark development (Source: NMPC, 1999b, as modified by staff)

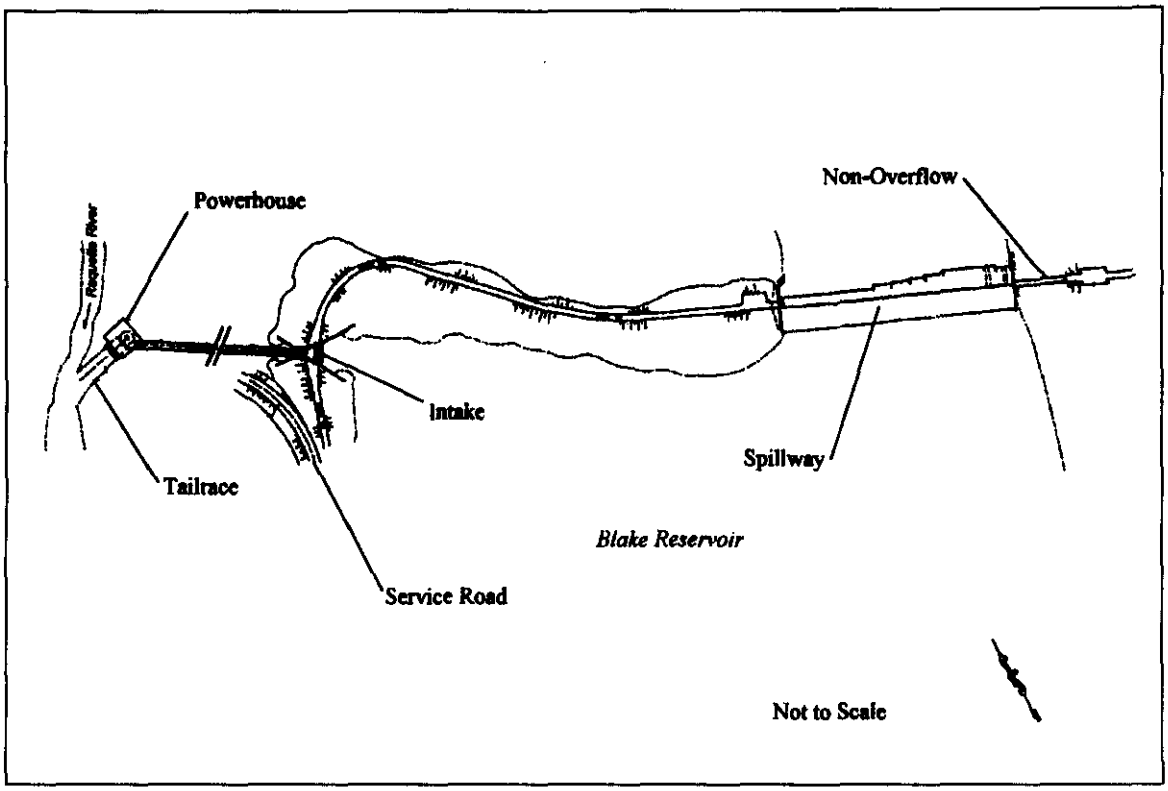
Non-Overflow
Powerhouse
Intake
Spillway
Tailrace
Blake Reservoir
Service Road
Not to Scale

Figure 5. Upper Raquette River Project–Blake development (Source: NMPC, 1999b, as modified by staff)

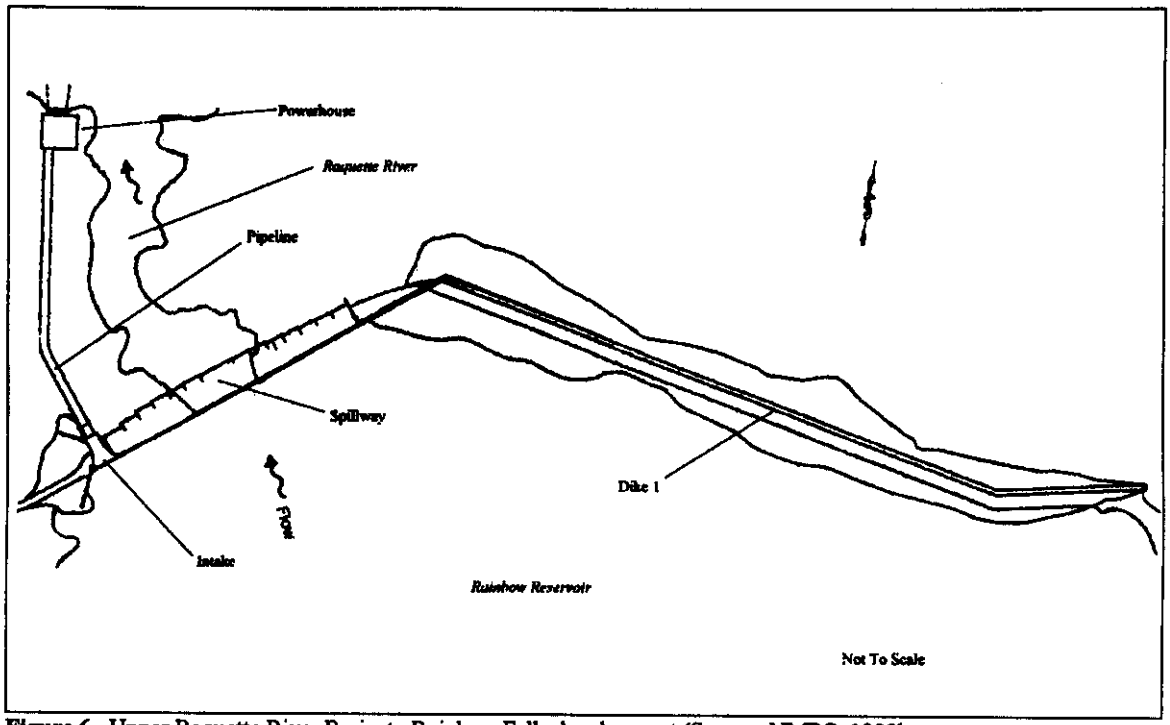

Figure 6. Upper Raquette River Project– Rainbow Falls development (Source: NMPC, 1999b, as modified by staff)

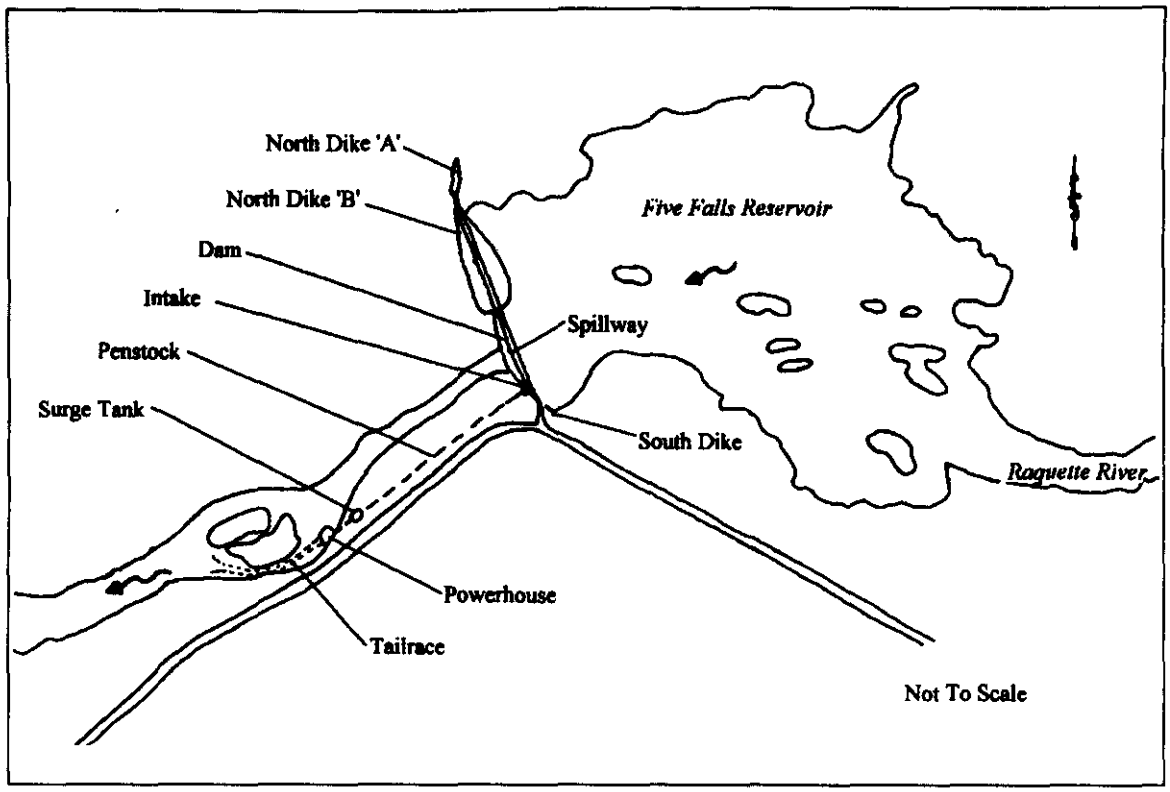
North Dike 'A'
North Dike 'B'
Dam
Intake
Penstock
Surge Tank
Five Falls Reservoir
Spillway
South Dike
Raquette River
Powerhouse
Tailrace
Not To Scale

Figure 7. Upper Raquette River Project–Five Falls development (Source: NMPC, 1999b, as modified by staff)

The South Colton development consists of: (1) a 45-foot-high concrete gravity-type dam with a concrete overflow section and earth abutments; (2) a 1.5-mile-long reservoir at normal pool elevation 973.5 feet ; (3) an intake; (4) a 1,300-foot-long penstock; (5) a powerhouse containing an 18,948-kW generating unit; and (6) appurtenant facilities (figure 8).

The five developments of the Upper Raquette River Project are operated remotely by Erie using the SHCC. These developments typically operate in either a peaking or load following mode using releases from the Carry Falls reservoir in conjunction with flow available from storage within each development's reservoir. If high flow conditions exist, these developments may operate continuously in a ROR mode. Under typical daily operations, Erie determines hourly megawatt (MW) targets for 24-hour periods from the Upper Raquette River Project.

Under existing normal operation, the Stark development operates in one of two modes depending on the pool elevation of the Carry Falls reservoir. When the pool elevation of the Carry Falls reservoir is at or above elevation 1,355.0 feet, the Stark development utilizes a normal impoundment fluctuation of 1.0 foot that varies between elevation 1,354.7 and 1,353.7 feet. When the pool elevation of the Carry Falls reservoir is at, or below, elevation 1,355.0 feet, the control of the composite impoundment system is shifted to the gates and turbine at the Stark development. The crest of the overflow section of the Stark dam is at elevation 1,355.0 feet, the crest of the gated section is at elevation 1,340.8 feet. During these drawdown times, the impoundment fluctuation can be as much as 23 feet.

The Blake development utilizes a normal impoundment fluctuation of 1.0 foot that varies between elevation 1,250.2 feet and 1,249.2 feet. The crest of the Blake dam is at elevation 1,250.5 feet. The Rainbow development utilizes a normal impoundment fluctuation of 1.0 foot that varies between elevation 1,181.2 feet and 1,180.2 feet. The
crest of the Rainbow dam is at elevation 1,181.5 feet. The Five Falls development utilizes a normal impoundment fluctuation of 2.0 feet that varies between elevation 1,076.7 feet and 1,074.7 feet. The crest of the Five Falls dam is at elevation 1,077.0 feet.

Under normal operation, the South Colton development utilizes a normal impoundment fluctuation of 2.0 feet that varies between elevation 973.2 feet to 971.2 feet. The crest of the South Colton dam is at elevation 973.5 feet.

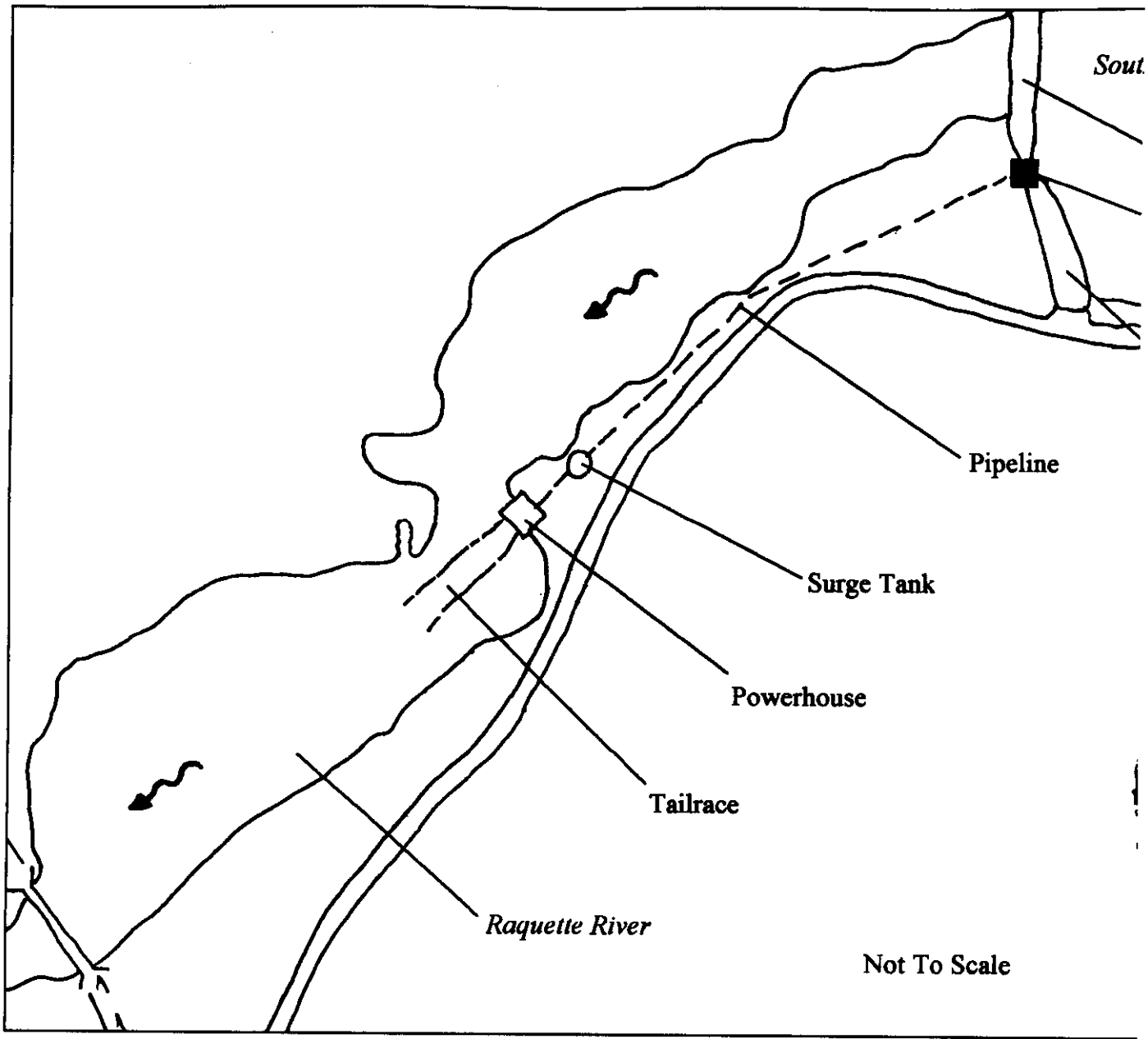

Figure 8. Upper Raquette River Project–South Colton development (Source: NMPC, 1999b, as modified by staff)

2. Applicant's Proposed Enhancement Measures

To protect and enhance project-related environmental resources, Erie proposes the following operational and environmental measures for the Upper Raquette River Project:

- provide instream flows at each development as follows:

Stark: 45 cfs[6] year-round through modification of the stoplog section and 90 cfs when releases are made for 24 hours or more through the Taintor gates; these flows are to be maintained for an additional 24 hours following closure of the Taintor gates;

Blake: 55 cfs from the stoplog section of the dam, with an increase to 120 cfs from the start of the walleye spawning period[7] through June 30;

Rainbow: 20 cfs year-round from the stoplog section of the dam;

Five Falls: 50 cfs from the stoplog section of the dam, with an increase to 145 cfs during the walleye spawning season;[8]

South Colton: 20 cfs year-round over the visible portion of the falls either by releasing 60 cfs from the stoplog section of the dam or by releasing 20 cfs from this location and modifying the channel to divert at least 20 cfs of the minimum over the visible portion of the falls;

- make fisheries habitat improvements, including: (1) a one-time effort to

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[6] Minimum flows may be slightly above or below the proposed value. The variance is a function of the normal reservoir fluctuation. Erie will derive gate settings based on the midpoint of the normal reservoir level at each development.

[7] As defined in the Settlement (page 3-2), walleye spawning season starts when the water temperature at South Colton reaches 4°C (39.2°F) for 4 consecutive days based on temperature readings taken in the South Colton tailwater.

[8] As defined in the Settlement (page 3-2), the walleye spawning period ends 30 days after water temperature at South Colton has reached 10 °C (50 °F) for 4 consecutive days.

minimize flow through a berm at 45 cfs by moving existing material at habitat segment 12A at the Stark development; and (2) a one time habitat modification at the time of construction of the downstream fish movement facilities at the Blake development by moving gravel/cobble material such that the area is wetted and usable at the 55 cfs minimum flow;

- ☐¡ limit normal reservoir fluctuations to within 1.0 feet at the Stark (1,354.7 to 1,353.7 feet), Blake (1,250.2 to 1,249.2 feet) and Rainbow (1,181.2 to 1,180.2 feet) developments, and within 2.0 feet at the Five Falls (1,076.7 to 1,074.7 feet) and South Colton (973.2 to 971.2 feet) developments as measured from 0.3 foot below the permanent dam crests;

- ☐¡ develop and implement a streamflow monitoring plan for: (1) measuring instream flows; (2) measuring all other project flows through the turbines and any other bypass/diversion flows; and (3) headpond and tailwater elevations, and a provision for the installation of permanent staff gages;

- ☐¡ provide measures to facilitate downstream fish movement at all developments, coincident with the point of instream flow release, which include modification of stoplog sections, reducing roughness of ogee spillway faces, reducing dispersion of instream flows across the faces of the spillways, and constructing plunge pools;

- ☐¡ install 1-inch clear spacing physical barriers at the location of the existing trashrack structures at each development; and

- ☐¡ develop and implement a recreation plan that includes canoe portage at each development, access to Dead Creek at the Blake development, cooperating with ADK and others as appropriate to develop a primitive access trail to the Clear Pond Wild Forest at the Rainbow development, and modification of project boundary to include all Erie lands occupied by the proposed recreational facilities, with the exception of lands associated with the Dead Creek and Clear Pond Wild Forest trails and access.

3. Additional Staff-recommended Measures

The staff has not identified any reasonable action alternatives to the proposed project, other than various additional environmental measures, for assessment. The

additional environmental measures that we evaluated, which are not part of Erie's proposal, include: (a) site-specific ESCPs; (b) measures to minimize the effects of increased recreational boating use on potential bald eagle habitat; and (c) an amended PA for the protection of cultural resources. We evaluate these measures, as appropriate, in section V.C.

C. Middle Raquette River Project

1. Description of Existing Project

The existing Middle Raquette River Project consists of four developments, which have a total installed capacity of 47,073 kW.

The Higley development consists of: (1) a 34-foot-high concrete gravity-type dam with 3-foot-high wooden flashboards, two flood gates, a trashrack, and two waste gates; (2) a 742-acre reservoir at normal pool elevation 883.6 feet ; (3) a 160-foot-long, 50-foot-wide flume; (4) a powerhouse containing three generating units with a total capacity of 4,972-kW; (5) a proposed intake structure, a proposed 13-foot-diameter, 225-foot-long steel pipeline, and a proposed powerhouse containing a 7,300-kW generating unit; and (6) appurtenant facilities (figure 9).

The Colton development consists of: (1) a 27-foot-high concrete gravity-type dam with 2-foot-high flashboards, a log flume, a trash gate, and a gated spillway; (2) a 195-acre reservoir at normal pool elevation 837.0 feet ; (3) an intake structure; (4) an 11,090-foot-long steel pipeline; (5) an 80-foot-high surge tank; (6) three penstocks; (7) a powerhouse containing three generating units, with a total capacity of 30,101 kW; and (8) appurtenant facilities (figure 10).

The Hannawa development consists of: (1) a 38-foot-high stone and concrete dam with 3.5-foot-high wooden flashboards, a log chute, a Taintor gate, and a sluice gate; (2) a 204-acre reservoir at normal pool elevation 552.0 feet ; (3) a headworks structure; (4) a 2,700-foot-long canal; (5) two penstocks; (6) a powerhouse containing two generating units, with a total capacity of 7,200 kW; and (7) appurtenant facilities (figure 11).

The Sugar Island development consists of: (1) a 37-foot-high concrete gravity-type dam with two Taintor gates; (2) a 29-acre reservoir at normal pool elevation 470.0 feet ; (3) an intake structure with trash racks and a headgate; (4) a 4,700-foot-long steel pipeline; (5) a 71-foot-high surge tank; (6) two penstocks; (7) a

powerhouse with two generating units, a total capacity of 4,800 kW; and (8) appurtenant facilities (figure 12).

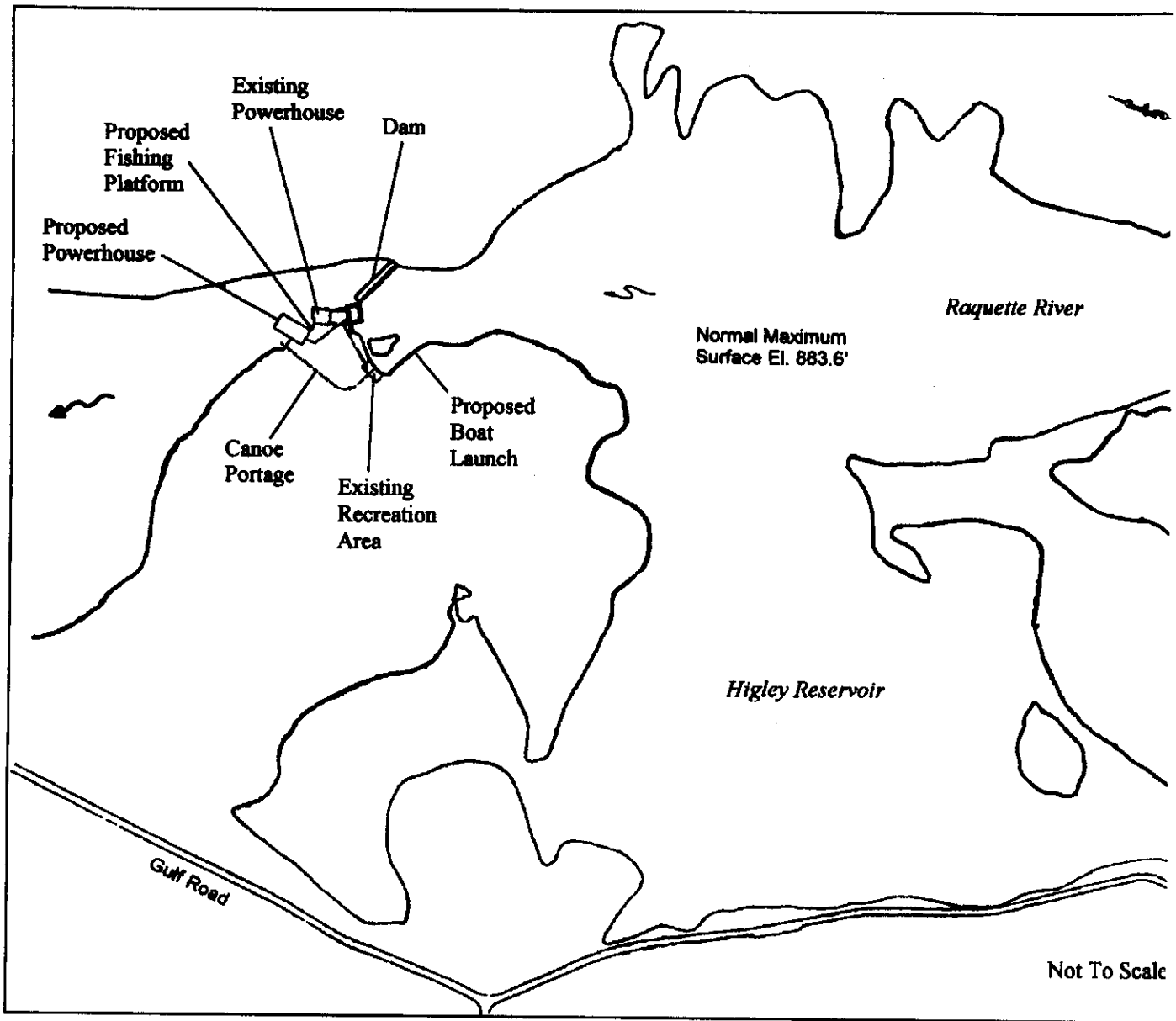

Figure 9. Middle Raquette River Project–Higley development (Source: NMPC, 1991a, as modified by staff)

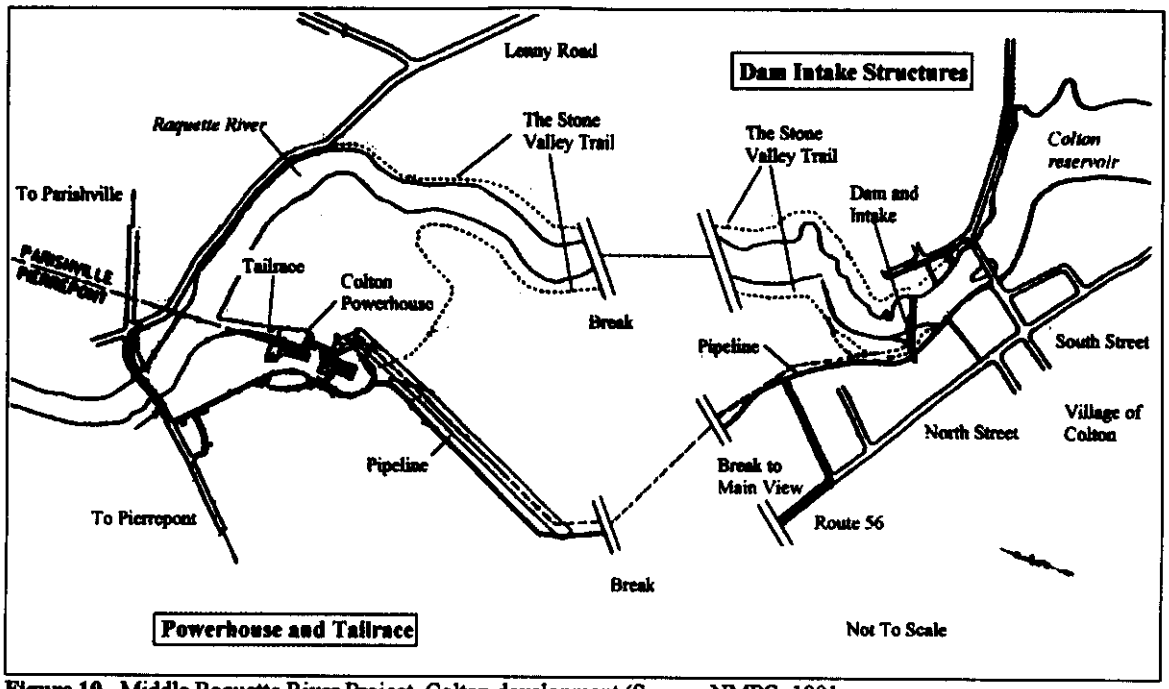

Figure 10. Middle Raquette River Project–Colton development (Source: NMPC, 1991a, as modified by staff)

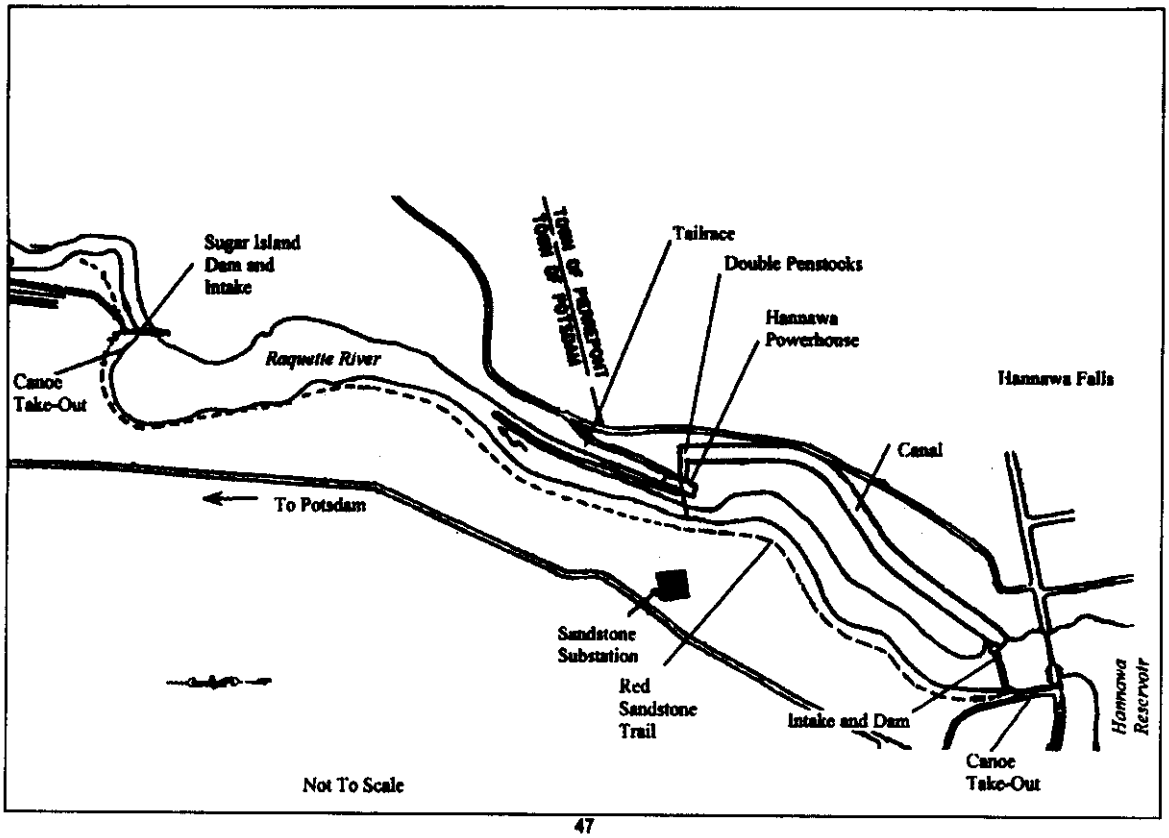
Sugar Island
Dam and
Intake
Canoe
Take-Out
Raquette River
Town of Hannawa Falls
Tailrace
Double Penstocks
Hannawa
Powerhouse
Hannawa Falls
Canal
To Potsdam
Sandstone
Substation
Red
Sandstone
Trail
Intake and Dam
Hannawa
Reservoir
Canoe
Take-Out
Not To Scale

Figure 11. Middle Raquette River Project–Hannawa development (Source: NMPC, 1991a, as modified by staff)

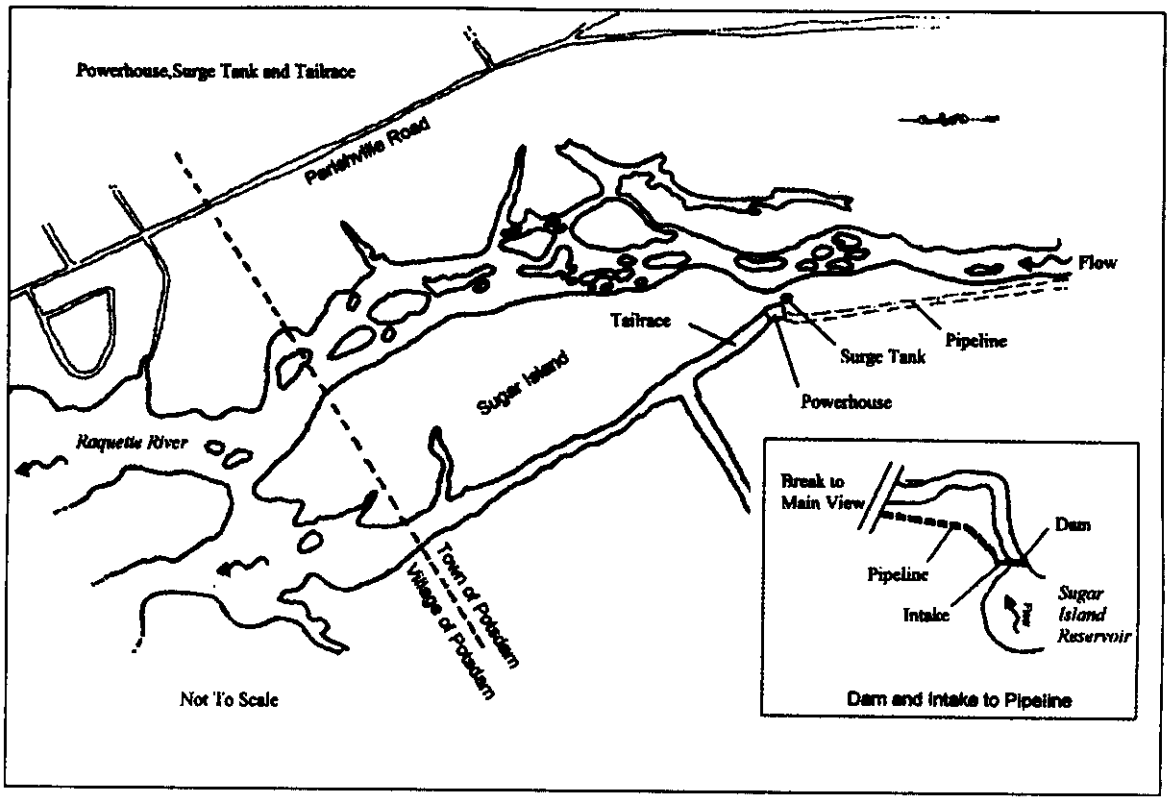
Powerhouse,Surge Tank and Tailrace
Perthville Road
Flow
Tailrace
Pipeline
Surge Tank
Powerhouse
Sugar Island
Raquette River
Town of Potsdam
Village of Potsdam
Not To Scale
Break to Main View
Dam
Pipeline
Intake
Sugar Island Reservoir
Dam and Intake to Pipeline

Figure 12. Middle Raquette River Project–Sugar Island development (Source: NMPC, 1991a, as modified by staff)

All of the developments in the Middle Raquette River Project, with the exception of the Higley development, are operated ROR with pondage mode utilizing releases from the Carry Falls reservoir and the Upper Raquette River Project. The Higley development operates as a re-regulating development to provide steadier flows for the 12 downstream hydropower projects. All four developments operate at a lower discharge than the developments of the Upper Raquette Project and currently are operated to provide a targeted minimum downstream discharge of 450 cfs.

Under existing conditions, the Higley development operates as follows: (1) between May 1 and October 1, reservoir fluctuations occur on a weekly basis. The reservoir level is at or near the lower pool elevation, approximately elevation 880.1 feet, each Monday morning. During the week, the reservoir is re-filled with the discharge from the Upper Raquette River Project to approximately elevation 883.1 feet. The Higley reservoir is then drawn down to approximately elevation 880.1 feet over the weekend to begin the cycle again on Monday morning; and (2) during the rest of the year, the reservoir fluctuates following the releases from the Upper Raquette Project. The maximum allowable drawdown during this time of year is 3.5 feet to elevation 880.1 feet , and no effort is made to bring the reservoir level up to the maximum pool during the weekends. The crest of the Higley dam is at elevation 880.6 feet, and the crest of the flashboards is at elevation 883.6 feet.

The Colton development utilizes releases from the Higley development, in conjunction with flow available from pondage with a daily allowable operating drawdown of 0.3 foot as measured from the top of the flashboards.. The crest of the Colton dam is at elevation 835.0 feet, and the crest of the flashboards is at elevation 837.0 feet. The Hannawa development utilizes releases from the Colton development, in conjunction with flow available from pondage with a daily allowable operating drawdown of 0.4 foot to 551.3 feet. The crest of the Hannawa dam is at elevation 548.5 feet, and the crest of the flashboards is at elevation 552.0 feet. The Sugar Island development utilizes releases from the Hannawa development, in conjunction with flow available from pondage with a daily allowable operating drawdown of 1 foot to 469.0 feet. The crest of the Sugar Island dam is at elevation 470.0 feet.

2. Applicant's Proposed Enhancement Measures

To protect and enhance project-related environmental resources, Erie proposes the following operational and environmental measures for the Middle Raquette River Project, consistent with the Settlement:

- provide instream flows at developments as follows:

Higley: 20 cfs year-round conveyance flows through the stoplog section of the dam to facilitate downstream movement of fish;

Colton: 110 cfs from November 1 through the start of walleye spawning season, and 240 cfs with spring spillage, or 200 cfs without spring spillage, during the walleye spawning season, 200 cfs from the end of the walleye spawning season through June 30, 125 cfs from July 1 to August 15, 90 cfs from August 16 to September 15, and 125 cfs from September 16 through October 31, from the Colton dam;

Hannawa: 50 cfs from October 31 through the start of walleye spawning season, 90 cfs from the start of walleye spawning season through June 30, and 65 cfs from July 1 through October 31, from the stoplog section of the dam;

Sugar Island: 300 cfs year-round from the minimum flow pipe, with an increase to 400 cfs from the start of the walleye spawning season through June 30;

- limit normal reservoir fluctuations at the Higley development to provide regulation of peaking flows and recreational opportunities during the summer according to the following regime:

Time of Year	Day of Week	Target Elevation (USGS)
Memorial Day Weekend through Labor Day Weekend	10:00 p.m. Friday through 6:00 a.m. Monday	By 10:00 p.m. Friday - at or near the top of flashboards (el. 883.6). Over the course of the weekend - use a 2.0 foot drawdown. By 6:00 a.m. Monday - at or near 2.0 feet below the top of the flashboards (el. 881.6)
Memorial Day Weekend through Labor Day Weekend	6:00 a.m. Monday through 10:00 p.m. Friday	2.5-foot fluctuation used as needed to facilitate re-regulation (el. 883.6 to 881.1)
End of Labor Day Weekend to Start of Memorial Day Weekend	all days	2.5-foot fluctuation used as needed to facilitate re-regulation (el. 883.6 to 881.1)

- ☐ limit normal reservoir fluctuations to within 0.4 foot at the Colton (837.0 to 836.6 feet), and the Hannawa developments (552.0 to 551.6 feet) and to within 1.0 foot at Sugar Island (470.0 to 469.0 feet) development;

- ☐ develop and implement a streamflow monitoring plan for: (1) measuring instream flows; (2) measuring all other project flows through the turbines and any other bypass/diversion flows; and (3) headpond and tailwater elevations, and a provision for the installation of permanent staff gages;

- ☐ provide measures to facilitate downstream fish movement at the Higley, Colton, and Hannawa developments, coincident with the point of instream flow release, that include modification of stoplog sections, reducing roughness of ogee spillway faces, reducing dispersion of instream flows across the faces of the spillways, retrofitting the trash sluice return channel (Colton), and constructing plunge pools;

- ☐ install 1-inch clear spacing physical barriers at the location of the existing trashrack structures at the Higley, Colton, and Hannawa developments;

- ☐ provide scheduled whitewater releases at the Colton, Hannawa, and/or Sugar Island developments, based upon: (1) a ramping schedule; (2) an initial annual whitewater budget of up to 800 MWh per year from 2000 to 2004; and (3) a schedule for releases between July and September with no more than 6 releases per whitewater season and no consecutive day releases at any one development, as determined by February 1 of each year by the Whitewater subcommittee of the Raquette River Advisory Council;

- ☐ provide whitewater access trails along the existing Stone Valley Trail System at the Colton development; one formal access point to the upper portion of the reach and one formal access along the riffle area of the bypassed reach coincident with the canoe portage put-in location at the Hannawa development; and one formal access point at the upstream end of the bypassed reach near the pipeline intake and one formal access coincident with the canoe portage location at the day use area at the Sugar Island development;

- ☐ provide a flow notification system, including an Internet website and phone access, to inform the public of scheduled whitewater releases and

known spillage events at the Colton, Hannawa, and Sugar Island developments; and

- develop and implement a recreation plan that includes canoe portage at each development; whitewater access at Colton, Hannawa, and Sugar Island developments; car-top boat launch with overnight parking in the vicinity of Browns Bridge at the Colton development; scenic overlook, picnic facilities, and roadside parking off Mill Street at the Hannawa development, planned in conjunction with the development of the Red Sandstone Trail between the Hannawa and Sugar Island developments; a day use area with gated access on the peninsula at the Sugar Island development; and modification of project boundary to include all Erie lands occupied by the proposed recreational facilities.

3. Additional Staff-recommended Measures

The staff has not identified any reasonable action alternatives to the proposed project, other than various additional environmental measures, for assessment. The additional environmental measures that we evaluated, which are not part of Erie's proposal, include: (a) site-specific ESCPs; ; and (b) an amended PA for the protection of cultural resources. We evaluate these measures, as appropriate, in section V.C.

D. Lower Raquette River Project

1. Description of Existing Project

The existing Lower Raquette River Project consists of four developments that have a total installed generating capacity of 12,000-kW.

The Norwood development consists of: (1) a 23-foot-high concrete gravity-type dam with 1-foot-high wooden flashboards; (2) a 350-acre reservoir at normal pool elevation 327.1 feet ; (3) a gated concrete intake structure with trashracks and a log chute; (4) a powerhouse containing a 2,000-kW generating unit; (5) a 3-mile-long transmission line; and (6) appurtenant facilities (figure 13).

The East Norfolk development consists of: (1) a concrete gravity-type dam with seven, 9-foot by 8-foot sluice gates; (2) a 135-acre reservoir at normal pool elevation 287.9 feet ; (3) a concrete intake structure; (4) a 1,408-foot-long flume; (5) a powerhouse containing a 3,500-kW generating unit; (6) a 0.86-mile-long transmission

line; and (7) appurtenant facilities (figure 14).

The Norfolk development consists of: (1) a 20-foot-high concrete dam with 10-inch-high flashboards, headworks gates, and two, 9-foot by 9-foot sluice gates; (2) a

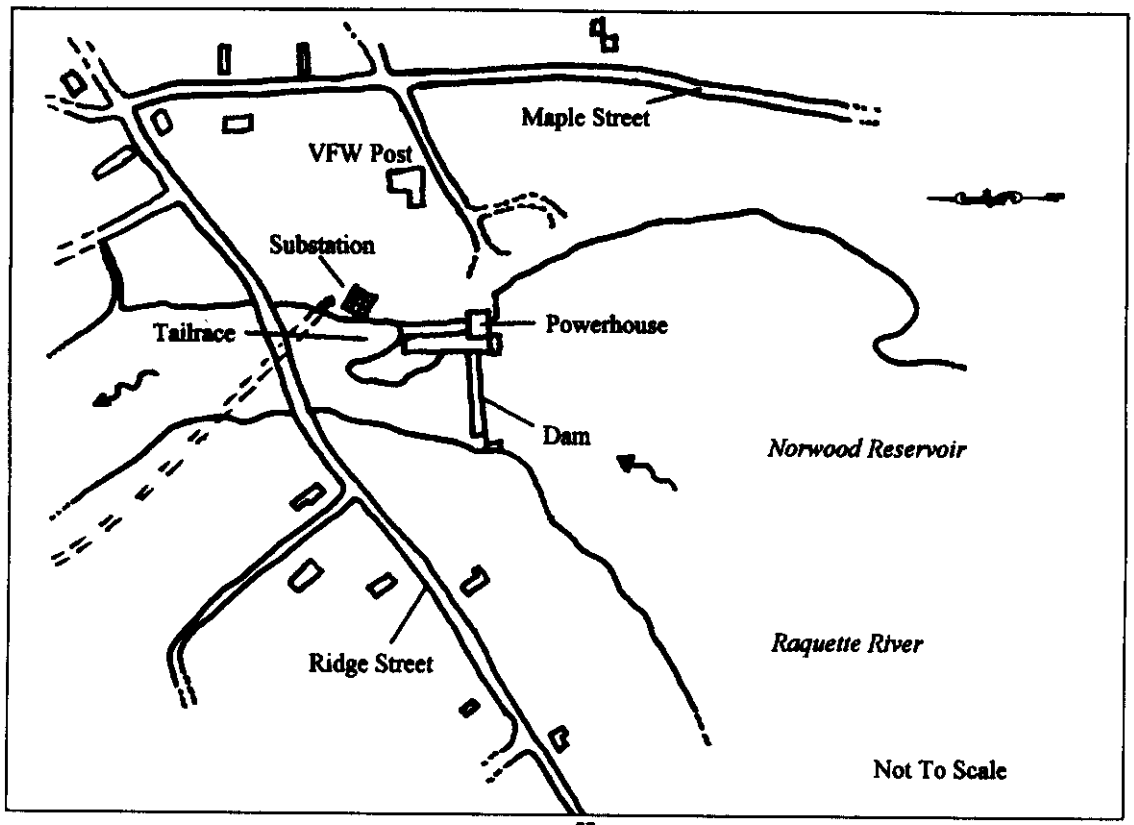
Maple Street
VFW Post
Substation
Tailrace
Powerhouse
Dam
Norwood Reservoir
Raquette River
Ridge Street
Not To Scale

Figure 13. Lower Raquette River Project–Norwood development (Source: NMPC, 1991b, as modified by staff)

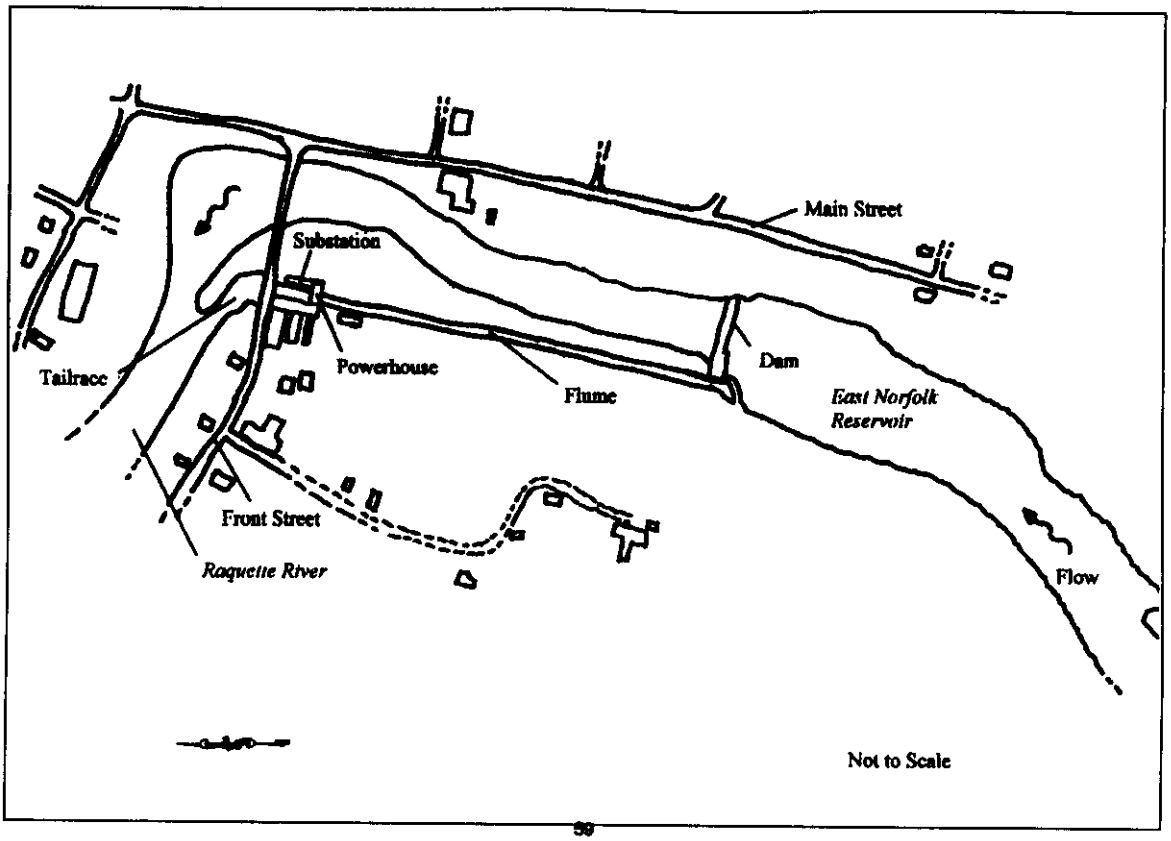
Main Street
Substation
Tailrace
Powerhouse
Flume
Dam
East Norfolk
Reservoir
Front Street
Raquette River
Flow
Not to Scale

Figure 14. Lower Raquette River Project–East Norfolk development (Source: NMPC, 1991b, as modified by staff)

10-acre reservoir at normal pool elevation 254.9 feet ; (3) a 1,275-foot-long canal; (4) a 700-foot-long wood stave pipeline; (5) a 103-foot-long steel penstock; (6) a powerhouse containing a 4,500-kW generating unit; and (7) appurtenant facilities (figure 15).

The Raymondville development consists of: (1) a 17-foot-high concrete gravity-type dam with 2-foot-high flashboards; (2) a 50-acre reservoir at normal pool elevation 211.6 feet ; (3) a 447-foot-long concrete flume with trashracks, an ice chute, and gates; (4) a powerhouse containing a 2,000-kW generating unit; (5) a 2.32-mile-long transmission line; and (6) appurtenant facilities (figure 16).

Erie operates the four developments of the Lower Raquette River Project remotely using the SHCC. These developments typically operate in a store and release pulsing or store and release peaking mode,[9] using releases from the Carry Falls, Upper Raquette River Project, and the re-regulating Higley development of the Middle Raquette River Project. The project may operate continuously in a ROR mode during periods of high flows.

Under existing conditions, the Norwood development uses a normal impoundment fluctuation of 0.5 foot that varies between elevation 327.1 and 326.5 feet as measured from the top of the 1-foot flashboards. The crest of the Norwood dam is at elevation 326.1 feet. The East Norfolk development uses a normal impoundment fluctuation of 1.0 foot that varies between elevation 287.9 and 286.9 feet. As measured from the top of the dam, the crest of the East Norfolk dam is at elevation 287.9 feet. The Norfolk development uses a normal impoundment fluctuation of 1.0 foot that varies between elevation 254.9 and 253.9 feet as measured from the top of the flashboards. The crest of the Norfolk dam is at elevation 254.1 feet. The Raymondville development uses a normal impoundment fluctuation of 1.0 foot that varies between elevation 211.6 and 210.6 feet. As measured from the top of the 2-foot flashboards, the crest of the Raymondville dam is at the top of the flashboards at elevation 209.6 feet msl.

2. Applicant's Proposed Enhancement Measures

[9] Store and release pulsing operations follow an on/off cycle in response to the level of inflow and normal impoundment fluctuations, while store and release peaking operations respond to peak electric power demand, usually during weekday hours.

To protect and enhance project-related environmental resources, Erie proposes the following operational and environmental measures for the Lower Raquette River Project, consistent with the Settlement:

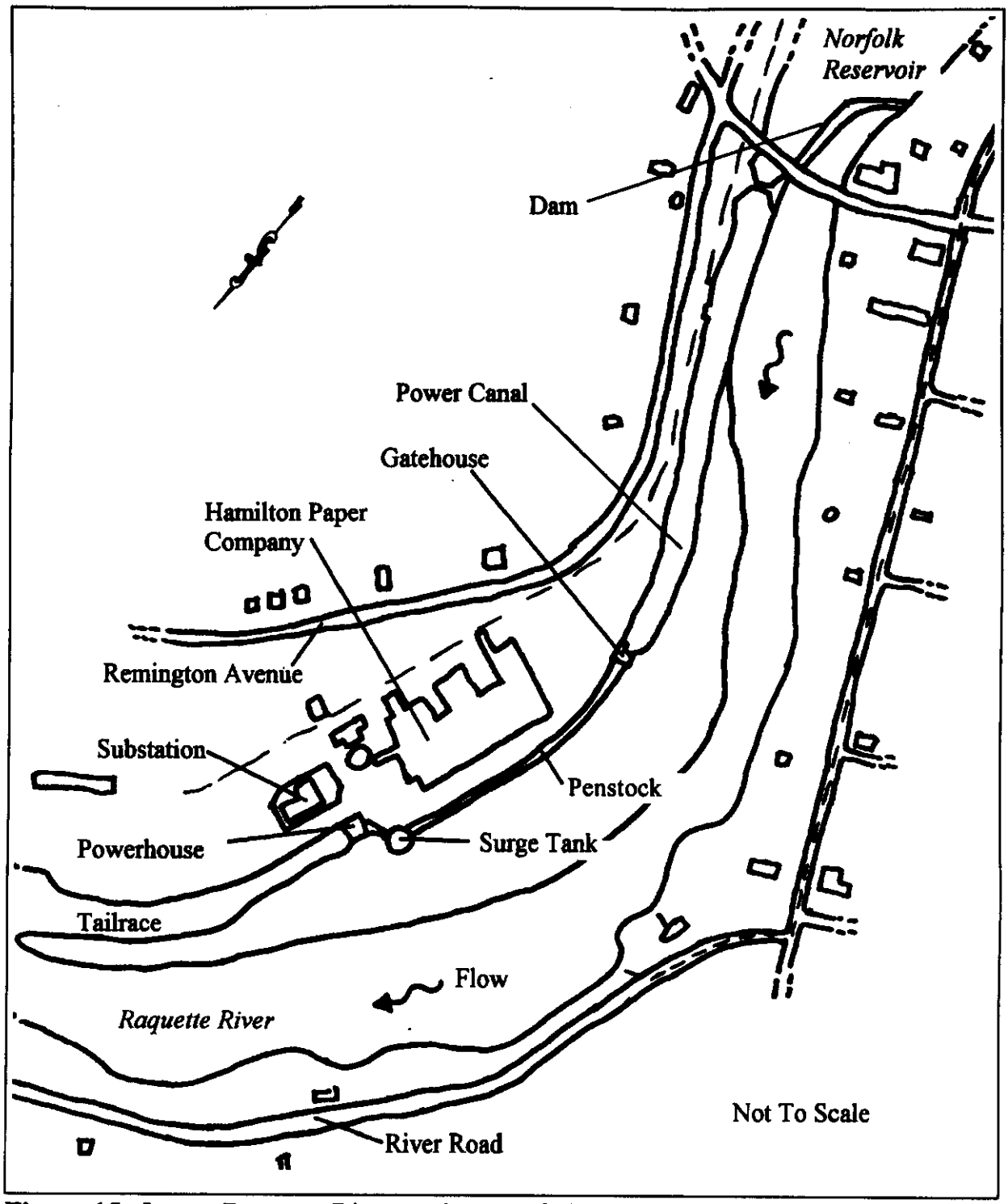

Figure 15. Lower Raquette River Project-Norfolk Development
(Source: NMPC, 1991b, as modified by staff)

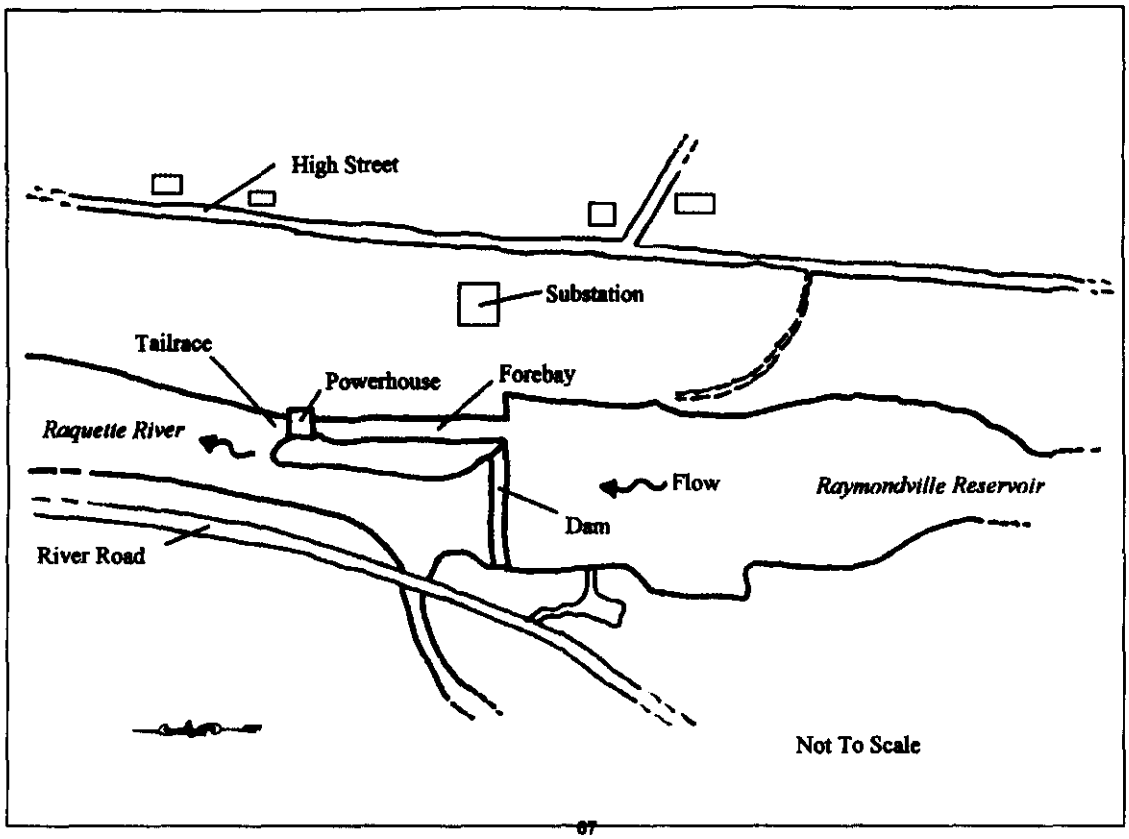
High Street
Substation
Tailrace
Powerhouse
Forebay
Raquette River
Flow
Raymondville Reservoir
Dam
River Road
Not To Scale

Figure 16. Lower Raquette River Project–Raymondville development (Source: NMPC, 1991b, as modified by staff)

- ☐ provide instream flows at each development as follows:

  Norwood: 20 cfs year-round conveyance flows from the stoplog section of the dam to facilitate downstream movement of fish;

  East Norfolk: 75 cfs year-round from the stoplog section of the dam;

  Norfolk: 37.5 cfs year-round from the stoplog section of the dam and 37.5 cfs year-round from the trash sluice return channel for a total of 75 cfs year-round;

  Raymondville: 20 cfs year-round conveyance flows through the trash sluice structure or the low level sluice gate to facilitate downstream movement of fish;

- ☐ limit normal reservoir fluctuations to within 0.5 foot at the Norwood (327.1 to 326.5 feet), East Norfolk (287.9 to 287.4 feet), and Raymondville (211.6 to 211.1 feet) developments and within 1.0 foot at the Norfolk (254.9 to 253.9) development;

- ☐ maintain a tiered base flow below the Raymondville development as described in section III.A.2;

- ☐ develop and implement a streamflow monitoring plan for: (1) measuring instream flows; (2) measuring all other project flows through the turbines and any other bypass/diversion flows; and (3) headpond and tailwater elevations, and include a provision for the installation of permanent staff gages;

- ☐ provide measures to facilitate downstream fish movement at all developments, coincident with the point of instream flow release, that include modification of stoplog sections, reducing roughness of ogee spillway faces, reducing dispersion of instream flows across the faces of the spillways, modifying trash sluice flume (Norfolk) and constructing plunge pools;

- ☐ install 1-inch clear spacing physical barriers at the location of the existing trashrack structures at each development; and

- develop and implement a recreation plan that includes: (1) canoe portage at each development (take-out only at East Norfolk and put-in only at Norfolk); (2) parking at the canoe portage at the East Norfolk development; (3) car-top boat launch, picnic facilities, and parking adjacent to the left abutment of the dam at the Raymondville development; and (4) modification of project boundary to include all Erie lands occupied by these recreational facilities.

3. Additional Staff-recommended Measures

The staff has not identified any reasonable action alternatives to the proposed project, other than various additional environmental measures, for assessment. The additional environmental measures that we evaluated, which are not part of Erie's proposal, include: (a) site-specific ESCPs; and (b) an amended PA for the protection of cultural resources. We evaluate these measures, as appropriate, in section V.C.

Erie proposes to implement the proposed environmental enhancement measures for each of four above-described projects according to the schedule contained in section 2.2.3 of the Settlement as shown in table 1.

The Settlement provides that any deferral of implementation will be based solely upon issuance dates of the individual project licenses or any rehearing or appeal identified in section 2.2.2 of the Settlement. If actual license issuance for a given project occurs after the expected date of the license, the dates of implementation for that project may be deferred by an amount of time equal to that between the expected and actual date of license issuance. The Settlement further provides that if a rehearing or appeal of specific aspects of the Settlement results in deferral of implementation of some measures, the implementation date of those measures shall be as soon as practical, but no later than December 31 of the year after which resolution of the issue becomes final. We reviewed the implementation schedule and conclude that both the schedule and the contingencies provision for deferred implementation seem reasonable in terms of the sequencing and costs of the proposed enhancements.

The Settlement also includes two provisions that the signatories specifically request not be included in any licenses issued for these projects: (1) land transactions detailed in section 9 of the Settlement, other than those lands subject to boundary revisions detailed in subsection 9.5; and (2) the mechanism for the formation and administration of the Raquette River Advisory Committee (RRAC) and Raquette River Fund, as identified in sections 10.1 and 10.2 and detailed in Appendix 2 of the

Settlement.

Table 1. Implementation schedule for Erie's proposed measures (Source: Staff).

Site	Instream flow	Fish passage[b]	Fish protection[c]	Reservoir fluctuations	Recreation	White-water
Carry Falls[e]	n/a	n/a	n/a	n/a	by 2004	n/a
Stark	2002	2002	2016 to 2018	2002	by 2004	n/a
Blake	2002	2002	2016 to 2018	2002	by 2004	n/a
Rainbow	2004	2004	2012 to 2015	2004	by 2004	n/a
Five Falls	2003	2003	2012 to 2015	2003	by 2004	n/a
South Colton	2003	2003	2012 to 2015	2003	by 2004	n/a
Higley	n/a	2001	2009 to 2011	1999	by 2004	n/a
Colton	1999[a]	1999	2009 to 2011	1999	by 2002	2000[d]
Hannawa	2000[a]	2000	2005 to 2008	2000	by 2002	2000[d]
Sugar Island	1999[a]	1999	n/a	1999	by 2002	2000[d]
Norwood	n/a	2001	2005 to 2008	1999	by 2003	n/a
East Norfolk	2000[a]	2000	2004	2000	by 2003	n/a
Norfolk	2000[a]	2000	2002	2000	by 2003	n/a
Raymondville[f]	n/a	2001	2000	1999	by 2003	n/a

Notes: Unless otherwise noted, implementation shall occur no later than December 31 of each year. If control of the river is not achievable in the year indicated, thereby precluding implementation of a specific measure during that year, implementation shall be initiated once control of the river is achieved in the following year.

[a] The existing interim flow shall be maintained until implementation of the permanent instream flow after adjustment of the schedule based on the date of license issuance.

[b] For the purpose of this table, fish passage shall mean installation of downstream fish movement and plunge pool systems

[c] After 2004, actual year of implementation may vary. However, Erie shall install protection within the timeframe indicated.

[d] Usage of whitewater budget may involve releases at this site pending determinations of the whitewater subcommittee.

[e] If the Carry Falls license is issued 30 days prior to June 1, 2000, the guide curve of the Settlement will be implemented starting June 1, 2000, otherwise implementation will be June 1, 2001.

[f] The base flow requirement at Raymondville will be implemented starting in 2000.

E. Potsdam Water Power Project

1. Description of Proposed Project

The Potsdam Water Power Project consists of: (1) an existing 165-foot-long and 7-foot-high concrete capped stone masonry dam (East dam); (2) an existing 200-foot-long and 11-foot-high concrete gravity dam (West dam), reconstructed in 1990; (3) a 300-acre reservoir, with a gross storage capacity of 1,350 acre-feet at elevation 405.2 feet; (4) an existing intake; (5) an existing powerhouse containing two vertical Kaplan turbines, with a combined installed capacity of 800 kW and a hydraulic capacity of 900 cfs; and (6) a proposed intake structure and 32-foot by 34-foot concrete and masonry powerhouse containing a new vertical semi-Kaplan turbine and generator rated at 700-kW, which would be located on the West dam abutment (figure 17).

Potsdam proposes to operate the project in a ROR mode using flows between the minimum hydraulic capacity of 450 cfs and the maximum hydraulic capacity of 1,020 cfs, plus a fish bypass conveyance flow of 40 cfs. All west channel flows below 490 cfs or above 1,060 cfs would go over the spillway or through the downstream fish bypass.

2. Applicant's Proposed Enhancement Measures

Potsdam proposed environmental enhancements in its application and in other filings and responses to additional information requests.[10] Filings subsequent to the application modified the proposed project, but did not withdraw any proposed enhancements. Therefore, we include here the enhancement proposals contained in these filings:

- ☐ install a temporary cofferdam and perform all construction activities in

[10] Potsdam proposed certain environmental enhancements in its application for an original license filed on February 7, 1997. On June 22, 1998, Potsdam filed its response to our additional information request of August 22, 1997, and provided appropriate revised pages from the February 7, 1997, filing to reflect its decision to apply for an amendment to its exemption. Potsdam filed additional information again on January 4, 1999, and August 24, 1999, with one new enhancement measure proposed in response to agency comments.

dry conditions;

☐¡ operate the project in a ROR mode with outflow matching inflow;

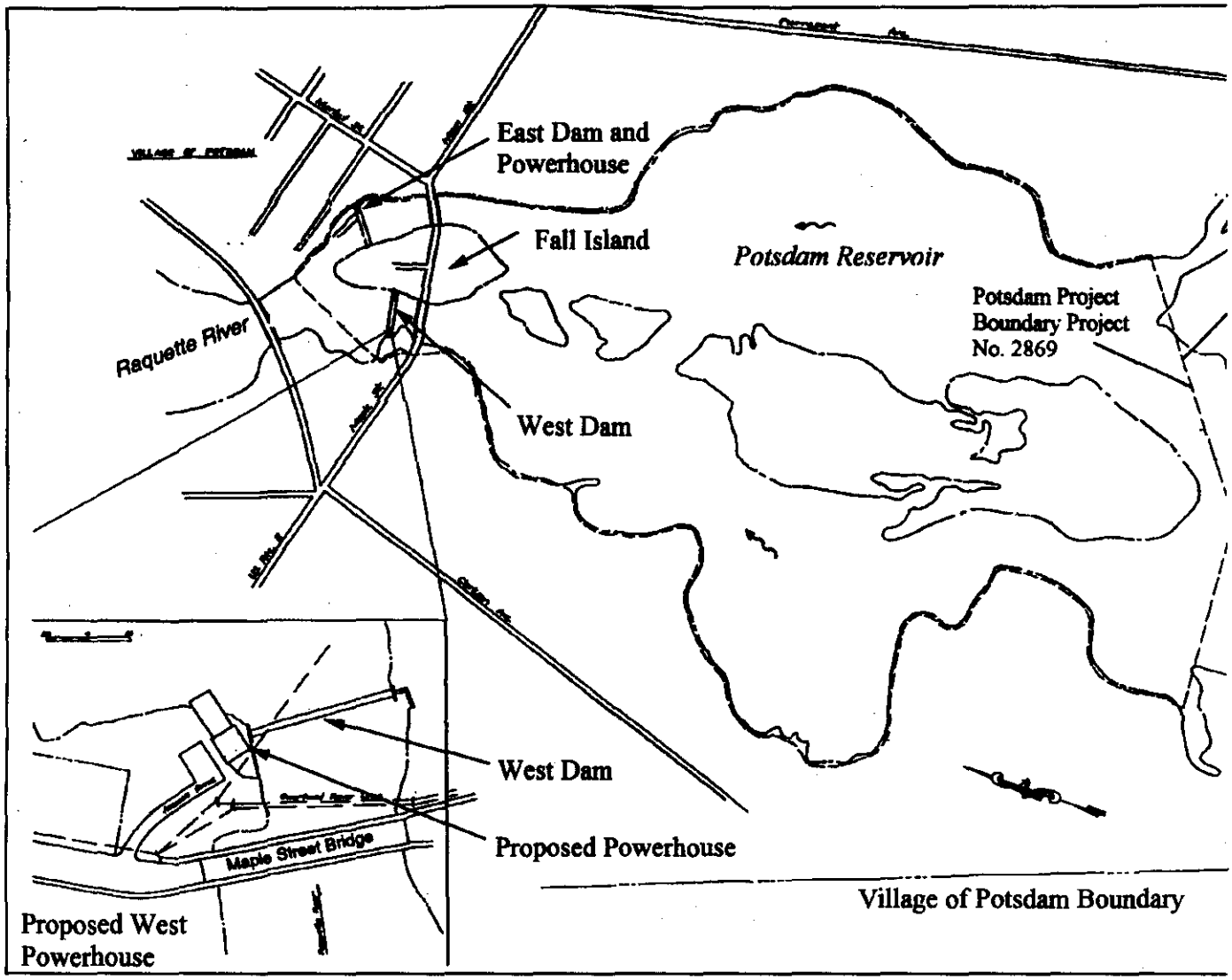

Figure 17. Potsdam Water Project facilities (Source: Staff, based on Christie Engineering, 1999)

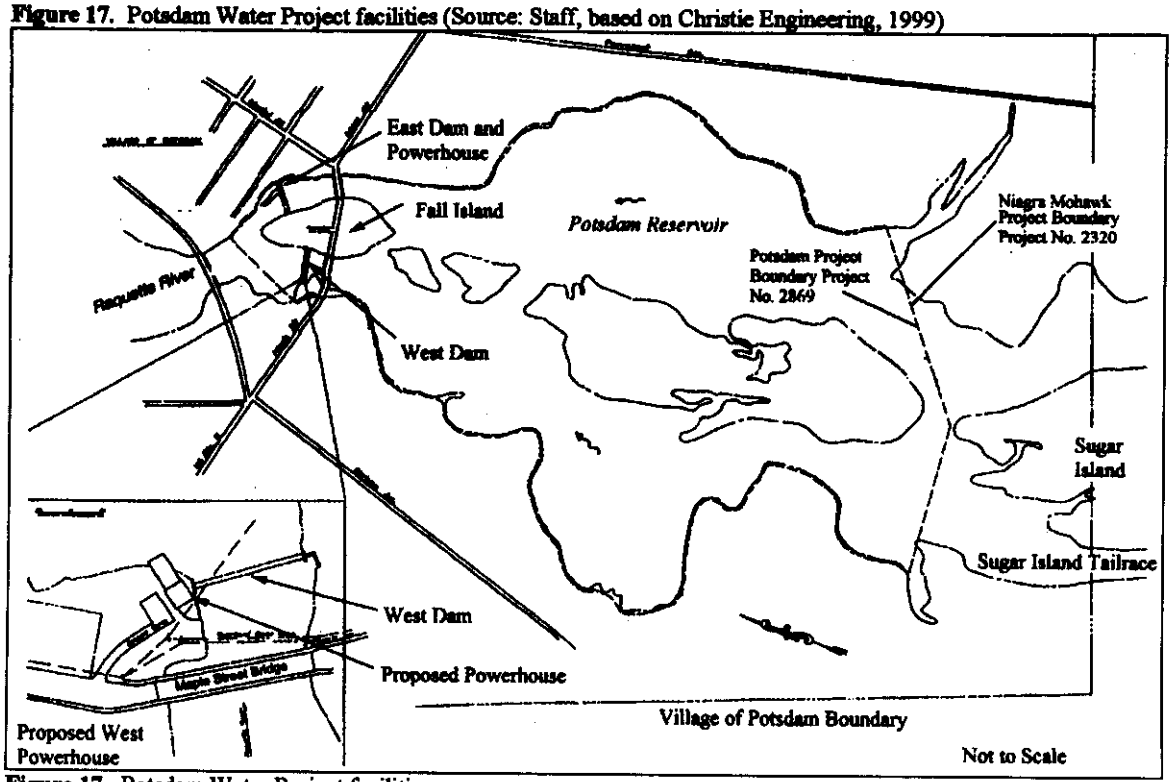

Figure 17. Potsdam Water Project facilities

- ☐¡ install a downstream fish passage sluiceway adjacent to the new intake structure, with a minimum conveyance flow of 40 cfs;

- ☐¡ install 1-foot-high inflatable flashboards, to be inflated and put into operation when the new West dam facility is generating (combined river flows in the East and West channel are greater than 900 cfs). This will maintain the water level in the reservoir at current operating levels and will reduce the effects on Sugar Island tailrace and bypassed reach;

- ☐¡ install trashracks, with 1-inch clear bar spacing, on the intake structure;

- ☐¡ implement a recreation plan for village-owned recreational facilities, including a promenade, trail along the river banks, bikeways, two canoe launch sites, interpretive plaques along the pathways, improvements to Sandstoner Park, and a canoe landing day use area; and

- ☐¡ review final plans for the design of the powerhouse with the State Historic Preservation Officer (SHPO).

3. Additional Staff-recommended Measures

By rule, any order granting approval of an amendment to an exemption would include the mandatory conditions of fish and wildlife resource agencies filed in response to our notice of application for amendment of exemption. We include these conditions here.

- ☐¡ operate the project in a ROR mode such that reservoir elevations are unchanged from those that currently exist with only the East powerhouse in operation;

- ☐¡ develop and implement a plan to assess project effects on the Sugar Island bypassed reach in consultation with FWS and NYSDEC, to determine if the negotiated flows in the Settlement for the Raquette River Projects still meet the management goal for the Sugar Island bypassed reach with the revised operations at the Potsdam Water Power Project, and if not, mitigate any adverse effects resulting from the revised operations;

- ☐¡ file designs for the fish protection and passage facilities, which include trashracks with 1-inch clear bar spacing, a sluice for safe downstream fish

movement, an adequate plunge pool at the sluice outlet, and adequate fish attraction and conveyance flows for both the West powerhouse and the East powerhouse, with FWS.

F. No Action

The no-action alternative addressed in this final MPEA would result in no change to the current environmental setting in the project areas. Under the no-action alternative, the projects would continue to operate as required by the original project licenses or exemption. No alterations or enhancements to existing environmental conditions would occur. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

G. Alternatives Considered But Eliminated from Detailed Study

1. Raquette River Projects

We considered several other alternatives to Erie's relicensing proposals but eliminated them from detailed study because they are not reasonable in the circumstances of these proceedings. They are: (1) federal takeover and operation of any of the projects; (2) issuing a nonpower license for any of the projects; and (3) retirement of any of the projects.

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of any of the projects would require Congressional approval. While that fact would not preclude further consideration of this alternative, there is 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 any of the projects.

A nonpower license is a temporary license which the Commission would terminate whenever it determines that another governmental agency would assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. In these proceedings, no agency has suggested its willingness or ability to do so. No party has sought a nonpower license, and since the power is needed, we have no basis for concluding that the projects should no longer be used to produce power, as long as it is economically beneficial to do so. Thus, nonpower licenses are not a realistic alternative to relicensing in these circumstances.

Project retirement could be accomplished with or without dam removal, but either alternative would involve denial of the relicense applications or surrender or termination of the existing licenses with appropriate conditions. No participant suggested that dam removal would be appropriate, and we have found no adequate basis for recommending it at this time. The current projects and reservoirs provide recreational opportunities and fish and wildlife habitat. Thus, dam removal is not a reasonable alternative to licensing the projects with appropriate protection and enhancement measures.

The second retirement strategy would involve retaining the dams and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. Another governmental agency would have to assume regulatory control and supervision of the dam and remaining facilities. As with the dam removal alternative, project capacity and energy would have to be replaced. No participant has advocated this alternative.

2. Potsdam Water Power Project

We considered denial of the application for amendment of exemption but eliminated it from detailed study in the final MPEA because it was not reasonable in the circumstances of this case. The alternative of denial of the amendment of exemption for Potsdam to continue operating the project would result in no further production of low-cost power at the site. The denial would not be in the best interest of the public because the energy produced by a reliable, low-cost generating facility, which produces no atmospheric pollution, would have to be replaced. Replacing the project's energy with high-cost energy, produced by fossil-fueled generating facilities, would increase atmospheric pollution and consume non-renewable energy resources.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation and Interventions

On July 15, 1999, the Commission issued public notices indicating that the license applications for the Carry Falls, Upper, Middle, and Lower Raquette River Projects were ready for environmental analysis and soliciting protests and interventions, and terms and conditions. In response to these public notices, the following entities filed comments:

Commenting Entities	Date of Letter

Adirondack Mountain Club	September 7, 1999
U.S. Department of the Interior	September 9, 1999
New York State Department of Environmental Conservation	September 14, 1999

All commentors requested that the Commission adopt the provisions of the Settlement as the preferred alternative in the MPEA. Further, Interior and NYSDEC urge the Commission to include all of the provisions, except those identified by the signatories as not to be included, in their entirety and without modification in any licenses issued for these projects. Erie filed a reply to Interior's comment letter on October 14, 1999, pointing out two discrepancies between Interior's terms and conditions and the Settlement. We discuss these discrepancies in section VIII of this final MPEA.

In addition to providing comments, organizations and individuals may also petition to intervene and become a party to subsequent proceedings. The following entities intervened in the relicensing proceedings, but do not oppose the projects:

Intervenors	Date of Motion
U.S. Department of the Interior[11]	September 3, 1999
Adirondack Mountain Club	September 7, 1999
Adirondack Park Agency	September 9, 1999
New York State Department of Environmental Conservation	September 13, 1999

Middle and Lower Raquette River Projects

On February 23, 1993, the Commission issued notices that NMPC had filed applications to relicense the Middle Raquette River and Lower Raquette Projects. These notices set April 30, 1993, as the deadline for filing protests and motions to intervene. In response to these public notices, the following entities intervened in the relicensing proceedings.

Intervenors	Date of Motion

[11] Interior also filed motions to supplement its prior motions to intervene in the Middle and Lower Raquette River Projects relicensing proceedings.

New York State Department of Environmental Conservation	March 8, 1993
Adirondack Mountain Club	April 26, 1993
U.S. Department of the Interior	April 28, 1993
Adirondack Park Agency[12]	April 29, 1993
New York Rivers United	April 29, 1993
St. Regis Mohawk Tribe[13]	August 25, 1998

Potsdam Water Power Project

On August 25, 1999, the Commission issued a public notice of an Amendment of Application for an Amendment of Exemption for the Potsdam Water Power Project. In response to the public notice, the following entities filed comments:

Commenting Entities	Date of Letter
Adirondack Mountain Club	October 4, 1999
New York State Department of Environmental Conservation	October 7, 1999
U.S. Department of the Interior	October 12, 1999

On November 16, 1998, the Commission issued a notice of Potsdam's application to amend the exemption of the Potsdam Water Power Project. The notice established a December 21, 1998, deadline for filing interventions and comments. In response to the public notice, the following entities intervened in the proceeding:

Intervenors	Date of Motion
Natural Heritage Institute	December 18, 1998
U.S. Department of the Interior	December 18, 1998
New York State Department of Environmental Conservation	January 12, 1999

[12] Intervention in the Middle Raquette River Project relicensing proceeding.

[13] Late-filed intervention in the Lower Raquette River Project relicensing proceeding.

Interior intervened in opposition to the proceeding.

B. Comments on the draft MPEA

The following entities filed comments letters on the draft MPEA:

Commenting Entities	Date of Letter
Adirondack Mountain Club	July 11, 2000
New York State Department of Environmental Conservation	July 20, 2000
Erie Boulevard Hydropower LP	July 27, 2000
St. Regis Mohawk Tribe	July 24, 2000
U.S. Department of the Interior	July 31, 2000

C. Mandatory Requirements

1. Water Quality Certification

Under section 401(a)(1) of the Clean Water Act (CWA), license applicants must obtain either state certification that any discharge from a project would comply with applicable provisions of the CWA or a waiver of certification by the appropriate state agency.

In 1991, NMPC applied to NYSDEC for Water Quality Certification (WQC) for the Lower and Middle Raquette River Projects. NYSDEC denied the WQC for these two projects on November 19, 1992. Litigation and settlement negotiations ensued over the next 6 years. Following execution of the final Settlement, Erie applied to NYSDEC for WQCs for the Carry Falls and Upper Raquette River Projects on April 24, 1998. NYSDEC issued a WQC for each of the four Raquette River Projects on June 11, 1998.

The WQCs specify that Erie meet all the terms and conditions of the Settlement relating to water quality, as well as NYSDEC standard conditions for the protection of water quality under state regulations implementing section 401. These standard conditions deal with the following: (1) compliance inspections; (2) cessation of flows through the turbines prior to any maintenance dredging in the intake or forebay area, testing any sediments to be removed, and prior approval of disposal locations of any

contaminated sediments; (3) approval and implementation of an ESCP prior to commencing any activities that could adversely affect water quality; (4) design of any temporary structures that could encroach on the river bed or bank in accordance with an ESCP; (5) maintenance of flows to maintain water quality standards throughout any construction period; (6) monitoring potential turbidity during any construction activity and taking corrective action when turbidity occurs; and (7) notifying NYSDEC at least 2 weeks prior to any work subject to conditions 2 through 6.

2. Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission must require a licensee to construct, operate, and maintain such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce. By letter dated September 9, 1999, Interior requested that we reserve our authority to require such fishways as Interior may prescribe in the future, including measures to evaluate the need for fishways and to determine, ensure, or improve the effectiveness of such fishways. Interior states that this reservation includes authority to prescribe fishways at these projects for any fish species to be managed, enhanced, protected, or restored to the basin during the term of the licenses. Section 2.10 of the Settlement reserves Interior's authority to prescribe such fishways should fishery management goals or other needs change during the term of the licenses.

3. Coastal Zone Management Act

The Carry Falls, Upper and Middle Raquette River Projects, and the Potsdam Water Power Project are located upstream of the Lower Raquette River Project, and are located outside New York's coastal zone management boundary. It is our assessment that no coastal zone consistency certifications are needed for these projects.

The Lower Raquette River Project is located just upstream of a New York State (NYS)-designated coastal zone management area. The coastal zone program in New York is administered by the New York Department of State, Division of Coastal Resources and Waterfront Revitalization. NMPC requested a coastal zone consistency determination for the Lower Raquette River Project by letter dated September 29, 1992. The state concurred with NMPC's consistency determination by letter dated March 24, 1993 (letter from George R. Stafford, Division of Coastal Resources and Waterfront Revitalization, Albany, NY, to Jorge Villali, Licensing Engineer, NMPC, Syracuse, NY, dated March 24, 1993).

V. ENVIRONMENTAL ANALYSIS

A. General Description of the Raquette River Basin

The Raquette River drainage flows through a four-county area in northern New York State with a drainage basin of 1,269 square miles (figure 1). The Raquette River is more than 120 miles long and is the second longest river in the state. The headwaters of the river originate from a mountainous plateau region of Blue Mountain Lake, located in the central Adirondack Mountains, at about 1,800 feet above mean sea level (ft msl). The Raquette River flows generally north-northwest and ultimately drains into the St. Lawrence River near Massena, New York.

The climate in this region is characterized by extremely cold, snowy winters and very cool, wet summers. This area is high in both elevation and latitude. Temperatures range from an average of 15°F in January and an average of 65°F in July. Annual precipitation averages more than 35 inches, and substantial snowfall averages are between 90 to 165 inches.

Vegetation in the vicinity is classified predominantly as forested and brushland, which is characteristic of steep foothill topography. The projects are located within the Adirondack Transition Zone, which is defined as a foothill region that goes from level ground to rolling hills. Between the Carry Falls Project and the Potsdam Water Power Project, the topography consists of irregular hills, 200 to 500 feet higher than the river, separated by wide swampy valleys. Between Potsdam and the St. Lawrence River, the river flows in a narrow valley cut 20 to 30 feet into a sloping plain. Portions of the Raquette River are within the Adirondack Mountains and contain numerous lakes and glacially formed ponds which represent considerable natural water storage. There is a small land area of wetlands, most of which occur along the tributary streams and drainages emptying into project reservoirs.

The land bordering this river, within and adjacent to the Adirondack State Park (Park), is primarily undeveloped woodland, with small pockets of development located in the valleys, and scattered recreational facilities. Five developments occupy land within the Park boundary, and the remainder of the developments are located to the north of the Park. The Adirondack Park Agency and municipal and state agencies exercise strict jurisdiction over land use (including wetlands) in these areas. Population density in the project areas is quite low, as there are very few roads within proximity to the river. The largest villages along the river are Potsdam, with a population of 16,822, and Massena, with a population of 13,826. Small hamlets and villages make up the

residential development of the surrounding region.

There are currently 19 hydroelectric developments and one storage reservoir regulating flow along the river's length (table 2); Erie owns and operates 16 of these; Potsdam owns and operates one; and Adirondack Hydro owns and operates the remaining three. The southernmost and furthest upstream licensed project is the Piercefield Project located at RM 88 in the village of Piercefield. The Raymondville Project is the furthest north and furthest downstream licensed project located at RM 20 in the town of Norfolk.

The developments are operated for downstream flow regulation, flood control, recreation, water supply, water quality management, and power generation.

B. Scope of the Cumulative Effects Analysis

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

We have determined that water quality, fisheries, and recreational resources may be affected in a cumulative manner by the relicensing of the Carry Falls Project, Upper Raquette, Middle Raquette, and Lower Raquette River Projects; by granting the amendment to the Potsdam exemption; and by other activities on the Raquette River. These other activities include the operation of other hydroelectric projects on the river, flow releases from other projects, and/or municipal and other wastewater discharges.

1. Geographic Scope

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

In this case, for water quality, fisheries, and recreational resources, the scope of our analysis encompasses the main stem Raquette River from the upstream limit of the Carry Falls Project, located approximately at RM 75 on the Raquette River, downstream to its confluence with the St. Lawrence River. We chose this geographic scope for these resources because the effects of project operations are limited to this

area and, in this case, these resources are directly and indirectly affected by project operations.

Table 2. Hydroelectric developments on the Raquette River (Source: Erie, 1999)

Project name	FERC No.	Installed capacity (kW)	Drainage area (sq mi)	Surface area (acres)	Approx RM
Piercefield[a]	7387	2,700	721	370	88
Carry Falls[a]	2060	0	877	3,000	68
Stark[a]	2084	23,872	877	641	66
Blake[a]	2084	13,913	907	660	62
Rainbow Falls[a]	2084	22,828	929	710	56
Five Falls[a]	2084	22,828	932	120	54
South Colton[a]	2084	18,948	937	225	52
Higley[a]	2320	4,972	979	742	47
Colton[a]	2320	30,101	981	195	45
Hannawa[a]	2320	7,200	993	204	39
Sugar Island[a]	2320	4,800	994	29	38
Potsdam[b]	2869	800	1,031	300	35
Sissonville	9260	2,300	1,025	30	33
Hewittville[b]	2498	2,600	1,036	90	32
Unionville[b]	2499	3,000	1,036	35	31
Norwood[a]	2330	2,000	1,045	350	28
Yaleville[a]	9222	700	1,046	70	25
East Norfolk[a]	2330	3,500	1,063	135	23
Norfolk[a]	2330	4,500	1,066	10	22
Raymondville[a]	2330	2,000	1,125	50	20

[a] Owned and operated by Erie.
[b] Exempted project.

2. Temporal Scope

The temporal scope of our cumulative effects analysis in the final MPEA includes past, present, and future actions and their effects on each resource that could be cumulatively affected. Based on the license terms, the temporal scope looks 30 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. The historical discussion is, by necessity, limited to the amount of available information for each resource.

C. Proposed Action and Action Alternatives

1. Geology and Soils

a. Affected environment: The Raquette River Projects occur within three physiographic provinces: the Adirondack Highlands; the Adirondack Lowlands; and the St. Lawrence Lowlands. The topography of the Adirondack Highlands consists of rolling, irregular hills, with a maximum relief ranging from 300 to 400 feet. Conversely, the topography of the St. Lawrence Lowlands is characterized as flat to gently rolling, although low hills are common with a general relief of less than 100 feet. The Adirondack Lowlands, also known as the Grenville Lowlands, create a distinct topographic break which marks the boundary zone between the Adirondack Highlands and the St. Lawrence Lowlands. Its topography is a narrow strip consisting of a series of alternating narrow ridges or elongated hills and flat-bottomed valleys.

The geologic boundaries of this region are complementary to their physiographic boundaries. The topographic break which exists between the mountain and the valley provinces marks the geologic boundary between the Precambrian metamorphic rocks of the southern region and the early Paleozoic sedimentary rocks of the northern region.

The majority of the Raquette River Project area is covered by a veneer of Pleistocene glacial deposits left by the retreating ice. All the major features of the topography are the products of stream erosion, largely preglacial in age, but many minor features are the result of superimposition of deposits from the ice and its melt waters. These include ground moraine, terminal moraines, eskers, kames, and deltas. Glacial drift is usually eroded from the tops of the higher hills, but some valley deposits are still thick and obscure the bedrock slopes.

Soils in the region of the Raquette River exhibit many differences in texture, structure, color, and chemistry of the soil-forming materials, as well as in modes of

deposition. Glaciation is the dominant factor controlling the deposition of soils and potential parent soil material in this region. Generally, in the southern parts of the project areas, the material is largely ice-laid in the form of ground moraines of varying thickness, while in the more northern parts, the material is ice-laid in the form of drumlins or water-laid in the form of deltas, beaches, and kames. Soil types in the project areas include medium sandy loam, fine sandy loam, fine sand, loam, silt loam, and clay loam.
Generally, sandy soils are most prevalent in the southern part of St. Lawrence County which includes the Carry Falls and Upper Raquette River Projects. Heavier clay soils are most prevalent in the northern region and along the St. Lawrence River.

Carry Falls Project

The Carry Falls Project area lies within the northwest corner of the Adirondack Park. To the south, lie the headwaters of the Raquette River and the heart of the Adirondack Mountain range, with peak elevations from 2,700 feet at Mount Matumbla to 5,344 feet at Mount Marcy, the highest point in New York. The Carry Falls Project lies within the Adirondack Highlands. This province is underlain predominantly by igneous granite gneisses of Precambrian age and minor amounts of rocks of the Post Grenville series. Rocks here are resistant to weathering due to metamorphic recrystallization and thus remain topographically higher than the lowlands.

Upper Raquette River Project

The Upper Raquette River Project area lies partially within the Adirondack Park boundary. The entire Upper Raquette River Project is within the Adirondack Highlands physiographic province of the Adirondack Piedmont. The Adirondack Highlands, as expressed at the existing Carry Falls Project, is underlain predominantly by igneous granite gneisses of Precambrian age. Both regions of the Upper Raquette River Project and portions of the Carry Falls Project were crossed by early Pleistocene glaciers. Two significant continental glaciers were the Malone and Fort Covington glaciations. The Malone glaciation came from the northeast and deposited what is referred to as "Malone till", that is red-brown in color. The second glaciation, the Fort Covington, came from the northwest and deposited "Fort Covington till", that is slate-gray when fresh, but yellow-gray buff upon weathering. These two tills contribute to a considerable thickness of lacustrine and lake deposits including sands, gravels, varied clays, and mud.

Middle Raquette River Project

The Middle Raquette River Project exhibits the most physiographic variation of provinces. The entire Higley development and the reservoir and upper portion of the Colton development's bypassed reach lie within the Adirondack Highlands. The Precambrian rocks found in this area are generally covered by a thin discontinuous till. Most of the deltaic sand, kame, and moraine belts of this area are now submerged in the Higley reservoir.

The lower portions of the Colton development lie within the Adirondack Lowlands. The bedrock boundary between the Adirondack Highlands and Lowlands provinces is located within the Colton bypassed reach, just downstream of the dam at Colton. This boundary separates the dominantly metamorphosed igneous intrusive rocks of the Highlands, from the dominantly metasedimentary rocks and associated migmatites of the Lowlands. The dominant slopes in the vicinity of the dams range from gently sloping (3-8 percent slopes) to moderately steep (15-25 percent slopes).

The remaining developments, Hannawa and Sugar Island, lie entirely within the St. Lawrence Lowlands. The St. Lawrence Lowlands are characterized by metasedimentary rocks as well as Grenville limestone, quartzite, and quartz schist. A large deltaic sand plain along the banks of the Raquette River exists at both developments. The bedrock underlying the area is the Potsdam sandstone of early Paleozoic age. The existing concrete structures, including the canal headworks, dams, and intake structures, penstocks, and powerhouses are anchored in this sandstone.

Lower Raquette River Project

The entire Lower Raquette River Project lies within the St. Lawrence Lowlands. As expressed at the Sugar Island and Hannawa developments of the Middle Raquette River Project, the St. Lawrence Lowlands are underlain by the relatively flat-lying metasedimentary rocks as well as Grenville limestone, quartzite, and quartz schist. The Paleozoic rocks of the St. Lawrence lowlands are overlain by an almost continuous mantle of Pleistocene glacial deposits.

The Norwood development is underlain by sedimentary formations of Cambrian to early Ordovician age, namely Ogdensburg dolomite, sandstones, and mixed beds. The sandstones and mixed beds are distributed at the existing concrete dam and powerhouse site. Similarly, the East Norfolk, Norfolk, and Raymondville developments are predominantly underlain by Ogdensburg dolomite. All of these developments are bounded on their reservoir banks with mainly till plains with narrow

belts of sand along the shoreline. Some winnowed till ridges parallel to the reservoirs are distributed in the adjacent areas. The existing concrete dams for the East Norfolk, Norfolk, and Raymondville developments are constructed on limestone. The dominant slope phases for each of the developments range from gently sloping (3-8 percent slopes) to nearly level (0-3 percent slopes).

Potsdam Water Power Project

The Potsdam Water Power Project lies within the St. Lawrence Lowlands physiographic province. The St. Lawrence Lowlands are primarily glacial drift overlaying relatively flat sedimentary rock. A narrow outcropping of granite gneiss forms a short rapids at Falls Island, and both dams are built on this outcropping. The construction site of the proposed West dam is primarily sand and gravel fill with a soil depth of 15 feet over bedrock.

b. Environmental effects: The activities proposed in the Settlement would have no effect on the existing geology of the project sites. Potential effects on soils are associated with soil stability and concerns for erosion and sedimentation. Many of the proposed recreational enhancements, such as canoe portage trails, picnic areas, and car-top boat launches, involve land disturbing activities that could result in localized short-term increases in erosion and sedimentation near the river. Steep areas and areas cleared of vegetation are particularly susceptible to erosion.

The Settlement does not propose any measures to control the potential effects of erosion and sediment disturbance on water quality during construction associated with the implementation of the proposed environmental enhancement measures. NYSDEC's standard conditions contained in the WQC for each project specify that prior to commencing any activities that could adversely affect water quality, Erie must receive NYSDEC approval of an ESCP.

Potsdam Water Power Project

Potsdam proposes to perform all construction related to the new powerhouse and installation of the inflatable flashboard in dry conditions. Potsdam proposes to install a temporary cofferdam to isolate the construction area of the new powerhouse from the main river and channel flow. In response to NYSDEC's concern that soil in this area might be contaminated with oil products, Potsdam tested the soil in 1995. The test results showed that the fill consists of fractured limestone fragments intermixed with site fill which would not be expected to represent a significant environmental concern (NTS, 1995).

Our Analysis

Implementation of the proposed environmental enhancements including installation of trashracks and downstream fish protection devices, streambed modifications, and the construction of recreational improvements could result in the temporary disturbance of existing soils.

Development and implementation of proper soil and erosion control practices, as specified by NYSDEC, would protect water quality in the Raquette River from any increase in sedimentation during construction activities, and the subsequent maintenance of the newly constructed facilities. Soil erosion and sedimentation would be minimized by appropriate erosion and sediment control practices.

Therefore, we recommend that, prior to commencement of any land-disturbing activities, Erie file with the Commission, for approval, a site-specific ESCP prepared in consultation with NYSDEC, FWS, Corps, and the St. Regis Mohawk Tribe for lands within or adjacent to the reservation that provides details of the soil erosion and sedimentation controls that would be implemented to minimize soil erosion. Also, any site-specific ESCP should address the need for contaminant screening of sediments prior to any removal and disposal of sediments.

Potsdam Water Power Project

Construction of the new powerhouse and installation of the inflatable flashboard would result in temporary soil disturbance. Installation of the temporary cofferdam as proposed by Potsdam would ensure that any excavation associated with the construction of the new powerhouse would be done under dry conditions minimizing any potential effects to water quality in the Raquette River. Construction drawings for the temporary cofferdam would be filed with the Commission for approval.

Development and implementation of proper soil and erosion control practices, as was done for the reconstruction of the West dam in 1990, also would help to protect water quality in the Raquette River from potential increases in sedimentation during construction activities. Therefore, we recommend that, prior to commencing any land-disturbing activities, Potsdam file with the Commission for approval, a site-specific ESCP prepared in consultation with the NYSDEC, FWS, and the Corps. The plan should detail the soil and erosion control measures that would be implemented to minimize the erosion and transport of soils.

c. Cumulative effects: None.

d. Unavoidable adverse effects: Construction of proposed recreational enhancements, including boat launches, boat take-outs/put-ins, and portage trails may result in minor, short-term increases in erosion and sedimentation. Construction of the new powerhouse at the West dam of the Potsdam Water Power Project also may result in minor, short-term increases in erosion and sedimentation. Implementation of approved site-specific ESCPs would minimize these impacts.

2. Water Resources

a. Affected environment:

Water Use and Quantity

The Raquette River is more than 120 miles long and drains an area of 1,269 square miles. The headwaters of the river originate in the mountainous Adirondack region of New York. The river flows north and finally drains into the St. Lawrence River near Massena, New York. The study area for this MPEA focuses on the river from Piercefield north to Massena. Table 3 shows the streamflow record for the three USGS gaging stations within this reach at Piercefield, South Colton, and Raymondville. The most recent calculation of the 7-day low flow discharge over a 10-year return period (7Q10) using data from the Raymondville gage over the 1953 through 1975 record, is 420 cfs. (NMPC, 1991a, p. 2-6)

Table 3. Average, minimum, and maximum daily discharges at USGS streamflow gages on the Raquette River (Source: Staff).

Gage	Drainage area (sq mi)	Period of record	Average daily discharge (for period of record)	Min. daily discharge (for period of record)	Max. daily discharge
04266500 Piercefield	721	1908-1993	1,314 cfs	4.1 cfs (10/21/47)	8,500 cfs (4/27/93)
04267500 South Colton	937	1953-1993	1,800 cfs	4.6 cfs (6/2/54)	9,720 cfs (5/11/71)

04268000 Raymondville	1,125	1943-1993	2,104 cfs	7.0 cfs (10/15/51)	13,000 cfs (4/5/74)

The Raquette River Projects are primarily regulated by flows released from the Carry Falls Project. Carry Falls is the only one of the 15 developments included in this MPEA that does not directly generate power. Its purpose is critical to hydropower generation, however, because it provides seasonal and daily flow regulation to facilitate the peaking and/or load-following operation of the downstream Upper Raquette River Project. All five of the Upper Raquette reservoirs experience some drawdown. Erie currently operates the Stark reservoir over a wide range (greater than 20 feet) necessary to reregulate the inflow from upstream Carry storage reservoir. The other four reservoirs experience only a 1 to 2 foot drawdown. Within the Middle Raquette Project, discharge is reregulated at the Higley development and passes sequentially through the Colton, Hannawa, and Sugar Island developments. Average efficient discharge of each development is about 1,250 cfs, and maximum discharges of these developments are about 1,500 cfs. A base flow of 450 cfs is intermittently released from Higley. The reservoirs within the Lower and Middle Raquette Projects currently fluctuate from 0.3 to 3.5 feet.

There are no consumptive (industrial, steam electric, irrigation) users of the Raquette River within the Carry Falls, Upper Raquette, and Middle Raquette Project areas. No non-municipal water systems draw water directly from the Raquette River within the study area, although the village of Potsdam draws its water supply from the river and uses the Raquette River for fire fighting, camping, and other domestic uses. Further downstream in the Lower Raquette River Project reach, there are three sewage treatment plants that discharge to the river at Norwood, Norfolk, and Unionville. None of these uses has a significant effect on river flow.

Water Quality

NYSDEC classifies the waters of the Raquette River reservoirs and reaches as Class B. For Class B waters the designated best usages are primary and secondary contact recreation and fishing. These waters also are suitable for fish propagation and survival. The associated tributaries are designated as Class C and D. The best use for class C and D is fishing (NYSDEC, 1998).

The Raquette River from Piercefield to Massena is at the lower end of a transition from coldwater to coolwater aquatic community/fishery as the river flows

down the north face of the Adirondack Mountains to the St. Lawrence River. This reach, which includes all of the projects included in this MPEA, exhibits a gentle downstream shift towards lower gradients, finer substrates, warmer temperatures, higher pHs, higher conductivity and dissolved solids, and higher nutrients. Although these shifts are discernable, total differences from top to bottom of this reach are very gradual.

NMPC conducted riverwide water quality monitoring at a series of eight stations from Piercefield downstream to the hamlet of Raquette River (near Massena) from March through November 1996 (ND&T, 1997). Although the geographical range of the study area covers more than 100 miles of river and more than 1,200 feet of elevation change, surface water temperatures, among project locations on any given day of the 1996 study, seldom varied more than 4°C. DO values throughout the river follow typical seasonal trends with declining levels during the summer as water temperatures increase and increasing levels during the fall as water temperatures drop. Summer DO levels generally remained above 7 mg/l, well within the NYSDEC water quality standard of 5 mg/l average for non-trout waters.

On a riverwide basis, pH increases from Piercefield to Massena and also demonstrates a seasonal declining trend during the spring when flows are high. This is consistent with acid deposition and spring snowmelt in a poorly buffered system. The pH values recorded during the 1996 study ranged from 5.11 to 6.5 in the upper reaches to 6.5 to 7.0 in the lower reaches. The NYSDEC standard for pH values in Class B waters is between 6.5 and 8.5.

Of the reservoirs examined during the peak summer surveys in 1996, only Carry Falls demonstrated sufficient stratification to affect DO. The Carry Falls reservoir is the largest and deepest of the project reservoirs and showed a thermal stratification, with a surface to bottom temperature difference of about 8°C. Although oxygen levels at the bottom temporarily dropped to 0.3 to 2.5mg/l, these water quality profiles are typical for a mesotrophic reservoir of this size during the critical summer months .

Water quality for the Upper Raquette River Project reflects the good to excellent water entering the project reservoirs from the Adirondack Highlands. NYSDEC indicates no substantial stratification of the deep reservoir waters and no use impairment during the summer. According to its study, the reservoirs are low in nutrients and productivity; this finding is corroborated by nutrient data acquired in the watershed by the USGS and NYSDEC, and by the water quality profiles obtained during reservoir studies in July and August 1996 (ND&T, 1997a).

In addition to the reservoir studies during the summer of 1996, the bypassed reaches for the Upper Raquette River developments also were examined to determine the effects of various instream flows on the water quality. In the deepest holes of the bypassed reaches for the Stark, Rainbow, and South Colton developments, under no flow or very low flow, the water column stratified and was nearly anoxic at the bottom. However, with the release of discharges at various levels these waters mix and oxygen levels are restored.

NYSDEC monitors 18 water quality parameters, including nutrients, nine metals, and eight organic materials, at two stations on the Raquette River as part of the Rotating Intensive Basin Studies. Based on data from 1991-1992, for the stations at the NYS Route 3 bridge in Piercefield and the South Main Street Bridge in Massena, NYSDEC assessed the water quality as good at both locations (NYSDEC, 1994). The overall water quality of the study reach is good to excellent, and no substantial project-related water quality deficiencies were noted in any available data.

Potsdam Water Power Project

The 300-acre reservoir is immediately downstream of the Sugar Island tailrace and bypassed reach. A series of islands nearly divides the reservoir in two. Fall Island separates the East dam and powerhouse from the West dam and the site of the proposed second powerhouse. Most of the flow passes through the west channel.

Water quality information for the former West dam license application and the current application to amend the exemption is largely data from other locations in the Raquette River, except for a few temperature and DO measurements taken during October 1995. Available water quality data from above and below the Potsdam Water Power Project do not show large differences, supporting the conclusion that the effect of the Potsdam Water Power Project on Raquette River water quality is minor.

b. Environmental effects: Erie proposes to provide instream flows and limit reservoir drawdowns. Erie also proposes to develop, in consultation with the agencies, a flow monitoring plan that would include staff gages in all the reservoirs and tailwaters.

By design, the recommended flow volumes and periodicity at each facility were derived to enhance and/or protect forage fish, benthic invertebrate production, fish movement, fishing opportunities, water quality, and for other purposes. In some cases

the management goal is to re-create a complete riverine ecosystem. Because the instream flows primarily benefit fishery resources, we discuss the specific flow recommendations and their effects in section V.C.3.

Potsdam Water Power Project

Potsdam conducted an incremental backwater study using the Corp's HEC-2 step backwater program to document the changes in elevation as a function of inflow to the reservoir (Christie Engineering, 1998). The study focused on locations at the head of Falls Island, in the tailrace of the Sugar Island development (cross section No. 25.150), and in the bypassed reach of the Sugar Island development at the downstream end of Ichthyological Associates's (IA's) instream study reach (cross section No. 12.130) and the downstream most section of reach used in the IA study (transect No. 1, cross section No. 16.150). Potsdam assumed a minimum flow of 300 cfs into the bypassed reach at the Sugar Island development and a hydraulic capacity of 900 cfs. The study concluded that the water levels at the upstream edge of Falls Island would drop a maximum of 0.6 feet at a flow of 1,800 cfs, would drop a maximum of 0.3 feet at the end of the Sugar Island bypassed reach, and would drop a maximum of 0.23 feet in the tailwater of the Sugar Island development.

NMPC and the agencies challenged the bypassed flow and hydraulic capacity assumptions of the study indicating that both were too low. Specifically, the Settlement specifies a year round minimum flow of 300 cfs with an increase to 400 cfs during walleye spawning season. NMPC stated that the existing and proposed hydraulic capacity of the Sugar Island development is 1,190 cfs. NMPC points out that with flows up to 1,200 cfs, the assumptions used by Potsdam would be correct, but with flows over 1,200 cfs (which would occur about 75 percent of the time), the HEC-2 model incorrectly assumes that the bypassed reach is receiving additional spill flow sooner in the flow regime than would actually occur, resulting in higher water surface elevations and depths.

Potsdam conducted additional backwater studies using the new assumptions provided by Erie, and including its new proposal to install an inflatable flashboard system. The new HEC-2 study used the same data points as the original with an additional point at the mid-point of the wetland area along the west bank of the reservoir (cross section No. 19.165). The study considered five alternative heights for the inflatable flashboard of 0 inches (existing), 0.7 feet, 0.8 feet, 0.9 feet, and 1.0 feet. The analysis assumed that the flashboard would operate only when the West powerhouse was operating (when flows in the West channel reach 450 cfs and total

river flow reaches 900 cfs). When the river flow exceeds the capacity of the combined powerhouses, water would be spilled over the dam.

The new study concluded there would be no change in water surface elevation at any flow at the bypassed reach location, a maximum deviation of 0.06 feet at the location in the bypassed reach at cross section No.12.130 at flows of 810 cfs, a maximum deviation of 0.03 feet at the tailrace location at cross section No. 25.150, and a maximum deviation of 0.08 feet (lower) at the wetland at cross section No. 19.165. At the upstream edge of Falls Island the maximum difference in reservoir elevation between existing and proposed conditions is slightly less than 0.1 feet up to a flow of about 3,000 cfs and zero difference up to flows of 1,250 cfs. Figure 18 shows the variation at the Falls Island location of the five flashboard heights. Potsdam, therefore, proposes to install a 1-foot inflatable flashboard because it most closely matches existing conditions at this location.

NYSDEC indicates that it does not object to the use of an inflatable flashboard system to maintain the existing water elevations in the reservoir but would require that Potsdam certify that the project would not alter the existing hydrology of New York State

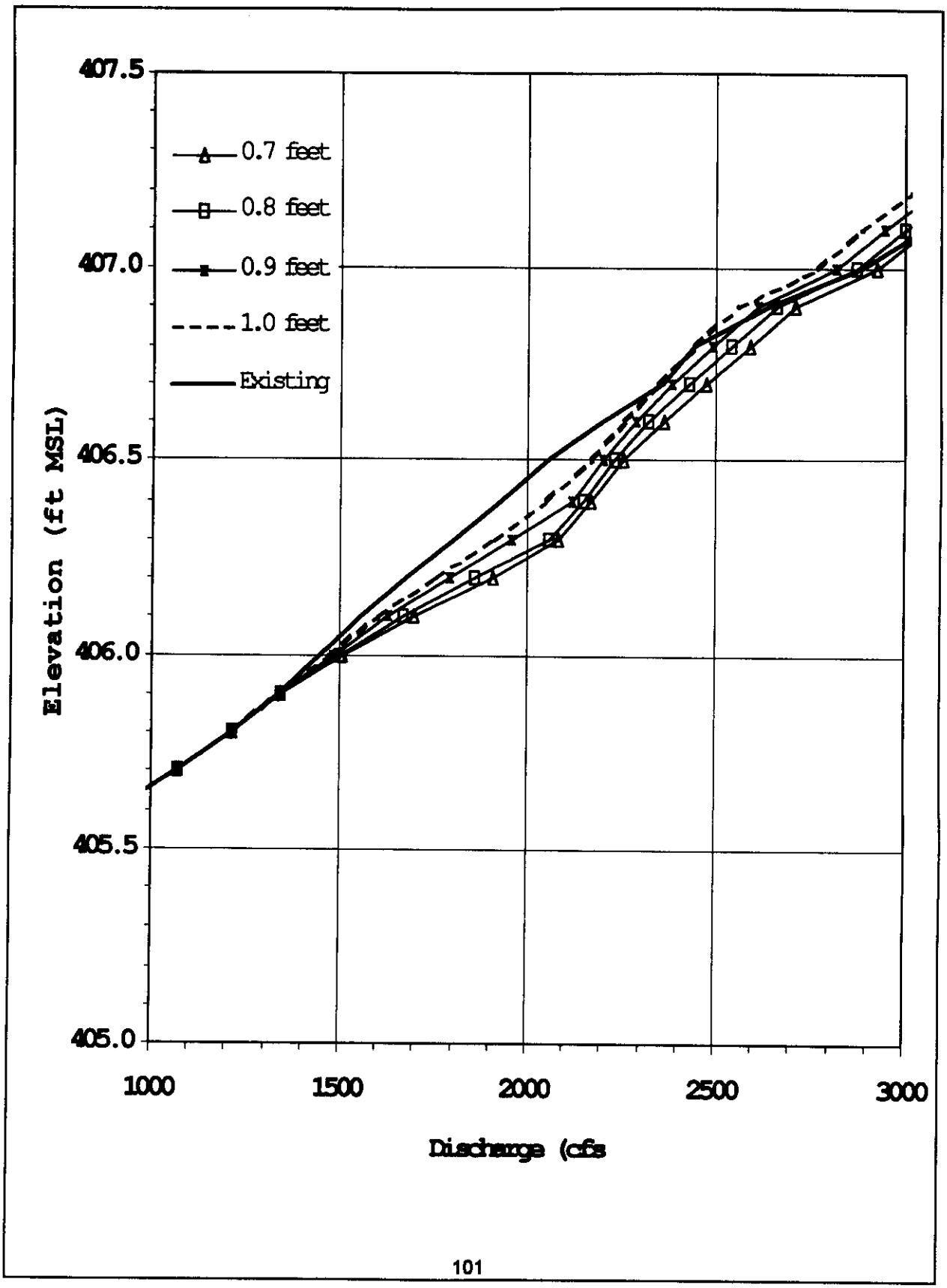
407.5
407.0
406.5
406.0
405.5
405.0
Elevation (ft MSL)
0.7 feet
0.8 feet
0.9 feet
1.0 feet
Existing
1000
1500
2000
2500
3000
Discharge (cfs

Figure 18. Comparison of water level elevations at flows between 1,000 cfs and 3,000 cfs for alternative inflatable flashboard heights (Source: Staff, based on Christie Engineering, 1999)

regulated freshwater wetlands within the Potsdam reservoir. Interior specifies that Potsdam would need to develop a plan within 60 days of any approval of amendment, in consultation with the FWS and NYSDEC, to assess the impacts of the project on the Sugar Island bypassed reach. The plan would need to determine whether the negotiated flows for the Sugar Island bypassed reach (as reflected in the Settlement) would still meet the management goals with the revised operations at the Potsdam Water Power Project. Interior further specifies that should the flows fail to meet management goals as determined by FWS and NYSDEC, then Potsdam would be required to mitigate for any adverse effects including compensating Erie for the loss generation associated with releasing any additional flows that would be required.

Our Analysis

The instream flows proposed by Erie would provide continuity of flows, enhance mixing and aeration of river water, and effectively increase water quality and waste-assimilation capacity of the river. Proposed continuous minimum flows to bypassed reaches would have a dramatic positive effect on benthic macroinvertebrate production and restore both instream and riparian habitat. Sustained minimum flows in the Stark and Rainbow bypassed reaches should eliminate the formation of temperature gradients and near anoxic conditions in deep pools by keeping these reaches well mixed.

The proposed limitations on reservoir fluctuations would either maintain the status quo or reduce existing drawdowns in all but the Colton reservoir. Where the magnitude of fluctuations is reduced, primary productivity would be improved, which would incrementally enhance other trophic levels within the aquatic system. Stable water levels also would contribute to improved spawning and rearing habitat for fish and for benthic invertebrate development. Colton is the only reservoir where water level fluctuation would increase. However, the anticipated increase from 0.3 to 0.4 foot (1.2 inches) would have no significant adverse effect on water quality in the reservoir (see section V.C.3).

Erie proposes a reduction of annual or semi-annual drawdowns by 23.0 feet in the Carry Falls reservoir (see figure 19). The result of this change would be a very large increase in the littoral zone with attendant retention of nutrients and increased

productivity in the reservoir. Similarly, headpond sediments would be less exposed to the elements (air and ice), which would have a positive impact on substrate stability and consolidation, further supporting submergent and emergent vegetation (see section V.C.4).

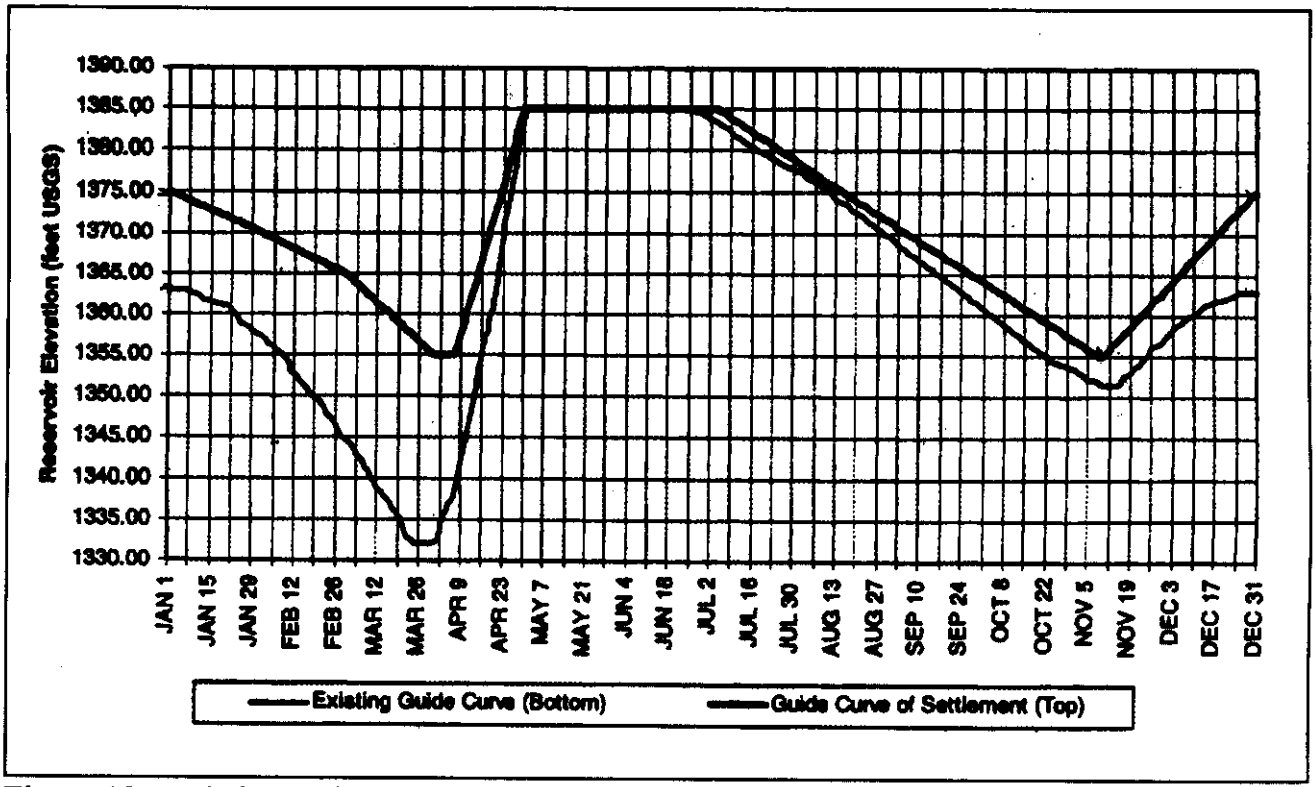

Figure 19. Existing and proposed guide curves at Carry Falls Reservoir (Source: NMPC, 1998, as modified by staff).

The flow regime and drawdown limitation proposed by Erie, consistent with the Settlement, provide an integrated approach to water resources management and enhancement. We would expect water quality in the Raquette River and the bypassed reaches to improve as a result of their implementation.

We agree that continuous headwater and tailwater monitoring by Erie at the projects would be necessary to ensure compliance with the recommended flow regimes and drawdown limitations. Gages visible to the public would allow reservoir elevations to be observed when the applicant's staff are not available to provide monitoring data. Therefore, we recommend that Erie develop, in consultation with the signatories to the Settlement, and file with the Commission for approval, a streamflow monitoring plan that is consistent with the provisions of section 10.5 of the Settlement.

Potsdam Water Power Project

We reviewed the methodology used in the backwater study and the amendment to the backwater study and conclude that use of the Corps' HEC-2 step backwater program is a reasonable approach to determine if the proposed West dam powerhouse would alter the existing water elevations in the reservoir. We considered the locations chosen for data analysis and find them reasonable in light of the prior instream flow studies and the need to focus on potential effects to New York State regulated wetlands (see section V.C. 4). The data provided by Potsdam support the conclusion that among the five alternative heights considered in the study, the 1-foot height provides the least variance from existing conditions. We also note that from the data provided, it appears that the variances would increase at heights greater than 1 foot. Under all scenarios, the variance from existing conditions is less than 0.1 feet or slightly more than 1 inch.

Since there is no guarantee that modeled results would be replicated under real conditions, we agree with NYSDEC and Interior that Potsdam should assess the operations of the project to verify that operation with the inflatable flashboard system provides the same approximate rating curves as the existing operations. Potsdam should file a plan to assess whether project operations are meeting the Settlement conditions for the reach downstream of Sugar Island. The plan should include mitigation measures and a provision to implement such mitigation measures should operations fail to maintain existing water levels in the reservoir.

c. Unavoidable adverse effects: None.

d. Cumulative effects: Water quality in the Raquette River is expected to experience a cumulative positive effect as a result of increased flows to the bypassed reaches and reduction in drawdowns at several of the developments.

3. Aquatic Resources

a. Affected environment: The Raquette River currently supports an important and diverse coolwater/warmwater fishery along its length. Up to the turn of the century, however, the lower Raquette River shared the fish fauna of the St. Lawrence River (including Atlantic salmon), which were unable to travel upstream past Hannawa Falls. Above this natural barrier, the upper Raquette River supported a fish community characterized by coldwater species, such as brook trout, lake trout, round whitefish, longnose sucker, slimy sculpin, and lake chub. During the late 1800s, species such as

northern pike, chain pickerel, walleye, and smallmouth bass were introduced into the upper watershed, displacing this native fauna. By 1934, the Raquette River mainstem supported few trout, and forage species were greatly reduced. Additional factors contributing to the decline of fish production were industrial and sewage pollution, watershed deforestation, impoundments for storage for power, artificial flow regimes, and angling pressure. Although water quality has improved in the last 25 years, the native fishery has not responded equally, and few native species have regained their former status.

As a result, the Raquette River between Carry Falls and Raymondville now supports a mixed coolwater/warmwater fishery. Fish species composition is mostly percids (walleye, yellow perch) and centrarchids (sunfish, smallmouth bass, and rock bass) throughout the river and reservoirs along this reach. Walleye and yellow perch stocks are composed mainly of smaller individuals, but smallmouth bass populations have an inordinate proportion of larger fish. Problems with declining walleye stocks, community imbalance, and undesirable length-frequency distributions are attributed to low basin fertility. This increases inter-species and intra-species competition for limited forage resources such as cyprinids (minnows). In the reservoirs, intense competition for zooplankton, and the limited availability of vegetated habitats and the benthic invertebrates they support, appear to be restricting fish populations (IA, 1996).

Habitat Description

Carry Falls Project

The alluvial substrate in the reach below the reservoir is separated into coarse substrate such as boulders and cobble and fine substrate such as sand and gravel. In general, the fine substrates are commonly found on the eastern and upstream shorelines, while the coarse substrates are more abundant on the western and downstream shorelines. The aquatic habitat quality in the Carry Falls reservoir ranges from high to low quality, depending on the location in the reservoir, time of year, and the water level (ND&T, 1997b).

There are indications that the productivity of the Carry Falls reservoir is nutrient limited, receiving its inflow from the Adirondack Highlands. In addition, vegetated habitats are limited further by the large winter drawdown (as much as 50 feet) that also impairs the production of benthic invertebrates, which are a major food source for forage species. Reservoir fluctuation studies undertaken in support of the Carry Falls Project application and the Settlement show a high degree of variability in the aquatic

habitat within the drawdown zone, depending on the substrate (course or fine material) and the underwater slope. Fortunately there are sufficient areas with appropriate conditions to foster perennial wetlands that provide spring spawning and nursery habitat for the fish species that support the fishery in the Carry Falls reservoir.

Mercury levels in Carry Falls reservoir, according to the New York State Department of Health (NYSDOH) and NYSDEC, were determined to be as high as 1.6 ppm, which exceeds the unlimited consumption criterion of 1 ppm. Therefore, the Carry Falls reservoir has been included in a NYSDOH warning about the consumption of walleye since 1992 because of these elevated levels.

Upper Raquette River Project

Riverine habitat in the Upper Raquette River Project area is primarily characterized as riffles and runs, with a substrate consisting of bedrock and an alluvium overlay. The alluvial substrate in the Stark and Blake reaches is dominated by boulders and cobble, with a considerable amount of gravel in the upper parts of the reaches. The Rainbow Falls and Five Falls river reaches consist mainly of bedrock and boulders at higher gradients and a mix of boulder, cobble, and gravel substrates at the lower gradients. The unimpounded river at South Colton consists of mainly pools and chutes/falls, with a substrate of bedrock. However, a large area of riffle/run habitat suitable for walleye spawning exists in the river mainstem immediately downstream of the bypassed reach and South Colton tailrace. The largest number of walleye surveyed in the 1996 Walleye Spawning Survey were found at this site.

Middle Raquette River Project

The majority of the bypassed reaches for the Middle Raquette River Project area are shallow riffle and run habitats, with cobble or mixed cobble/boulder substrate. Exposed bedrock occurs in the high gradient sections of each bypassed reach but is generally not common. Alluvial substrate is relatively well sorted and well rounded, due to the till being worked in the stream during post-glacial times. Fines such as gravel, sand, silt, clay, and organics occur in the bypassed reaches only in small quantities, especially at Hannawa. The Colton bypassed reach has the largest proportion of deep pool habitat; some medium-depth pool habitat is also found in the lower Sugar Island region.

Lower Raquette River Project

Riverine habitat in the Lower Raquette River Project area is characterized by riffles and runs, with infrequent pools, similar to that of the Middle Raquette River Project area. The streambed is predominantly weathered dolomite bedrock, with portions covered by a thin layer of alluvial material such as boulders, cobble, and some gravel. In each of the bypassed reaches, the upper portions are narrow with extensive exposed bedrock accompanied by large boulders. The lower portions have a wider channel with a greater cover of alluvial material. These lower, alluvial substrate portions of the bypassed reaches provide the most suitable physical habitat for fishes, including walleye, and benthic invertebrates.

Potsdam Water Power Project

The bypassed reach of the Potsdam Water Power Project is similar to the lower developments of the Middle Raquette River Project. Habitat consists of riffles and runs, with cobble or mixed cobble/boulder substrate. Sandstone bedrock underlies the well sorted and well rounded alluvial substrate.

Fish Populations

Several fish collection programs, using a variety of capture/observation methods, have been conducted throughout the Raquette River system over the past 20 years. There are no obvious trends in species assemblages among the reservoirs. The bypassed reaches generally yielded more forage species than game species, attributable, at least in part, to the size and depth of the pools and riverine substrate remaining wetted during no flow periods.

Carry Falls Project

The Carry Falls reservoir was sampled intensively on several occasions from 1991 to 1995. The most abundant species in the electrofishing surveys was yellow perch, which represented between 30 to 60 percent of the catch. Smallmouth bass, walleye, and rock bass also were relatively abundant. Rock bass and yellow perch dominated gill net collections followed by walleye and smallmouth bass. Northern pike and brook trout were the only other game species captured. There are no rare, threatened, or endangered species of fish in or near the Carry Falls Project, as established by state or federal listing authorities.

Upper Raquette River Project

The five reservoirs of the Upper Raquette River Project have comparable fish

species assemblages, being dominated by smallmouth bass, yellow perch, and rock bass, and generally supporting 10 to 15 commonly found species. In 1996, NMPC conducted a fish sampling program specifically directed to the bypassed reaches. It showed a predominance of rock bass and small forage species in the lower four reaches, with only moderate diversity. The bypassed reach below Stark was the only reach in the Upper Raquette from which cisco, lake whitefish, northern pike, bluntnose minnow, white sucker, banded killifish, tessellated darter, and walleye were collected; a total of 16 species were represented (IA, 1997a). These were collected in the large pools which are not as well represented in the other bypassed reaches.

Intensive surveying on several occasions by NYSDEC over the period 1992 through 1994 in the Stark reservoir collected only nine fish species. This reduced diversity is, at least partly, due to the impaired productivity of the upstream Carry Falls reservoir because of its low nutrient input and large drawdown. NYSDEC sampled the Blake reservoir intensively in 1992 and 1993 using a boat electrofisher, and in 1993 with gill nets. Fifteen species were collected during these surveys. Yellow perch and rock bass were the most abundant species in both collections. Smallmouth bass was the most abundant game species collected, followed by walleye and northern pike.

NYSDEC sampled the Rainbow reservoir in 1994 and 1995. In the electrofishing catch, yellow perch was the most frequently caught fish, with smallmouth bass and rock bass also abundant. In addition, eight species were collected while surveying with gill nets and seine nets in 1994. Yellow perch, rock bass, and white sucker were the most abundant species in the gill net collections. Yellow Perch and smallmouth bass were the most abundant species collected in the seine hauls, representing up to 44 and 38 percent of the catch, respectively.

NYSDEC sampled the Five Falls reservoir in 1994 and 1995. In the electrofishing catch, yellow perch was the most abundant fish; smallmouth bass, pumpkinseed, and rock bass also were abundant. Yellow perch, rock bass, smallmouth bass, white sucker, and pumpkinseed were the most abundant species in the gill net collections at Five Falls.

NYSDEC sampled the South Colton reservoir in 1994 and 1995. In the electrofishing catch, yellow perch was the most abundant fish species caught. Walleye and white sucker also were captured. Yellow perch and rock bass were the most abundant species in the gill net collections, followed by smallmouth bass, white sucker, and walleye. Shoreline seine sampling was dominated by banded killifish and smallmouth bass captures.

Middle Raquette River Project

The fishery in the Middle Raquette reach is similar to the Upper Raquette, composed of a diverse group of game fish and panfish. Currently, NYSDEC manages the Raquette River in the section between Raymondville and South Colton as a mixed coolwater/warmwater fisheries resource. The more important game and panfish are, again, walleye, smallmouth bass, northern pike, yellow perch, rock bass, pumpkinseed, and brown bullhead. White sucker and fallfish also have been found in all of the reservoirs sampled. Surveys have shown that essentially the same assemblage of fish species exist in all Middle Raquette River Project reservoirs.

NYSDEC trap and gill net collections in the 1960s showed that smallmouth bass was the most frequently caught game fish, followed by walleye in the Higley reservoir. The major panfish species were pumpkinseed, yellow perch, and rock bass. Other species collected included white sucker, fallfish, and brown bullhead. Collections in 1978 and 1981 confirmed that smallmouth bass was still the most common game fish, followed by walleye. The major panfish were still yellow perch, rock bass, and pumpkinseed. The relative abundance of white sucker, however, had increased from 6 to 21 percent of the total catch. A subsequent investigation by IA in 1985 during a drawdown period yielded comparable results.

In 1988, NYSDEC conducted another fisheries survey of the Higley development to evaluate species composition, relative abundance, and biological condition of existing fish stocks. Eleven species of fish were collected, including black crappie which had not previously been reported in the Raquette River. Its appearance in the reservoir suggests an unmanaged introduction of this species. If crappie populations expand, impacts on walleye and other similar species probably would be significant. There are no recent studies of this type with which to compare.

The Colton reservoir was sampled once in 1983 using Swedish gill nets. The game species found were smallmouth bass and walleye. The major panfish species were pumpkinseed, yellow perch, rock bass, and brown bullhead. In 1989, IA conducted a fisheries investigation of the Colton bypassed reach. Logperch dominated the total catch (40 percent). White sucker, margined madtom, rock bass, and fallfish were common. Four other species comprised the remainder of the collections.

NYSDEC sampled the Hannawa reservoir in 1983. Smallmouth bass was the only game species found. The major panfish species was rock bass. Brown bullhead,

pumpkinseed, and yellow perch were also taken. The relative abundance of brown bullhead was similar to that in the upstream Colton reservoir. Fallfish, white, and longnose suckers were also common. In 1998 the reservoir was sampled again, and 16 species were collected during this survey. Game species collected included smallmouth bass, largemouth bass, northern pike, and walleye. Panfish species included yellow perch, pumpkinseed, rock bass, and brown bullhead. The most abundant species collected was the forage species, fallfish. The Hannawa development bypassed reach was not sampled during the fisheries investigation of the Middle Raquette River Project bypassed reaches.

No fisheries collections have been made recently from the small Sugar Island reservoir. IA sampled the bypassed reach for fish in summer 1989. Margined madtom dominated the catch. Rock bass, fantail darter, and fallfish also were abundant, as were pumpkinseed, cutlip minnow, rosyface shiner, and logperch. Nine other species were captured by chain electrofisher, trap net, gill net, or minnow trap in the survey. The fish fauna of the Sugar Island bypassed reach was similar to that of other bypassed reaches in the Middle Raquette River Project and of the Raquette River as a whole.

Lower Raquette River Project

NYSDEC made a series of fish collections in reservoirs on the lower Raquette River in 1985. The present fishery in the study area is composed of a diverse group of game fish and pan fish. Currently, NYSDEC manages the Raquette River in the section between Raymondville and South Colton as a mixed coolwater /warmwater fisheries resource. The more important game fish and panfish are walleye, smallmouth bass, northern pike, yellow perch, rock bass, pumpkinseed, and brown bullhead and are similar from reservoir to reservoir. In 1989 IA conducted a fisheries investigation of the bypassed reaches of the Lower Raquette River Project. A total of 145 fish representing six species were collected. Pumpkinseed and logperch constituted 82 percent of the catch. The dominant species structure has not changed since 1933.

Norwood is the most upstream of the Lower Raquette River Project developments. In 1983 NYSDEC gill net sampling showed smallmouth bass as the most abundant game species, followed by walleye and northern pike. Rock bass was the most abundant pan fish, followed by pumpkinseed, yellow perch, and brown bullhead. Redhorse, white sucker, and golden shiner were the rough species most frequently taken. The next year NYSDEC made a juvenile fish survey of the Norwood reservoir and found that the pond supported good numbers of young of many forage fish and panfish species, as well as smallmouth bass. Some juvenile walleye also were

taken. Other young collected included yellow perch, rock bass, pumpkinseed, brown bullhead, and white sucker.

A 1989 survey of the Norwood reservoir yielded numerous species. The two most abundant were the banded killifish (a forage fish caught primarily by seining the shoreline) and the pumpkinseed (a panfish collected most frequently by electrofishing). Other forage species included the blacknose shiner, bluntnose minnow, bridled shiner, fallfish, and rosyface shiner. These forage species were collected primarily inshore. Game species included the pumpkinseed sunfish, yellow perch, smallmouth bass, rock bass, largemouth bass, white sucker, walleye, brown bullhead, and northern pike.

During the 1989 IA fisheries survey, a total of 99 fish from 11 taxa were collected or observed in the East Norfolk bypassed reach. Smallmouth bass represented 27 percent of the species collected, followed by minnow species and longnose dace.

In gillnet collections made by NYSDEC in 1983 in the Norfolk reservoir, smallmouth bass was the most abundant game fish taken, followed by Northern pike and walleye. Rock bass was the most abundant pan fish followed by yellow perch and pumpkinseed. Redhorse, white sucker and fallfish also were taken. During the fisheries investigation of the Norfolk bypassed reach in 1989, a total of 427 fish, representing 16 taxa, were observed. Minnow species dominated the catch, followed by longnose dace, logperch, and rosyface shiner.

Fisheries collections were made in the Raymondville reservoir and bypassed reach in 1989. In the bypassed reach a total of 175 fish, representing 13 species, were taken. Tessellated darter dominated the catch, followed by logperch, fallfish, longnose dace, American eel, and eight other species. In the reservoir, 16 fish species were collected during this fishery survey. The most abundant forage species was the fallfish, followed by the blacknose shiner. The most common species was the smallmouth bass.

Potsdam Water Power Project

Because it is situated at the tailwater of Sugar Island and discharges into Sissonville reservoir (FERC No. 9269), with no intervening bypassed reach, it could be assumed that this very shallow (10 foot deep) water body would support limited populations of the species common to the other reservoirs in this section of the river. Surveys of fish collected from the Raquette River near the Potsdam Water Power Project during the period from 1934 to 1995 identify 55 species. These surveys also

show that the most abundant species are rock bass, pumpkinseed, logperch, smallmouth bass, and yellow perch. NYSDEC manages the section of the Raquette River influenced by the Potsdam Water Power Project as a mixed coolwater/warmwater fisheries resource. The more important game fish in this stretch of river are walleye, smallmouth bass, northern pike, yellow perch, rock bass, and pumpkinseed.

There are no threatened or endangered fish species in the river reach under consideration in this MPEA (NYSDEC, August 6, 1997).

b. Environmental effects: NMPC proposes to continue to operate the reservoirs and intervening river reaches within the Carry Falls and Upper Raquette River Projects as a load following hydropower system, and the reaches within the Middle and Lower Raquette River Projects as either store and release pulsing or store and release peaking plants, but would modify operations to better integrate its primary hydropower generation objectives with the broader recreational and environmental management interests within the system.

The components of NMPC's proposal that would most likely affect fisheries resources include: (1) provision of instream flows to the reaches below the generating stations currently experiencing no flows during non-generation periods, including a base flow below Raymondville; (2) reduction in reservoir water level fluctuations, particularly in Carry Falls reservoir; and (3) provision of safe downstream passage for fish using intake protection and downstream release enhancement measures.

Instream Flows

Table 4 summarizes the instream flow schedules proposed for implementation at the 10 projects where no minimum flows are currently required. The periodicity and discharges were derived from a comprehensive Delphi Instream Flow Study conducted in the summer of 1996 for the five Upper Raquette bypassed reaches (ND&T/IA, 1997b) followed by a similar Delphi process, "Middle and Lower Raquette River Instream Flow Demonstration Study," for the Middle and Lower Raquette River Projects. The study teams, led by a facilitator, included representatives from NYSDEC, FWS, APA, NYRU, and the licensee as participating members, in addition to representatives from NYSCC, ADK, and the SLCPO as contributing members. The bypassed reaches were broken into

Table 4. Erie's proposed instream flows (Source: Settlement, March 1998)

	Flow magnitude[a]	Annual start date	Annual end date

Carry Falls	None required	-	-
Stark	45 cfs (42-48)[b]	January 1	December 31
	90 cfs (84-96)[b]	Immediately after any Taintor gate release of 24 hrs	24 hrs after end of any Taintor gate release
Blake	55 cfs (52-58)[b]	January 1	Start of walleye spawning season
	120 cfs (112-128)[b]	Start of walleye spawning season	June 30
	55 cfs (52-58)[b]	July 1	December 31
Rainbow	20 cfs (19-21)[b]	Jan 1	Dec 31
Five Falls	50 cfs (43-57)[b]	January 1	Start of walleye spawning season
	145 cfs (125-165)[b]	Start of walleye spawning season	End of walleye spawning season
	50 cfs (43-57)[b]	End of walleye spawning season	December 31
South Colton	20 cfs with channel modifications (17-23)	January 1	December 31
	60 cfs without channel modifications (52-68)[b]	January 1	December 31
Higley	None required	-	-

Colton	110 cfs (100-120)	Jan 1	Start of walleye spawning season
	240 cfs with spring spillage (216-264) 200 cfs without spring spillage (180-220)	Start of walleye spawning season	End of walleye spawning season
	200 cfs (180-220)[b]	End of walleye spawning season	Jun 30
	125 cfs (113-138)[b]	Jul 1	Aug 15
	90 cfs (81-99)[b]	Aug 16	Sept 15
	125 cfs (113-138)[b]	Sept 16	Oct 31
	110 cfs (100-120)[b]	Nov 1	Dec 31
Hannawa	50 cfs (48-52)[b]	Jan 1	Start of walleye spawning season
	90 cfs (87-93)[b]	Start of walleye spawning season	Jun 30
	65 cfs (63-67)[b]	Jul 1	Oct 31
	50 cfs (48-52)[b]	Oct 31	Dec 31
Sugar Island	300 cfs (282-318)[b]	Jan 1	Start of walleye spawning season
	400 cfs (376-424)[b]	Start of walleye spawning season	Jun 30
	300 cfs (282-318)[b]	July 1	Dec 31
Norwood	-	-	-
East Norfolk	75 cfs (65-85)[b]	Jan 1	Dec 31
Norfolk	37.5 cfs from stoplog section at the dam (35-40)[b]	Jan 1	Dec 31
	37.5 cfs from the trash sluice return channel (35-40)[b]	Jan 1	Dec 31
Raymondville	Base flow	-	-
Potsdam	None required	-	-

[a] Flows are nominal flows. Actual release may be slightly above or below the value indicated. Flow is a function of headpond elevation.

[b] As provided in section 3.3.2 of the Settlement, actual flow releases may be above or below the value indicated, depending on headpond elevation. Appropriate gate settings will be derived based on the midpoint of the normal impoundment fluctuation. The range of nominal flows for each development is shown in parentheses.

segments and rated for their habitat value, and other uses. Management objectives were not confined to fish but included, among the 19 objectives, recreational access to flows, riparian wildlife habitat, aesthetic values, and safety for hikers and bathers. The bypassed reaches were then examined visually by the team, and measurements taken, at different times and under different discharges to determine (by consensus) at what nominal flows collective management objectives could be attained. Using the data from these bypassed reaches, and flow/hydration/habitat information from other studies on the Middle and Lower Raquette River Projects, the group developed instream flows for all the bypassed reaches.

From both temporal and flow volume perspectives, priority was given to the restoration of walleye spawning and incubation, fish movement, restoration of benthic invertebrate and forage fish production, riparian and wetland production, aesthetics, safety, and water quality. In reaches where little could be regained, the volumes were kept minimal. In reaches where superlative results could be expected, larger volumes or longer periods were established. In very short backwatered reaches, such as those at Higley and Norwood, no instream flows for aquatic purposes were necessary. Carry has no bypassed reaches. The Potsdam facility will have a short bypassed reach, the riffle below the dam, because the tailrace will enter the pond below the dam.

Raymondville was treated as an exception because it is the last facility in the system and for the remaining 19 miles of the Raquette there are no additional control structures. A required minimum instantaneous base flow was therefore established for the river downstream of the Raymondville development, tied to wet (560 cfs), normal (560 cfs) , dry (290 cfs), and drought conditions (as measured at Piercefield gage). Drought conditions are defined as a daily average flow of less than 250 cfs and a Carry Falls reservoir elevation less than 1,357 feet.

Our Analysis

The Delphi Instream Flow Methodology used to develop the flow regimes proposed in the Settlement was a collaborative effort to develop comprehensive, biologically based flow scenarios that incorporate other relevant flow-related values for the various reaches of the Raquette River. Overall, the largest reaches and those with the best habitats were given priority and the evaluation criteria for each reach are clearly justified in the Settlement. Table 5 summarizes the benefits that would be derived from Erie's proposed instream flows.

Because walleye was the target species for the Delphi approach, we reviewed the Walleye Spawning studies (IA, 1997b, 1997c). In general, walleye spawning occurs during early spring at very high flow rate (greater than 500 cfs). However, during the 1996 Walleye Spawning Study, walleye were observed in areas with current velocities ranging from very low to very high at depths ranging from about 1 foot to over 10 feet. The most suitable substrate for walleye is small boulder and cobble mixed with some gravel or medium sized boulders. Substrates finer than gravel (sand, silt, mud, and detritus) and bedrock have very low suitability for walleye egg incubation and survival. Suitable current velocities for egg incubation life history stages of walleye range from 0.0-9.8 feet/sec, with an optimal range of 0.3-3.5 feet/sec. Suitable water depths range from 0.2-20.0 feet, with an optimal range of 1.0-5.0 feet. During most of the year, the walleye inhabits shallow water, but may seek deeper cool water in late summer.

Table 5. Benefits derived from Erie's proposed instream flows (Source: Staff).

Bypassed Reach	Fish Spawning	Fish Movement	Forage Fish/ benthos production.	Riparian wetland vegetation	Aesthetics /Access	Fishing	Water Quality	Brook Trout Habitat	Safety
Stark	X	X	X	X	X	X	X		
Blake	X	X	X	X			X	X	
Rainbow		X	X		X				X
Five Falls	X	X	X						
South Colton		X	X						X
Colton	X	X	X	X	X		X		X
Hannawa		X	X	X	X				X
Sugar Island		X	X		X			X	
East Norfolk		X	X						
Norfolk		X	X						

The staff agree that the survival of the species at various life stages within the bypassed reaches of the Raquette River Projects depends upon the release of water at an upstream dam.

The general fish management goals, at least for the Upper Raquette River, are to increase productivity of the water, improve the growth rate and size distributions of walleye and yellow perch, and increase the abundance of catchable size walleye (Gordon and Richardson, 1995; Priest et al., 1994). The role of bypassed reach habitat in attaining overall fish management goals depends on many variables, only a few of which can be controlled, the quantity of water provided being the most obvious. Provision of flow may increase forage fish or macroinvertebrate production by providing physical habitat. It may provide spawning habitat for walleye. Bypass channel habitat would not be expected to be extensively used by smallmouth bass, northern pike, yellow perch, or other panfish compared with impoundment habitat, but by increasing food sources, it would benefit them indirectly.

Each of the bypassed reaches was characterized and evaluated in terms of aquatic habitat. This was estimated by the evaluation team observing the "dry" conditions of the various bypassed reaches to establish the baseline and then at two or more additional flows to compare areas wetted, depths, and velocities. Other factors, such as substrate and cover, are also major determinants in the assessment of habitat value, but the extent to which each factor contributes to habitat value in a given reach varies.

For example, in comparing two reaches within the Upper Raquette Project area, the South Colton bypassed reach was allotted only 20 cfs as a maintenance flow because little was to be gained biologically by passing more water through this reach. When observed at "no flow," there was virtually no useable habitat. The substrate was largely bedrock; there was little instream cover, which was limited to boulders; upstream fish movement was restricted by two waterfalls, both impassable at most flows except for strong-swimming fish at high flows; and the best habitat along the 1,990-foot reach was within the pool between the waterfalls, which could provide some habitat for the adult, juvenile, and fry stages of smallmouth bass, walleye, northern pike, yellow perch, fallfish, and brook trout, although probably limited by lack of cover. Increased flows would provide little improvement to steeper portions of the reach because once wetted, bedrock still does not provide adequate fish habitat. The depth of the pool is physically defined by the river profile and can be maintained with the provision of the 20 cfs nominal flow.

On the other hand, the Blake bypassed reach held much greater potential to benefit from flow increases. Even in the "no flow" baseline condition, the evaluation team observed adult fish. This entire, 4,700-foot-long reach, had a low to moderate gradient with a variety of habitat types available to fish. The inflow of the Dead Creek tributary near the mid-point of the reach, provided useable habitat even under leakage flow conditions. Substrate was dominated by boulders but with abundant cobble and gravel and a high percentage of alluvial material. The boulders provide instream cover, and there was riparian cover provided by herbaceous and shrubby terrestrial vegetation. Fish movement through the bypassed reach was generally unrestricted (ND&T/IA, 1997).

This reach was observed at five different flows. Under leakage flow conditions, the upper half of the reach was mostly dewatered riffle and run habitat, suitable for fry and young-of-the year fish. The Dead Creek tributary was contributing about 34 cfs, which created a large pool and provided depth and velocity to riffle and run habitats downstream, making habitat available for juvenile and fry stages of smallmouth bass, walleye, northern pike, yellow perch, fallfish, and brook trout and adult fallfish as well as a limited amount of spawning habitat for smallmouth bass and northern pike. Walleye spawning habitat was unavailable at these flows. Habitat for benthic invertebrates was relatively abundant even at leakage flow.

The team also observed the Blake bypassed reach at 25, 55, 105, and 258 cfs flows. Based on those observations, a maintenance flow of 55 cfs and a 120 cfs flow

during the walleye spawning period were ultimately recommended for the enhancement and/or protection of forage fish and benthic invertebrates, riparian wetland vegetation, fish spawning and incubation, fish movement into/out of Dead Creek, and provision of brook trout habitat during cooler periods.

The Delphi Instream Flow Methodology was systematically applied to all bypassed reaches, yielding comparable results that recognize the inherent potential of each reach to respond to the addition of flowage. The degree of improvement varies greatly, but in all cases, the provision of maintenance flows to otherwise essentially "dry" habitats constitutes enhancement of aquatic habitat in these reaches.

Providing base flows downstream of Raymondville is a means to reconcile all regulated upstream activities for the lower 20 miles of the Raquette River. The proposed base flow would keep most of the riffle habitat along this reach watered throughout the year and would, therefore, increase diversity and productivity. The attractiveness of the Raquette River to resident fish in the St. Lawrence River would also increase with base flows stabilized in the reach below Raymondville. Also, as the whole reach from Carry Falls reservoir downstream improves, the opportunities for further enhancement measures will probably become evident.

Once stable flows have become established, the productivity and diversity of every component in the system would benefit from upstream enhancement. In the reaches with coldwater tributaries, prospects for the re-establishment of brook trout and associated native coldwater species would improve. Therefore, we concur that implementation of the instream flows, as proposed by Erie and consistent with the Settlement, would restore or enhance aquatic and fisheries resources as summarized in table 5.

Reduction in Reservoir Level Fluctuations

Raquette River Projects

Erie's load following operation of its hydropower system on the Raquette River, necessitates some fluctuation in water levels in the reservoirs. Present operations place the storage burden on the Carry Falls reservoir with the downstream headponds experiencing only modest fluctuations in level. Erie proposes, consistent with the Settlement, to reduce fluctuations at the Carry Falls reservoir to the level above which it would influence the water surface level of the Stark reservoir. Erie would reduce the maximum spring drawdown from 53 to 30 feet, a reduction of more than 40 percent.

During the fall, the drawdown would be reduced from 33 to 30 feet, and the reservoir water surface elevation would not drop below 1,355 feet, under normal operating conditions.

Reducing Carry Falls below 1,355 feet has historically meant Stark had to be drawn down too. Limiting the drawdown at Carry Falls to 1,355 feet in both spring and fall would result in a corresponding reduction in fluctuations in the Stark reservoir as well. The maximum operating range of the Stark development is currently 23 feet (although this has not actually been experienced because Carry Falls has not utilized its full 53 feet range). This maximum operating range would be reduced to a maximum of 1 foot. Also, the proposed changes include reducing not only the magnitude of the water level fluctuations, but also the timing and duration of those fluctuations, so as to provide stable water levels during the spring fish spawning and nursery period (May and June).

Erie proposes to maintain existing reservoir fluctuations for the Upper Raquette reservoirs and for Hannawa, Sugar Island, Norwood, and Norfolk; to reduce the fluctuations at Higley (from 2.5 to 2.0 feet), East Norfolk (from 1.0 to 0.5 feet), and Raymondville (from 1.0 to 0.5 feet); and to increase fluctuations at Colton from 0.3 to 0.4 foot (1.2 inches). Table 6 shows the normal reservoir fluctuations under existing and proposed conditions.

Potsdam Water Power Project

Even though NMPC does not own the Potsdam facility, it lies between Sugar Island; downstream projects at Sissonville (FERC No. 9260), Hewitville (FERC No. 2498), and Unionville (FERC No. 2499); and Norwood, and must therefore be operated to be consistent with the rest of the hydropower system. The application for amendment of exemption for this project, as subsequently revised, includes installation of a 1-foot-high inflatable flashboard to ensure maintenance of the headpond elevation, as it currently exists even when the West dam and proposed new powerhouse are operating. As our analysis in section V.C.2 shows, there would be only a minor change of slightly over 1 inch from existing conditions.

Our Analysis

Although the proposed operating changes would not eliminate water level fluctuations in Carry Falls reservoir, it would dramatically reduce the fluctuations and increase the permanently wetted substrate of the reservoir from 700 to 2,500 acres - a three and a half fold increase in potentially useful habitat. Substrates characterized by

finer materials such as sands and silts, would support submerged and emergent aquatic vegetation and benthic invertebrates, and could be used for spawning by favored pan fish species (largemouth bass, pumpkinseed, rock bass). Courser substrates, gravel and

Table 6. Normal reservoir fluctuations under existing conditions and Erie's proposal (Source: Staff).

Reservoir	Existing fluctuations (feet)	Proposed fluctuations (feet)
Carry Falls	53	30
Stark	23	1.0
Blake	1.0	no change
Rainbow	1.0	no change
Five Falls	2.0	no change
South Colton	2.0	no change
Higley	2.5 to 3.5	2.0[a]
Colton	0.3	0.4
Hannawa	0.4	no change
Sugar Island	1.0	no change
Norwood	0.5	no change
East Norfolk	1.0	0.5
Norfolk	1.0	no change
Raymondville	1.0	0.5

[a] Under Erie's proposal, during Memorial Day weekend through Labor Day weekend, the Higley reservoir fluctuation would be limited to 2.0 feet during weekends and to 2.5 feet during weekdays. For the rest of the year the reservoir level would fluctuate up to 2.5 feet.

cobble, are used by smallmouth bass, perch and walleye for spawning, if found at appropriate depths and associated with appropriate cover, and would also contribute to macroinvertebrate habitat (Scott and Crossman, 1973).

The productivity of the Carry Falls reservoir, which has been identified as being nutrient limited, would benefit from the additional habitat made available with the reduced drawdown. Since this is the uppermost water body in this hydropower system, downstream reservoirs would also benefit. The collective reductions in reservoir fluctuations would stabilize and increase the productivity of the whole system. Therefore, we agree with the signatories to the Settlement that proposed limitations on reservoir fluctuations is a reasonable measure to enhance aquatic and fisheries resources of the Raquette River.

Potsdam Water Power Project

We would expect no change in the water level in the Potsdam reservoir at flows

of 1,250 cfs or less, and only 0.1 feet change with flows up to 3,000 cfs. Therefore, we would not expect the proposed operation of the West dam, with the 1-foot inflatable flashboard, to effect the fisheries resources in the Potsdam impoundment.

Fish Protection and Passage

In 1997 NMPC sponsored a study to evaluate the potential for fish entrainment and mortality at the Upper Raquette River and Carry Falls Projects (DES, 1997). Using available data as indicators, it was possible to estimate potential entrainment and mortality risk. The results of the study indicated that: (1) the Upper Raquette River Project's developments exhibit a relatively low risk of substantial entrainment, based upon fish population characteristics and the location of turbine intakes; (2) any entrained fish at a given development may encounter a low to medium risk of mortality; (3) turbine entrainment may not represent a dominant factor limiting the development of the warmwater/coolwater fishery sought within the Upper Raquette River Project.

NMPC conducted an entrainment study at the Higley development in 1993 and 1994 (DES,1997). Of the approximately 13,000 fish collected, 93 percent were yellow perch under 100 mm. Other fish entrained included smallmouth bass, pumpkinseed, rock bass, largemouth bass and others. It was estimated that 117,541 fish were entrained during the one year study period.

NMPC also conducted an entrainment study at the Colton development in 1993 and 1994. Only 452 fish were collected during the 26 sampling periods. Fish entrained included rock bass, logperch, pumpkinseed, largemouth bass, yellow perch, and others. It was estimated that approximately 12,000 fish were entrained during the one year study period.

In 1994-1995 NMPC sponsored a fish entrainment study at the Lower Raquette River Project to estimate how many fish are killed as a result of turbine passage over a 12-month period. In general, the entrained fish species composition was similar to that reported for project reservoirs in previous surveys, with yellow perch, smallmouth bass, pumpkinseed, and rock bass dominating game/pan species entrainment. Lesser numbers of largemouth bass, walleye, and black crappie are also entrained. Length frequency data for smallmouth bass, pumpkinseed, and rock bass suggest that, although both juvenile and adult fish were entrained, most fish were juveniles. These species and size classes also had the highest turbine survival rates (table 7). The most commonly entrained fish species at Norwood, Norfolk, and Raymondville were species such as northern redbelly dace, central mudminnow, and brook stickleback. These

species are generally small forage species, characterized by high fecundity, high natural mortality, and relatively short life spans. These species composed approximately 56 percent of the overall catch at the above sites.

Table 7. Summary of turbine survival tests (Source: KA, 1996).

Body form	Size	Mean survival
centrarchid	small	95.2 %
centrarchid	medium	87.2 %
centrarchid	large	83.8 %
percid	small	85.0 %
percid	medium	91.1 %
percid	large	91.8 %
soft ray	small	80.8 %
soft ray	medium	80.6 %
soft ray	large	79.3 %
salmonid	small	92.8 %
salmonid	medium	93.1 %
salmonid	large	97.4 %

The annualized turbine mortality for the aforementioned forage and juvenile fish at the Lower Raquette River Project developments ranged from less than 1,000 to approximately 16,000 fish per site, most of which were either young-of-year, juvenile, or forage organisms. This equates to a maximum daily average fish loss rate of 44 fish. Given the high natural mortality characteristics of these fish, the impact on the riverine ecosystem of a loss of the small magnitude exhibited at these sites is questionable, particularly since a naturally supported, apparently stable warmwater/coolwater fishery presently exists in the Raquette River.

The loss for legal-size game fish also appears to be small. For example, at the Norfolk site where estimated turbine loss was highest, a total of approximately 67 smallmouth bass greater than the minimum harvestable size were killed annually. This equates to an average annual fish loss of 0.2 fish per day. This is low when compared to the legal harvest rate of 5 fish *per day per angler* for smallmouth bass permitted under the NYSDEC general angling regulations for this portion of the Raquette River.

In 1996, KA reported that eels are projected to comprise 0.96 to 1.4 percent (62.7 to 3,436.5 individuals) of the total number of entrained fish at the Lower Raquette River Project (KA, 1996). Eels are also expected to account for 3.1 to 7.7

percent (23.2 to 1271.4 individuals) of total fish mortalities per year at the Lower Raquette developments. The report also projects about 37 percent mortality for entrained eels.

Although fish entrainment and mortality do not appear to be having an adverse effect on the fishery, Erie proposes, consistent with the Settlement, to install trashracks with 1-inch clear bar spacing at all its hydro developments except the Sugar Island development of the Middle Raquette River Project, to prevent entrainment of adult fish. FWS has also mandated 1-inch trashrack spacing at the Potsdam Water Power Project.

Erie also proposes to provide measures to facilitate downstream fish movement at all 13 of its hydroelectric developments. In addition to the 1-inch trashracks, these measures would include the provision of an alternate route for downstream fish movement and a plunge pool system designed to reduce damage to fish moving downstream. At the 10 developments where instream flows are proposed, Erie proposes to locate the instream flow release point to provide for safe downstream fish passage. At installations where instream flows have not been required, Erie proposes to facilitate downstream fish passage via gate structures. Table 8 shows the specific measures proposed at each development.

Because there are no anadromous fish species in the reach of the Raquette being considered in this MPEA, anadromous fish passage is not a concern. Provisions for upstream fish passage are not recommended at this time.

The Settlement reserves Interior's authority under Section 18 of the Federal Power Act to prescribe upstream or downstream fish passage facilities in the future. This reservation ensures that adequate facilities for fish passage would be in place should management goals or needs change during the life of the license.

Table 8. Fish protection and passage measures (Source: Settlement, March 1998).

Reservoir	1-inch trashracks	Downstream flow (cfs)	Passing structure	Conveyance and collection/ protection
Carry	N/A	N/A	N/A	N/A
Stark	X	45	Pipe	[a]
Blake	X	55	Instream Flow	[a]
Rainbow	X	20	Instream Flow	[a]
Five Falls	X	50	Instream Flow	[a]
South Colton	X	20	Instream Flow	[a]
Higley	X	20	Stoplog Section	[a]
Colton	X	20	Sluice Rehab	retrofit trash sluice return channel[a]
Hannawa	X	50	Instream Flow	[a]
Sugar Island	N/A	300	Instream Flow	N/A
Potsdam	X	40	Instream Flow	N/A
Norwood	X	20	Stoplog	[a]
East Norfolk	X	75	Instream Flow	plunge pool
Norfolk	X	37.5	Sluice/Pipe	modify trash sluice; plunge pool
Raymondville	X	20	Sluice	modify pool

[a] Roughness reduction of spillway face, water dispersion across spillway face, plunge pool.

Potsdam Water Power Project

Potsdam proposes to construct a fish passage structure adjacent to the proposed West dam powerhouse intake consisting of a 1.5-foot-wide sluiceway extending from the near turbine intake chamber into the tailrace near the turbine discharge. The fish passage structure would have a small intake chamber equipped with trashracks with 8-inch clear bar spacing installed across the opening. The 18-foot by 38-foot turbine intake would be equipped with 1-inch clear bar spaced trashracks situated at a 90 degree angle to the spillway. The maximum approach velocity at the trashrack would be 1.9 feet per second (fps). Potsdam proposes to provide a 40 cfs conveyance flow through the fish passage structure. Potsdam does not propose any fish protection or passage structures at the existing East dam powerhouse.

FWS indicates, in its mandatory terms and conditions filed on October 12, 1999, that Potsdam's application for amendment does not adequately describe the proposed fish protection measures. FWS indicates that, consistent with other recent licensing

proceedings involving projects on the Raquette River, Potsdam should be required to retrofit the East dam with fish protection measures, as well as install fish protection measures at the West dam powerhouse, to facilitate the downstream movement of fish. Therefore, FWS specifies that Potsdam file with the Commission, for approval, final designs for fish protection and passage facilities proposed for the West dam that are consistent with preliminary plans already discussed with FWS. FWS further specifies that Potsdam should file designs for fish protection measures at the East dam that also include a trashrack with a maximum 1-inch clear bar spacing, a sluice to provide safe downstream fish movement, an adequate plunge pool at the sluice outlet, and adequate fish attraction and conveyance flows. Designs for both the East and West dam fish passage facilities should be filed within 60 days of any Commission approval of amendment.

Our Analysis

The provision of 1-inch trashracks is expected to reduce entrainment of adult fish, but the previous entrainment/mortality studies done on the Upper, Middle, and Lower Raquette Projects indicate that these were not the fish most prone to entrainment and that turbine mortality was not a likely contributor to fishery limitations in the system. Mortality of those small fish that are likely to be entrained is likely to be low (EPRI, 1992). However, installation of 1-inch trashracks may contribute to increased impingement of adult fish if the approach velocities are too great.

We reviewed the developments of the Raquette River Projects and determined that the average approach velocities, as measured 1 foot in front of the trashracks, were generally less than 2 fps. The approach velocities are generally higher, up to 3 fps, at the Upper Raquette River developments. However, at these developments, the intakes are off-shore and deep, reducing the likelihood of impingement. Therefore, we conclude that installation of 1-inch trashrack screens at the Raquette River developments and at the Potsdam Water Power Project should not result in any adverse effects on the Raquette River fisheries resources provided that Erie continues to routinely remove debris from the trashracks.

The installation of 1-inch trashrack screens at the Upper, Middle, and Lower Raquette River Projects also could provide some measure of fish protection to American eels, the only catadromous fish identified within project waters. However, there is no technology currently available to effectively exclude eels from entrainment, or to guide them into fish passage structures. Current research being conducted is examining the issue of upstream and downstream eel passage at hydroelectric facilities,

and the Atlantic States Marine Fisheries Commission is currently developing management goals for this species due to its apparent decline in recent years.

We agree that the provision of conveyance flows, along with modifications to the dam face and bypassed reaches at the toe of the dams, would result in better, less stressful downstream movement for fish. Therefore, we recommend that Erie file the final designs of the flow release structures, including the final locations of fish protection and conveyance measures as proposed and as specified in section 6 and table 2-1 of the Settlement, developed in consultation with FWS and NYSDEC, with the Commission for approval.

Potsdam Water Power Project

The designs of the proposed fish protection and passage facilities proposed by Potsdam at the West dam and specified by FWS for the East dam are consistent with the specifications for downstream fish protection and passage measures contained in the Settlement for the Upper, Middle, and Lower Raquette River Projects. As with the Upper, Middle, and Lower Raquette River Projects, we agree that provision of sluiceways, appropriate plunge pools, and adequate attraction and conveyance flows would result in enhanced, less stressful, downstream movement for fish. Installation of trashracks with 1-inch clear bar spacing with a maximum approach velocity of 1.9 fps should not result in any adverse effects on the fisheries resources in this stretch of the river.

c. Unavoidable adverse effects: No technology compatible with hydroelectric operations is 100 percent effective at protecting small and juvenile fishes. Some entrainment and turbine mortality loss is unavoidable. However, as described previously and quantified in table 7, turbine mortality is expected to be very low, with minimal overall impact on the Raquette River fishery.

d. Cumulative effects: The combination of instream flows, reduced reservoir level fluctuations, and downstream fish passage should result in increased productivity and stability of aquatic resources within the entire Raquette River system from the Carry Falls reservoir to the St. Lawrence River.

4. Terrestrial Resources

a. Affected environment: There are four Ecological Wildlife Range zones in St. Lawrence County that provide a variety of habitat/cover types in the vicinity of the

projects. The Adirondack Transition Zone encompasses the Carry Falls and Upper Raquette River Project areas and that portion of the Middle Raquette River Project area extending upstream to just south of Hannawa Falls. The St. Lawrence Plain Zone encompasses the northern portion of the county parallel to the St. Lawrence River, including the Middle Raquette River, Potsdam Water Power, and Lower Raquette River Project areas.

The entire Carry Falls Project and the Stark, Blake, and Rainbow developments of the Upper Raquette River Project lie within the Adirondack Park boundaries. Cover types range from shrub-dominated abandoned farmland to stands of hardwood and softwood species. The diversity of cover types throughout the project areas support a variety of wildlife species, inclusive of mammals, birds, reptiles, and amphibians. The following section details the vegetative and wildlife resources present within the project areas.

Vegetative Resources

Approximately 70 percent of St. Lawrence County is forested land. Forestland in the northern, downstream regions of the county is predominantly small woodlots and wooded wetlands. Those areas in the southern portion consist of large, unbroken forest tracts in the Adirondack Region.

The Carry Falls and Upper Raquette River Projects, located at the upper elevations of the Adirondack Transition Zone, exhibit a wide range of vegetative cover types. NMPC identified six vegetative cover types within the project areas, including northern hardwood forest, mixed conifer-hardwood forest, spruce-fir forest, forested wetland, scrub-shrub wetland, and emergent wetland.

Sugar maple, American beech, yellow birch, and red maple comprise the northern hardwood forest cover type, the northernmost deciduous forest community. Associated tree species include eastern hemlock, black cherry, white pine, black birch, red oak, and basswood, with conifers intermixed. Northern hardwood forests often exhibit a well developed understory with many wildflower and fern species. Common midstory and groundcover includes striped maple, maple-leaf viburnum, hobblebush, and raspberries. Herbaceous species include Indian cucumber-root, purple trillium, wood ferns, common wood sorrel, star flower, and partridge berry.

The mixed conifer-hardwood forest includes white pine, red pine, paper birch, and quaking aspen. Associated tree species consist of yellow birch, red maple, balsam

fir, and red spruce. Understory shrubs include highbush blueberry, sheep laurel, wild raisin, and shad bush. Bracken fern, wintergreen, painted trillium, and Pennsylvania sedge comprise the herbaceous species commonly associated with the mixed conifer-hardwood forest.

Red spruce and balsam fir dominate the spruce-fir forest, which inhabits the thin, poorly drained soils of rocky slopes with a mixing of yellow birch, paper birch, quaking aspen, American beech, sugar maple, red maple, white and red oak, northern white cedar, and white pine. Understory species include hobble bush, striped maple, and mountain ash. Typically occurring in very dense stands, spruce-fir forests are essentially devoid of ground cover except for mosses and seedlings. Goldthread, bunchberry, common wood sorrel, Canada mayflower, and club mosses may be found when ground cover is present.

The St. Lawrence Plain Zone encompasses the northern portion of the county parallel to the St. Lawrence River, covering the Middle Raquette River Project, from the northern limits at the village of Potsdam to just south of Hannawa Falls, as well as the Potsdam Water Power Project and the Lower Raquette River Project areas. Although dominated by agricultural land use, a variety of vegetative cover types, including northern hardwood forest, spruce-fir forest, beech-maple forest, and northern hardwood-spruce forest, occur in the St. Lawrence Plain Zone. The northern hardwood forest and spruce-fir forest coverages, exhibit the same species as those detailed above. The beech-maple forest coverage predominates as the deciduous forest type. American beech, sugar maple, and red maple dominate the beech-maple forest type, with black and silver maple commonly associated. The dominant tree species present in the northern hardwood-spruce forest equal those present in the northern hardwood forest with the addition of red spruce, white pine, and intermittent black or white spruce.

Wetland Resources

According to the 1994 *Fisheries Enhancement Plan*, wetlands associated with the Raquette River abound from Higley Flow (RM47) to Potsdam (RM35). Two large wetland areas include Foxmarsh wetland, located near the Carry Falls reservoir, and a large area in the village of Potsdam, near Sugar Island. Other locations within the project areas with state and/or federally designated wetland areas include Colton (28 wetlands), Norfolk and East Norfolk (26 wetlands), Norwood (23 wetlands), Higley Flow (16 wetlands), Raymondville (14 wetlands), and Hannawa Falls (10 wetlands) (Priest et al., 1994).

Three wetland cover types exist throughout the project areas: emergent wetland, scrub-shrub wetland, and forested wetland. Plant species associated with emergent wetlands include cattail, bluejoint grass, reed canary grass, rice cutgrass, marsh bellflower, rushes, bulrushes, and sedges. Purple loosestrife has been documented in some emergent wetland locations within the Middle Raquette River Project area.

The scrub-shrub wetland cover type includes bogs or heaths dominated by woody vegetation less than 6 meters tall, including speckled alder, elderberry, northern wild raisin, northern arrowwood, red-osier dogwood, steeplebush, male-berry, broad-leaved meadowsweet, willows, highbush blueberry, and red maple. Herbaceous species include sensitive fern, cinnamon fern, skunk cabbage, spotted jewelweed, and sedges. Tamarack, leatherleaf, Labrador tea, sphagnum mosses, round-leaved sundew, and pitcher plant dominate the more acidic bogs.

White cedar dominates the majority of forested wetlands occurring within the project boundaries. Other associated canopy species include red maple, hemlock, balsam fir, tamarack, yellow birch, black ash, white pine, and black spruce. Characteristic shrub species include the dwarf raspberry, red-osier dogwood, swamp fly honeysuckle, and highbush blueberry. Sensitive fern, cinnamon fern, sedge species, goldthread, lady's-slippers, and sphagnum mosses characterize herbaceous species present.

Wildlife characteristic of these wetland types include a variety of birds, mammals, reptiles, and amphibians. Waterfowl and wading birds, as well as a variety of amphibian and reptile species, use these cover types for nesting, breeding, and feeding.

Wildlife Resources

St. Lawrence County is divided into four Ecological Wildlife Range zones. The six vegetative cover types described within these zones provide habitat for a variety of wildlife species. Mammals representative of the forested cover types include white-tailed deer, black bear, northern flying squirrel, gray squirrel, southern red-backed vole, woodland jumping mouse, porcupine, and gray fox. Beaver, muskrat, northern water shrew, northern short-tailed shrew, meadow, jumping mouse, raccoon, mink, bobcat, opossum, and rabbit typify mammalian species present in the wetter habitats.

The vegetative diversity of the northern hardwood forests provides suitable

habitat for a number of avian species, including: white-throated sparrow, dark-eyed junco, hermit thrush, black-throated blue warbler, and oven bird. Canopy dwellers and other species associated with the habitat consist of broad-winged hawk, barred owl, downy woodpecker, hairy woodpecker, pileated woodpecker, least flycatcher, American redstart, black-and-white warbler, scarlet tanager, solitary vireo, and black-capped chickadee. The large white pines present in the mixed conifer-hardwood forest provide suitable nesting and perching habitat for a variety of raptors including sharp-shinned hawk, Cooper's Hawk, broad-winged hawk, and red-tailed hawk. The conifers also provide suitable habitat for ruffed grouse, a variety of woodpecker, blue jay, and tufted titmouse.

Rare, Threatened, and Endangered Species

During the Settlement discussions, FWS indicated that the only federally listed or proposed endangered or threatened species existing within all project boundaries is the transient bald eagle (August 6, 1997). During Erie's reservoir fluctuation study, bald eagles were documented within the project area adjacent to the Blake reservoir. NYSDEC staff have observed nesting eagles within the project area on Blake reservoir (letter from C. Randy Vaas, Regional Supervisor, NYSDEC, Watertown, NY, dated July 23, 2000). In response to the notice of application tendered for filing, issued by the Commission on February 10, 1999, FWS indicated that it participated in and signed the Settlement. It stated that it had no further additional study requests, but reserved the right to request additional studies should the Settlement not be accepted by the Commission (letter from David Stilwell, Acting Field Supervisor, FWS, Cortland, NY, to David Boergers, Secretary, Commission, Washington, DC, dated March 26, 1999). Subsequently, by letter dated August 5, 1999, in response to the Commission routine request for an update on threatened and endangered species of June 29, 1999, FWS states that the bald eagle is known to occur in the vicinity of the Carry Falls and Upper Raquette River Project sites and requests an evaluation of the potential direct, indirect, and cumulative effects of specific project-related activities on the bald eagle or its habitat.

Also in the August 5, 1999 letter, FWS expresses concern about the presence of the yellow lampmussel in the vicinity of the Middle and Lower Raquette River Projects. FWS considers the yellow lampmussel a species of concern (formerly known as Category 2 Candidate species), and its status is being monitored throughout much of its range. FWS recommended that an evaluation of the Middle and Lower Raquette River Projects include the potential direct, indirect, and cumulative effects of the proposed activities on the yellow lampmussel.

Two state-listed species have been documented in the vicinity of the projects. These are the common loon, a protected wildlife/special concern species, and the spruce grouse, a threatened species. NYSDEC staff have observed the common loon at two sites in the Upper Raquette River Project area: one pair and one chick in 1985 and two adults and two chicks in 1996 on Stark reservoir, and one pair and one chick in 1985 on Rainbow reservoir (letter from C. Randy Vaas, Regional Supervisor, NYSDEC, Watertown, NY, dated July 20, 2000).

b. Environmental effects: NMPC proposes a reduction in the fluctuation in reservoirs and riverine reaches affected by the developments and the provision of instream flows to enhance fish and wildlife habitat. Neither NMPC nor the signatories to the Settlement propose surveys or plans for the protection of the bald eagle or yellow lampmussel. Potsdam proposes to install an inflatable flashboard to maintain the existing water surface elevations.

Our Analysis

Erie's proposal, as presented in the Settlement, defines the normal reservoir fluctuations as the maximum drawdown limit within a given reservoir associated with the operating range necessary to achieve ROR with pondage, store-and-release peaking, load following, re-regulating, or store-and-release pulsing hydropower operations. Each of the allowable fluctuations proposed maintains the status quo or reduces existing drawdown (see table 6 in section V.C.6). The existing wetland habitat at those sites operating at the status quo would be maintained. Wetland habitat would benefit from water level stability in the reservoirs where the extent of drawdowns would be reduced. Based on our observations, the proposed limit on reservoir fluctuation, including status quo and drawdown reduction, would benefit the wetland communities that occur in the Raquette River Project reservoirs.

FWS indicates that bald eagles are known to occur in the vicinity of the Carry Falls and Upper Raquette River Projects, and nesting sites have been observed on Blake reservoir since 1990 . Erie does not propose any activities that would require the removal of potential perch trees or nest sites at these two projects. The proposed recreational enhancements at these two projects consist of canoe portage access points and relatively short trails to access these locations at each of the developments (see section V.C.6). Canoe access to the full length of the Raquette River probably would increase boater use at the Carry Falls and the Upper Raquette River project areas. Increased boater use could disturb potential bald eagle use of the project area.

Therefore, we recommend that Erie consult with the FWS and the NYSDEC to determine the necessity of placing signage in the vicinity of the proposed canoe portage to warn users of nearby eagle nesting sites that should be avoided. Further, we conclude that future operation of the Carry Falls and Upper Raquette River Projects with mitigative signage would not likely adversely affect the bald eagle.

FWS also recommended that the Middle and Lower Raquette River Projects be surveyed by a qualified person to determine the presence or absence of the yellow lampmussel. In response to FWS's concern, Erie developed a study plan in consultation with FWS and NYSDEC and conducted surveys (July 26, 2000) for the occurrence of this species in the Middle and Lower Raquette River Project areas. The results of the surveys indicated that yellow lampmussel is more abundant in the Raquette River than previously noted, and self-sustaining populations exist where they had not previously been reported. .

Erie proposes to limit normal reservoir fluctuations at the Middle Raquette River Project (ranging from 2.0 to 0.4 feet) and the Lower Raquette River Project (ranging from 1.0 to 0.5 feet) to lessen the effect of water level fluctuation on existing wildlife habitat. Sudden changes in reservoir elevations may affect yellow lampmussel colonies. Those individuals found near the shallow shoreline areas may be temporarily exposed when water levels recede. The yellow lampmussel is able to slowly move from environments not suitable for survival. Although mobile, the yellow lampmussel requires time to adjust to water fluctuations. Any sudden drops in water level could expose the yellow lampmussel to desiccation as well as potential predation. However, among freshwater species, some unionaceans appear relatively tolerant of emersion and when exposed to air, can survive for weeks or months during these periods (Thorp and Covich, 1991).

The mussel survey demonstrated that suitable habitat was present to support an abundance of yellow lampmussel in the Sugar Island development of the Middle Raquette River Project, and at the Norwood and Raymondville developments of the Lower Raquette River Projects. The mussels were present in areas where depth was typically over 1.5 feet and appropriate substrate was found (loose, unconsolidated substrates of sand and gravel where mussels are able to burrow and overwinter). Velocity ranged from less than 0.5 ft/s to about 3.0 ft/s. The Sugar Island bypassed reach and downstream of the Raymondville development contained the greatest yellow lampmussel abundance and habitat suitability. These two impoundments currently fluctuate 1.0 foot and 0.5 foot, respectively, on a daily basis. The Norwood impoundment currently fluctuates 0.5 foot on a daily basis. These fluctuation ranges

support existing and future colonies of mussels under the current project operations. Those developments that currently fluctuate greater than 1.0 foot (such as the Higley development at 2.0 feet) do not contain suitable habitat, therefore would not serve as potential colonization sites for this species.

Existing conditions at these projects have provided habitat which supports a stable population of the yellow lampmussel. The applicant's proposed actions would maintain the current fluctuation at the Sugar Island development and would reduce the fluctuation to 0.5 foot at the Raymondville development. We conclude that the existing yellow lampmussel populations would likely not be adversely affected by relicensing the Middle and Lower Raquette River Projects as proposed. Establishment of more stable minimum flow regimes, including a base flow below the Raymondville development, and reduced reservoir fluctuation would likely increase habitat for the yellow lampmussel, thereby potentially expanding its distribution and abundance in the Raquette River. For these reasons, we do not recommend any further studies of the yellow lampmussel at this time.

Section V.C.6 describes the proposed recreational facilities for the Raquette River Projects. Based on our observations, vegetation proposed for removal does not offer any unique ecological characteristics not found elsewhere in the project areas. Creation of canoe portages and access would cause some minor, short-term wildlife displacement during construction. Long-term, but minor, wildlife displacement also would result from use of the access sites. Wildlife common to the area are typical of those found in developed areas, however, and probably would become accustomed to frequent human disturbances at potential upstream and downstream access sites and would experience little incremental effects. The enhancement benefits offered by the proposed access to project waters would outweigh the minor adverse effects on terrestrial resources.

Potsdam Water Power Project

Potsdam's proposed addition of an inflatable flashboard on the West dam at the Potsdam Water Power Project, as a measure to ensure maintenance of the existing reservoir water level elevations would be acceptable under the criteria for issuing exemptions on the condition that the reservoir elevation remains constant. Under the existing exemption's mandatory conditions, Potsdam must operate the project in a ROR mode and may not change the water surface elevation of the reservoir. Based on our analysis in section V.C.2, Water Resources, we conclude that use of the proposed inflatable flashboard would result in a maximum 0.08 inch foot (or less than 1 inch)

decrease in water levels within the wetland areas in the impoundment. We would not expect this magnitude of decrease to affect the wetlands. Therefore, we conclude that the addition of an inflatable flashboard on the West dam at the Potsdam Water Power Project would have no incremental effect on the wetland habitat in the area downstream of Erie's Sugar Island development provided the existing reservoir elevation is maintained.

c. Unavoidable adverse effects: Vegetative clearing associated with the development of trails or canoe portages would represent a minor, long-term unavoidable adverse impact. Wildlife disturbance during the construction of certain recreational facilities (section V.C.6) would represent a short-term minor adverse impact and any displacement would represent a long-term, minor adverse impact.

5. Land Use and Aesthetic Resources

a. Affected environment:

Carry Falls and Upper Raquette River Projects

The Carry Falls Project is located within the town of Colton, and the Upper Raquette River Project is located in the towns of Colton and Parishville. Land within the Carry Falls Project and Upper Raquette River Project areas is primarily undeveloped with forestland, agricultural, public outdoor recreation, and dispersed residential development as the primary land uses. The area tends to be sparsely developed, mountainous, and rustic, and the reservoir shorelines are primarily wooded and undeveloped. Visible flora is typical mixed northern hardwood forest with stands of spruce, fir, and pine intermingled.

The Carry Falls, Stark, Blake, and Rainbow Falls developments are entirely located within the boundaries of the Adirondack Park. Portions of the Five Falls development are also located within the Adirondack Park. The portions of the project within the Adirondack Park boundary are under the jurisdiction of the Adirondack Park Agency. NYSDEC regulates shoreline development on the northern portion of Five Falls and South Colton developments through a shoreline development permitting system.

At Carry Falls, the campground and boat launch areas provide for views of the predominantly wooded, undeveloped shoreline and reservoir. Viewers at the Carry Falls dam boat launch can see the earthen dam embankment, gate structures, and views

of the reservoir. The Stark development shoreline is predominantly natural in appearance with a few private dwellings. The powerhouse and tailrace are visible from Joe Indian Road, which traverses the site, and the reservoir is primarily visible from the boat launch area. Viewer sensitivity would be moderate to high within the Carry Falls and the Stark developments due to the natural features and limited artificially constructed elements in the project area.

The Blake reservoir shoreline is primarily wooded, with dispersed private camps located along the edge. Primary views of the Blake reservoir can be seen from different locations within the McNeil campground and at the Blake dam. Viewer sensitivity would be moderate to high, because the area is primarily undeveloped. The Rainbow reservoir shoreline is natural in appearance with few artificially constructed elements visible. The intake structure is visible from the Rainbow site boat ramp and fishing access. Views of the intake structure and a glimpse of the penstock also can be seen from the Raquette River Road. Viewer sensitivity would be moderate, because the area is close to Raquette River Road, and the surrounding lands are more cleared and developed than upstream regions.

The Five Falls boat launch and fishing access area provides views of the dam and intake structure. The surge tank is a large, tan colored structure, and the penstock and surge tanks can be viewed from the intake structure, with some visibility from the adjacent Three Falls Lane. Viewer sensitivity would be moderate to high due to the surrounding undeveloped nature of the area. Portions of the South Colton reservoir are more developed than upstream developments with the adjacent hamlet of South Colton. The South Colton intake structure and dam are marginally visible from Three Falls Road, while the powerhouse, tailrace, and surge tank can be viewed from South Colton along Route 56. Viewer sensitivity would be primarily moderate, particularly for those accessing the site from the hamlet of South Colton.

Middle Raquette River Project

The Middle Raquette River Project area is predominantly undeveloped with forestland, agricultural, residential, commercial/industrial, transportation, and public and outdoor recreation land uses. The area is characterized as rural, although more developed than upland reaches of the Raquette River, with open fields and forests and residential development. The residential development is primarily concentrated around the village of Potsdam, and the reservoir shorelines of Hannawa Falls, Colton, and Higley developments. Reservoir shorelines are a mix of vegetated, wooded areas and private residences.

The Higley development shoreline is moderately developed with private residences. The powerhouse can be viewed from the boat launch area. The Colton reservoir is small with some private dwellings along the reservoir shoreline areas. The reservoir is visible from Main Street in Colton, and there are other primary viewing points along hiking trails that are part of the Stone Valley Cooperative Recreation Area. Uphill from the powerhouse is an elevated surge tank, which is visible from as far away as Route 56. Viewer sensitivity would be moderate due to the somewhat developed reservoir shoreline area and proximity to developed areas.

The shoreline of the Hannawa reservoir is primarily developed with private residences, with the exception of a large wooded area along the southeast shoreline. There are informal hiking trails throughout the project and the bypassed reach can be viewed along the trail. Viewer sensitivity would be moderate due to the somewhat developed reservoir shoreline area. The Sugar Island reservoir is small, and the shoreline is primarily natural and undeveloped. The upper portions of the reservoir are more secluded, and the lower portion is visible from Potsdam's urban area. Viewer sensitivity would be low in the upper portion of the reservoir and moderate to high in the lower portion in the areas adjacent to Potsdam.

Lower Raquette River Project

Land use within the Lower Raquette River Project area includes agricultural, forestland (primarily in the northern portion of the project area), residential, commercial/industrial, transportation, and public and outdoor recreation. At the Norwood development, there are remains of a former mill structure adjacent to the powerhouse. The upstream view of the reservoir includes a mix of open space and residential development along the shoreline surrounding the reservoir. The powerhouse and dam are visible from the reservoir, boat launch, and fishing access. The project is visible from the adjacent highway and from residential properties both along the shoreline and slightly downstream of the development. Viewer sensitivity is moderate. The East Norfolk reservoir shoreline includes residential development with some limited open space. The power canal runs parallel to the river bypass and is visible from residential properties along Route 56 on the east. The powerhouse is visible from the east by residential properties, on the north by Route 56, and on the west side by some commercial development. Viewer sensitivity is low, because project elements tend to blend in with the built-up urban character of the area.

The Norfolk development is primarily surrounded by residential development

and industrial sites. The penstock is constructed of wood and is barely visible from surrounding areas. A vacant industrial site sits just upstream of the powerhouse area. Viewer sensitivity is low because the area is quite developed. The Raymondville development is also primarily surrounded by residential development. The dam, flume, and powerhouse are visible from a two-lane asphalt paved road, River Road, that traverses the west side of the Raquette River. Viewer sensitivity is low because the surrounding area is suburban and urban in nature.

Potsdam Water Power Project

The Potsdam Water Power Project is located in the village of Potsdam and surrounded by a number of historic buildings (see section V.C.7) and public open spaces. The existing brick powerhouse, facing toward the river front, is situated on the eastern shore of the river. The river branches in this section and creates Falls Island. On the east shore of the river is a dam structure and a riprap embankment with a small, adjacent open space area and adjacent commercial development. Views of the eastern bank of the river include a number of old structures and public open spaces. Views of the western side of the river include commercial development and the dam structure. Potential viewer locations include pedestrian and vehicular traffic traveling along Route 11, and a number of vistas both upstream and downstream within the village of Potsdam. Viewer sensitivity in this area would be moderate.

b. Environmental effects:

Project Operations

As summarized in section V.C.2, compared to existing conditions Erie's proposed project operations would alter the reservoir fluctuations primarily at Carry Falls and Stark reservoir during the winter and spring period. The fluctuations of these reservoirs would be reduced by up to 23 feet during the early spring period and reduced between 5 and 12 feet during the fall and winter periods, reducing the amount of exposed shoreline substrate during these periods. In addition, the reservoir fluctuations would be reduced at the Higley development by 1.0 foot during the recreational season, and by 1.5 feet at the East Norfolk and Raymondville developments, also reducing the amount of exposed shoreline substrates compared to existing conditions. The reservoir fluctuations would be increased at the Colton development by 0.1 foot and would have minimal effect on the additional amount of exposed substrate.

Erie's proposed instream flows as specified in section V.C.2 would provide for

enhanced flows and aesthetics in the project bypassed reaches during these periods. The proposed whitewater boating releases (see section V.C.6) would provide enhanced opportunities during daylight hours for viewers to see increased flows and associated enhanced aesthetics of the bypassed reaches.

Project Construction

The proposed recreational facilities as described under section V.C.6 would have minimal short-term aesthetic effects during construction periods. The type of proposed facilities would be comparable with the existing aesthetic environment and would have no negative long-term aesthetic effects on the project areas. The proposed construction at the Higley powerhouse would be conducted in consultation with the SHPO (see section V.C.7) and would afford opportunities to preserve and enhance the architectural character of the Higley powerhouse.

Potsdam proposes to develop a powerhouse structure for the Potsdam Water Power Project along the west bank of the river adjacent to the existing dam structure. The structure would be located along Route 11 as it runs through the village of Potsdam, adjacent to an existing commercial development, and would be next to the historic district (see section V.C.7). The proposed structure would affect the aesthetic character of the area; however, development of drawings in consultation with the SHPO would ensure that the structure would be designed to be compatible with the historic character of the village of Potsdam.

Project Boundaries

Erie proposes to convey conservation and development rights easements to the state of New York at no cost for the lands associated with the proposed recreational access areas: Jordan River canoe portage route, the Dead Creek canoe access, and the Clear Pond Wild Forest trail; all of which are located within the Carry Falls Project and Upper Raquette River Project areas. As recommended in the Settlement, these areas would remain outside of the project boundaries. Erie proposes to modify the project boundaries to include all other lands associated with the proposed recreational facilities (see section V.C.6), if they would be located on lands currently owned by Erie, but not currently within the existing project boundaries. These areas would include portions of the canoe portages at Stark, Colton, Hannawa, Norwood, and Norfolk; the intermediate access point to the east bank of the Colton bypassed reach off Lenny Road; any portions of the Stone Valley Trail system at Colton, not currently within the project boundary; and all lands associated with the development of the Red Sandstone Trail

system.

If lands associated with any other proposed recreational facilities are determined to be located on lands not owned by Erie, Erie proposes to modify the location of the facility to ensure that it is sited on project lands. Erie also would have the option to elect not to include those lands within the project boundary.

Our Analysis

The proposed donation of the conservation and development rights easements to the state of New York for the lands associated with the Jordan River canoe portage, the Dead Creek canoe access, and the Clear Pond Wild Forest trail would allow for long-term public access and use of these lands for recreational purposes.

Inclusion of the proposed recreational facilities for the canoe portage routes, the Stone Valley Trail system, and Red Sandstone Trail system (as described above) within the project boundaries would ensure long-term public access to these recreational facilities. The remaining recreational facilities would, to the extent they would be located on Erie-owned lands, be included in the project boundaries. Inclusion of the proposed recreational facilities within the project boundaries would allow for long-term public access to recreational opportunities afforded by the projects. Erie proposes to develop a recreation plan and further refine the proposed recreational facilities in consultation with the Raquette River Advisory Council (RRAC) (see section V.C.6). In the development of the recreation plan, specific measures to include the proposed recreational facilities within the project boundaries would help ensure that these facilities are publicly available over the term of the license.

c. Unavoidable adverse effects: None.

6. Recreational Resources

a. Affected environment: St. Lawrence County, New York, is predominantly rural in character. The Raquette River originates at Blue Mountain Lake in the mountainous Adirondack region of upstate New York and flows northward through Raquette Lake, Long Lake, Tupper Lake, and Carry Falls reservoir, before draining into the St. Lawrence River near Massena, New York. Generally, the project area is largely undeveloped and sparsely populated offering opportunities for recreation in a natural setting. Recreational activities in this region are diverse and include angling, motor boating, canoeing, sailboarding, waterskiing, camping, picnicking, hiking, biking,

hunting, cross-country skiing, and snowmobiling.

Existing Recreational Facilities

Carry Falls and Raquette River Projects

Table 9 summarizes existing recreational facilities within the Carry Falls; Upper, Middle, and Lower Raquette River; and Potsdam Water Power Projects. The upper portion of the projects' areas lies within the Adirondack Park boundaries (see section V.C.5).

Existing recreational facilities within the Carry Falls Project include the Parmenter campground and a picnic and trailer-accessible boat launch area. The Parmenter campground on the western shore of the Carry Falls reservoir includes 16 campsites, restrooms, a trailer boat launch, and it provides fishing and hunting access. The boat launch area, also on the western shore near the Carry Falls dam, provides boating, fishing, and hunting access.

Table 9. Summary of existing recreational facilities (Source: Staff).

Development	Facilities
Carry Falls	Parmenter campground · 16 campsites, restrooms, trailer boat launch, hunting and fishing access Carry Falls dam · trailer boat launch and day use area
Stark	Multi-use site · trailer boat launch and picnic area Bypass Picnic Site · picnic area
Blake	McNeil campground · 58 sites (2 that meet ADA standards), 3 boat launches, swimming area, playground, restrooms, fishing access

	Boat launch · trailer boat launch
Rainbow	Boat launch · trailer boat launch, picnic area, and fishing access
Five Falls	Boat launch · trailer boat launch
South Colton	Boat launch · boat launch, picnic area, fishing access
	Fishing platform · tailrace fishing platform (ADA-compliant)
Higley	Boat lunch · boat launch, picnic area
	Picnic area
Colton	Stone Valley Hiking Trail System · hiking trail
	Boat launch · car-top with parking
Hannawa	None
Sugar Island	None
Norwood	Multi-use site · boat launch, picnic area, ADA-compliant fishing platform
East Norfolk	None
Norfolk	None
Raymondville	None
Potsdam	Village park on Fall Island · park benches and playground equipment
	Sandstoner Park · indoor skating arena, a softball field, picnic areas, a playground, and a swimming beach on the river

Existing recreational facilities within the Upper Raquette River Project include two campground areas, one multi-use area, five trailer-accessible boat launches, a picnic area, and a fishing access area. Two of these recreation areas lie within the Stark development, including a multi-use site on the south shore with a trailer-accessible boat launch and picnic area and a picnic area adjacent to the Stark bypassed reach. The Blake development contains two recreation areas, including: the McNeil campground, which includes 58 campsites (two that meet Americans with Disabilities Act (ADA) standards for accessibility), three boat launches, a supervised swimming beach, a playground area, restrooms, and fishing access; and a trailer-accessible boat launch. The Parmenter and McNeil campgrounds receive the greatest level of recreational use within the Carry Falls and Upper Raquette River Project areas. Capacity of these campgrounds ranged from an estimated 65 percent capacity in 1990 to an increase of 85 percent capacity in 1995.

The recreational facilities at the Rainbow Falls development include a trailer boat launch area with a picnic area and fishing access. The Five Falls development has a trailer boat launch, and the South Colton development has one boat launch area with a picnic area and fishing access. In addition, there is an ADA-compliant fishing platform and parking area downstream of the South Colton tailrace area.

Existing recreational facilities within the Middle Raquette River Project include two boat launch areas and a hiking trail. Two of these existing recreational facilities are located within the Higley development, including a boat launch area and picnic area. A car-top boat launch is located under the project transmission line at the Colton development, and a hiking trail that is part of the Stone Valley hiking trail system parallels portions of the Colton bypassed reach. The Hannawa and Sugar Island developments have no formal existing recreation areas.

Within the Lower Raquette River Project, one recreational access area, located at the Norwood development, includes an ADA-compliant fishing platform, a boat launch, and a picnic area. No formal existing recreation areas are located within the East Norfolk, Norfolk, and Raymondville developments.

Potsdam Water Power Project

The Potsdam Water Power Project is located within the village of Potsdam, and adjacent recreational facilities include a village park on Fall Island with park benches, playground equipment, and landscaping. Upstream of the project dam and

powerhouse, adjacent to the right side of the Raquette River is an existing village-owned 14.5 acre park, Sandstoner Park, which includes an indoor skating arena, a softball field, picnic areas, a playground, and a swimming beach on the river. Potsdam owns several additional parcels of land that are currently open space recreational areas. Other recreational facilities, primarily associated with Clarkson University and State University of New York at Potsdam, are located within the vicinity of the village of Potsdam; however, there are no other formal recreational facilities associated with the Potsdam Water Power Project up- or downstream of the dam and powerhouse.

Whitewater Boating

As part of a system-wide whitewater recreation plan that NMPC developed in 1993, the whitewater interests consulted in the development of the plan identified sites within the Erie system with whitewater recreation potential. On the Raquette River, the whitewater boating interests identified seven locations with whitewater potential, one located within the Piercefield Project located upstream of the Carry Falls Project, three located within the Upper Raquette River Project, and the remaining three located within the Middle Raquette River Project.

The locations identified within the Upper Raquette River Project included: Rainbow development bypassed reach, 0.15 mile length of class III-IV; Five Falls development bypassed reach, 0.45 mile length of class II-IV; and South Colton development bypassed reach, 0.3 mile length of class V. The locations within the Middle Raquette River Project included: Colton development bypassed reach, 3.2 mile length of class III-IV; Hannawa development bypassed reach, 0.8 mile length of class II-III; and Sugar Island development bypassed reach, 2.1 mile length of class III-IV. All segments, except the Hannawa and Sugar Island bypassed reach segments, were determined to be boatable with natural flows.

In response to an Additional Information Request (December 12, 1993), NMPC assessed recreational boating opportunities at the Hannawa and Sugar Island bypassed reaches. The study assessed boatability and cost of flows ranging from 400 to 1,500 cfs for the Hannawa bypassed reach and ranging from 300 to 2,000 cfs for the Sugar Island bypassed reach. The study, conducted in cooperation with local boating clubs, the ADK, and the American Whitewater Association (AWA), concluded that recreational boating opportunities at both locations were of marginal value and that expenditures to enhance whitewater boating opportunities would be of more value at other locations prioritized by the whitewater boating interests. The whitewater boating

opportunity sites on the Raquette River identified by whitewater boating interests to be of greatest interest included the segment of the river downstream of the Piercefield Project, and the Colton development bypassed reach.

b. Environmental effects:

Proposed Recreational Facilities

Raquette River Projects

Erie proposes to maintain the existing recreational facilities (summarized in table 10) and to develop additional recreational facilities. Table 10 summarizes the proposed recreational facilities within the Carry Falls, and Upper, Middle and Lower Raquette River Projects as specified in the Settlement. The general type and location of the proposed recreational facilities were developed in consultation with numerous stakeholders as part of the Settlement Offer. Erie proposes to develop a recreation plan that would further refine and detail the proposed recreational facilities. The proposed recreation plan would be circulated for review to the RRAC and would be completed within 1 year of license issuance for each project. In addition to these proposed facilities, Erie proposes to monitor recreational activity and facilities through the submittal of FERC Form 80 documentation, as required by 18 CFR, subchapter B Part 8 §8.11.

Table 10. Summary of proposed recreational facilities (Source: Staff).

Development	Facilities
Carry Falls	Canoe portage at the Jordan River
	Canoe portage around the Carry Falls development dam
Stark	Canoe portage around the Stark development dam
Blake	Canoe portage around the Blake development dam
	Canoe access to Dead Creek
Rainbow	Canoe portage around the Rainbow development dam
	Clear Pond Forest Trail
Five Falls	Canoe portage around the Five Falls development dam
South Colton	Canoe portage around the South Colton development dam
Higley	Canoe portage around the Higley development dam
Colton	Canoe portage around the Colton development dam
	Whitewater boating access
	Car-top boat launch with overnight parking

Hannawa	Canoe portage around the Colton development dam
	Scenic overlook and picnic area
	Red Sandstone trail (southern terminus)
	Whitewater boating access
	Roadside parking area
Sugar Island	Canoe portage around the Sugar Island development dam
	Day use area
	Red Sandstone trail (northern terminus)
	Whitewater boating access
Norwood	Canoe portage around the Norwood development dam
East Norfolk	Canoe portage with parking (take-out only)
Norfolk	Canoe portage (put-in only)
Raymondville	Canoe portage around the Raymondville development dam
	Car-top boat launch and picnic with parking facilities

Erie proposes canoe portages and appropriate directional signs at all of the project developments. Additional proposed recreational facilities throughout the projects include: two additional canoe portage/access areas, whitewater boating access at three developments, two car-top boat launches, two hiking/access trails (developed and maintained through a cooperative effort), two day use areas, and a roadside parking area.

All existing and proposed facilities, except the Parmenter and McNeil campgrounds, would be operated under a "carry-in and carry-out" trash policy. Trash facilities would continue to be provided at the campgrounds.

Carry Falls Project

For the Carry Falls development, Erie proposes to provide a canoe portage between the Carry Falls reservoir and the Jordan River. The proposed portage route would extend from the right shore of Carry Falls reservoir to the Jordan River at the first bridge crossing, about 1.5 miles upstream of the reservoir. The proposed canoe portage at the Carry Falls dam would extend from the left shore of the Carry Falls reservoir to the left shore of the Stark reservoir.

Upper Raquette River Project

Within the Upper Raquette River Project, Erie proposes to provide a canoe portage around the Stark dam that would connect the right shore of the Stark reservoir

at the existing boat launch area to the left shore of the Blake reservoir. At the Blake development, the applicant proposes a canoe portage around the Blake dam that would connect the left shore of the Blake reservoir with the left shore of the Rainbow reservoir. Also within the Blake development, access to Dead Creek, a tributary that enters the Blake bypassed reach at about the halfway point, would be allowed via canoe from the Blake bypassed reach, or by car on a dirt road off Joe Indian Road. Signs would be provided at Joe Indian Road designating the access to Dead Creek.

At the Rainbow development, Erie proposes to provide canoe portage around Rainbow dam that would connect the left shore of Rainbow reservoir to the left shore of the Five Falls reservoir. Adjacent to the Rainbow reservoir, Erie proposes to provide, in conjunction with the ADK and others, as appropriate, a primitive access trail. This trail would connect a landing in a small bay on the right shore of the Rainbow reservoir to the Clear Pond Wild Forest, a state-owned forest preserve located about 0.3 mile from the Rainbow reservoir.

At the Five Falls development, Erie would provide a canoe portage around the Five Falls dam that connects the left shore of the Five Falls reservoir to the left shore of the South Colton reservoir. Erie also proposes to make a good faith effort to enter into an agreement with NYSDEC to institute a horsepower limit agreement on the Five Falls reservoir, that would still allow the applicant necessary access and use for maintenance purposes. Erie proposes to provide a canoe portage around the South Colton dam to connect the left shore of the South Colton reservoir to the left shore of the riverine reach below South Colton.

Middle Raquette River Project

Within the Middle Raquette River Project, Erie would provide a canoe portage around Higley dam, beginning at the existing picnic area. Canoe portage also would be provided around the Colton dam, with an upper whitewater put-in within the bypassed reach, and continue along the pipeline road to a second put-in below the bypassed reach. Erie also would provide a car-top boat launch with overnight parking in the vicinity of Browns Bridge, located immediately downstream of the Colton tailrace.

Erie would develop in conjunction with the ADK and others as appropriate, the Red Sandstone Trail, with the southern terminus of the trail extending from the Hannawa dam canoe take-out northward to the Sugar Island reservoir and merging with the Sugar Island canoe portage route. Erie proposes to provide a canoe portage around Hannawa dam that would follow the Red Sandstone Trail until diverting to the put-in

location. Other proposed recreational facilities at the Hannawa development include a scenic overlook off the Red Sandstone Trail that would provide scenic viewing of the falls and gorge within the Hannawa bypassed reach, and picnic facilities and roadside parking in the vicinity of the Hannawa dam.

Within the Sugar Island development, Erie proposes a canoe portage around the Sugar Island dam with the take-out located along the left shore of the reservoir and the put-in on the left shore of the bypassed reach that also would also serve as the whitewater put-in. Erie also proposes to develop a day-use area on a large peninsula called Sugar Island off the bypassed reach. The day-use area would include a hiking trail, canoe access, a picnic area, and a gate to restrict access at night.

Lower Raquette River Project

Within the Lower Raquette River Project, Erie proposes to provide canoe portage around the Norwood dam with the take-out at the existing boat launch and the put-in on the right shore downstream of the powerhouse. At the East Norfolk development, a canoe take-out with parking would be provided on the left shore of the reservoir, and the canoe portage route would bypass both the East Norfolk and Norfolk dam because of the small size of the Norfolk reservoir. The canoe portage route would include a combination of trails and public roadways with appropriate directional signs. The canoe portage put-in would be provided within the bypassed reach of the Norfolk development. At the Raymondville development, Erie proposes to provide canoe portage around Raymondville dam on the left shore, and a car-top boat launch, parking, and picnic facilities near the dam.

Potsdam Water Power Project

Potsdam proposes to develop recreational facilities within the village that would include improvements to Sandstoner Park, a promenade, two canoe launch sites, a hiking trail along the river, bikeways, and interpretive signs. The proposed improvements to Sandstoner Park would include baseball fields, ADA-compliant beach access and picnic tables, a picnic pavilion, a concession stand, walkways, signs, and one of the two proposed boat launches. The proposed promenade would be located at the Market Square Mall on the left side of the Raquette River and would include a walkway, an ADA-compliant fishing platform, benches, lighting, signs, and landscaping. Potsdam proposes to provide a second canoe launch at the existing Falls Island Park and also proposes fencing at the dam area, signs, and lighting at the park. Potsdam proposes Class III bikeway development through portions of the village and a

walking trail connector from the village along the river banks to the Sandstoner Park. The proposed day-use area on Sugar Island would be accessible by water and would include an interpretive trail and boat landing area. In its comments dated October 4, 1999, the ADK recommends that Potsdam install signs on Falls Island for the proposed canoe portage.

Our Analysis

Raquette River Projects

The proposed recreational facilities would provide long-term recreational access and enhanced recreational opportunities throughout the project areas. In particular, the proposed recreational facilities at the Hannawa, Sugar Island, East Norfolk, Norfolk, and Raymondville developments would provide recreational facilities where no formal recreational facilities associated with these developments currently exist. The proposed canoe portages at each development would allow for continuous and enhanced canoe access along the affected segment of the Raquette River.

The proposed development of the recreation plan, in consultation with the RRAC, would provide the means to develop more specific recreational facilities that would meet the needs and future recreational demands of the project region with input from the state and local recreational interests. In addition to the further refinement of the proposed recreational facilities, specification within the recreation plan of the long-term maintenance responsibility of the recreational facilities would help ensure that these facilities are suitably maintained over the term of the licenses.

The proposed recreational monitoring, FERC Form 80 submitted every 6 years, would provide opportunity to review the adequacy of the recreational facilities over the term of the licenses. Because use and capacity of the Parmenter and McNeil campground areas continues to increase, continued characterization of these changes during the monitoring period and reporting in the recreational monitoring report would help ensure that adequate campground facilities are provided to meet future recreational demand.

Potsdam Water Power Project

Potsdam proposes recreational facilities that would enhance recreational opportunities by providing enhanced recreational facilities and access within the village of Potsdam. The proposed promenade and connecting trail would provide enhanced

opportunities to view segments of the Raquette River and to access recreational facilities at the Sandstoner Park. The proposed day-use area would provide opportunity for boaters to access and use Sugar Island and the proposed interpretive trail.

Whitewater Boating Flows

As specified in the Settlement Offer, Erie proposes to provide up to six whitewater boating releases annually between July and September at Colton, Hannawa, and/or Sugar Island developments. The whitewater releases would be determined by February 1 of each year by the whitewater subcommittee of the RRAC, which would include a representative of the local whitewater boating community and a local government representative. The releases would be based upon the annual energy loss associated with the releases, with initial whitewater budget of up to 800 MWh per year from 2000 to 2004, and include a ramping schedule. Every 5 years, beginning in 2005, the subcommittee would review whitewater use records to determine if variations in the whitewater budget are warranted, and may select an annual whitewater budget between 400 and 1,080 MWh.

Erie would maintain anticipated (confirmation system) and actual (sign-in sheet) whitewater recreational use records. The anticipated use would be determined based on a confirmation system where boaters would make a confirmation through mail, Internet, or phone. Scheduled releases would proceed at the Hannawa and Sugar Island developments regardless of the number of confirmed boaters. At the Colton development, if less than five confirmations were received one week prior to the scheduled release, Erie could exercise the option to cancel the release and would not be obligated to reschedule the release.

The proposed whitewater flows are targeted to provide flow releases at the Colton bypassed reach, because the stakeholders identified this as the greatest potential whitewater experience in the project area for the intermediate to advanced paddler. The approximate peak flow of any scheduled whitewater releases would be targeted as follows: 1,250 cfs at the Colton development, 800 cfs at the Hannawa development, and 1,500 cfs at the Sugar Island development. No consecutive day releases at any one development would be allowed. Erie proposes to determine ramping and peak flow levels through assessment of the relationships associated with unit flow, gate opening, and spillage, and this information would be shared with the whitewater subcommittee. No instream gaging of scheduled whitewater releases is proposed.

Erie proposes to provide whitewater access at Colton, Hannawa, and Sugar

Island with appropriate safety and directional signs. The primary access to the Colton development would be along the existing Stone Valley Trail system, and Erie would maintain a trail connecting Lenny Road to the main Stone Valley Trail along the right bank of the bypassed reach as a formal intermediate access point. At the Hannawa development, Erie proposes to develop a formal access point along the upper portion of the bypassed reach and one formal take-out along the left shore of the bypassed reach upstream of the powerhouse. At the Sugar Island development, Erie would develop a formal access point at the upstream portion of the bypassed reach near the pipeline intake, with a second access point at the proposed day-use area.

Erie proposes to provide a flow notification system including an Internet website and dial-up phone system. The system would give the public information about scheduled releases and known spillage events at the Colton, Hannawa, and Sugar Island developments.

Our Analysis

The proposed whitewater boating releases would provide recreational opportunities at the bypassed reaches at Colton, Hannawa, and Sugar Island developments during July through September. The flow notification system would provide information on the timing and amount of the scheduled whitewater flow releases, and access would be ensured to these bypassed reaches for the whitewater boaters. The whitewater subcommittee and the mechanism proposed for determination of the whitewater boating flows would allow opportunity for the input from the local whitewater boating community in determining the timing and amount of the proposed flow releases.

Reservoir Fluctuations

Under Erie's proposal, the reservoir fluctuations would be modified at the Carry Falls, Stark, Higley, Colton, East Norfolk, and Raymondville developments (see table 6 in section V.C.2).

Our Analysis

Normal reservoir fluctuations at Carry Falls would be reduced by 23 feet, from 53 feet under existing conditions to 30 feet under proposed conditions. The 30-foot reduction would occur during the winter to spring period; the lowest reservoir levels (about elevation 1,355 feet) would occur in late March and briefly in early November.

During late April through mid July, the reservoir elevations would remain the same--full pond elevation of 1,385 feet as occurs under the existing drawdown regime. From mid-July to early November, under proposed conditions, the reservoir would be gradually drawn down 30 feet to elevation 1,355 feet. Under existing conditions, the drawdown begins late June gradually down to about elevation 1,352 feet in early November. The reduced fluctuation would provide enhanced recreational experience by reducing the extent of the maximum allowed drawdown and reducing the amount of exposed shoreline substrate on Carry Falls reservoir, particularly in the early spring and winter periods. In conjunction with this change the Stark reservoir fluctuation would go from 23 feet to 1.0 foot under proposed conditions. This change would keep reservoir levels constant year-round. Similar to Carry Falls, this reduction in fluctuation would enhance recreational experience by reducing the amount of exposed shoreline.

The proposed changes to the Higley reservoir normal fluctuations would provide for reduced drawdown by 1.5 feet during primary recreational activity periods, weekends during the period from Memorial through Labor Day. The East Norfolk and Raymondville reservoirs normal elevation fluctuations would be reduced from 1.0 foot to a proposed 0.5 foot fluctuation. These reduced fluctuations would provide a minor recreational enhancement and minor reduction of exposed shoreline substrate areas. The only proposed increase in normal reservoir fluctuation, 0.1 foot at the Colton development, would have a limited effect on the recreational experience in this area.

c. Unavoidable adverse effects: None.

d. Cumulative effects: The proposed canoe portages would provide beneficial recreational opportunities throughout the project areas by allowing for continued transport around each of the project dams. In addition, the proposed whitewater boating flows and notification system would enhance opportunities for whitewater boating within the region. The proposed recreational facilities also would provide additional and enhanced recreational facilities and opportunities within the region and help ensure public access and availability of these recreational opportunities.

7. Cultural Resources

a. Affected environment:

Carry Falls Project

Native Americans once occupied the foothills of the Adirondack Mountains.

However, according to the SHPO's archeological sensitivity maps, provided to the applicant during consultation, no known archeological sites have been identified within the Carry Falls Project's area of potential effect (APE). The APE includes lands within and immediately adjacent to the project boundary. There are no historic properties listed on or eligible for listing on the National Register of Historic Places (National Register) within or adjacent to the APE.

Upper Raquette River Project

The SHPO's archeological sensitivity maps identify six known archeological sites in the vicinity of the Upper Raquette River Project that could be near or within the project's APE. There are no historic properties listed on or eligible for listing in the National Register within the Upper Raquette River Project's APE.

Middle Raquette River Project

There is one identified archeological site within the Middle Raquette River Project's APE. The foundation of an early tanning factory is located just downstream of the Colton dam between the bypassed reach and the Stone Valley hiking trail. An interpretive sign provides information on the importance of the tannery, which operated from 1856 to 1898, to the local economy.

The construction dates of the four developments of the Middle Raquette River Project range from Higley in 1911 to Sugar Island in 1924. NMPC conducted a survey of all hydroelectric development in New York State (Hay, 1991). Based on this survey, the SHPO provided an opinion that the Higley plant meets the criteria A and C[14] for listing in the National Register (letter from Julia S. Stokes, Deputy Commission for Historic Preservation, NYSOPRHP, Albany, New York, to Jerry Sabattis, Relicensing Coordinator, NMPC, Syracuse, New York, dated May 1, 1991). The SHPO states that in her opinion the Higley plant meets the National Register criteria because it is an

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[14] Criterion A is met when properties are associated with events that have made a significant contribution to the broad patterns of our history. Criterion C is met when properties embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess the master's artistic values; or represent a significant and distinct visual entity whose components may lack individual distinction.

intact representative example of a generating facility containing two original turbine generator units, which illustrates the operation of a small hydropower facility built during an important period in the development of electrical engineering in the region and the United States.

Lower Raquette River Project

There are no identified archeological sites within the Lower Raquette River Project's APE. All four developments of the project were constructed in 1928. None of the developments meet the criteria for listing in the National Register. About 20 miles downstream of the Raymondville development, the Raquette River forms the northwestern boundary of the St. Regis Mohawk Tribe reservation at the confluence with the St. Lawrence River. However, no properties that are eligible for inclusion in the National Register, that are located off Tribal lands and to which the Tribe may attach religious and cultural significance, have been identified in the Project's APE.

Potsdam Water Power Project

There are no known archeological sites near the proposed construction site of the West dam or powerhouse (letter from David S. Gillespie, NYSOPRHP, Albany, NY, to Frank Christie, Christie Engineering, Malone, NY, dated October 25, 1994). The project is adjacent to the Market Street Historic District. The SHPO stated that two properties located on Maple Street, the Trinity Episcopal Church and Trinity Office Building, meet the criteria A and C for listing in the National Register (letter from Tony Opolka, NYSOPRHP, Albany, NY, to Frank Christie, Christie Engineering, Malone, NY, dated April 11, 1996). Both buildings are constructed of Potsdam sandstone; both are associated with the Clarkson family, who also founded Clarkson University in Potsdam; and both are visible from the West dam and the site of the proposed new powerhouse.

b. Environmental effects: During pre-filing consultation, NMPC provided draft applications of the four Raquette River Project applications for relicense to the SHPO. No survey or salvage archeological surveys were conducted as part of the pre-filing consultation, and the SHPO did not request these surveys. The SHPO provided copies of archeological sensitivity maps and lists of properties listed in state and national registers of historic places and commented on the potential effects of relicensing these projects on any known archeological or historic properties in the immediate vicinity of the projects.

The Bureau of Indian Affairs (BIA) filed comments dated December 3, 1998, in response to the draft applications for the Carry Falls and Upper Raquette River Projects, and on the Settlement for all four projects. BIA concludes that the projects, if operated as proposed in the Settlement, would be adequate to protect the tribal trust resources of the St. Regis Mohawk Tribe (Tribe). BIA further states that the Settlement would provide for increased habitat protection for the areas of concern to the Tribe. However, BIA contends that the Tribe is "an affected Tribe" under the Commission's regulations[15] because the Raquette River flows through the Tribe's reservation 20 miles downstream of the Lower Raquette River Project. BIA requests that NMPC modify the Settlement to include the Tribe as a party to be consulted during implementation of the projects' environmental enhancements and to include the Tribe's reservation within the geographic boundaries for the Raquette River Enhancement Fund. The Tribe also filed an intervention on August 25, 1998, to the Lower Raquette River Project citing potential effects on the flow, water quality, and related resources of the Raquette River.

By letter dated January 11, 1999, NMPC stated that it cannot unilaterally modify the Settlement, which is an agreement among 17 separate parties. However, NMPC proposed to include the Tribe as a member of the RRAC and as a concurring party to the project- specific Appendix to the PA. NMPC indicated that these steps would ensure that the interests of the Tribe are recognized and included in decisions concerning implementation of the Settlement provisions. NMPC further indicated that it would not oppose the provision of funding beyond the study area as defined in the Settlement.

Carry Falls and Upper Raquette River Projects

NMPC consulted with the SHPO pursuant to Section 106 of the National Historic Preservation Act (NHPA) and the implementing regulations. The SHPO indicated that it had reviewed the Settlement, and had no additional comments on the Carry Falls or Upper Raquette River Projects (letter from Ruth L. Pierpont, Director, Historic Preservation Field Service Bureau, Waterford, New York, to Jerry Sabattis, Hydro Licensing, NMPC, Syracuse, New York, dated July 15, 1998).

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[15] 18 CFR § 16.8(a)(1) requires any applicant for a new license to consult with any Indian tribe that may be affected by the project.

Middle and Lower Raquette River Projects

The SHPO concurred that the relicensing of the Middle Raquette River Project would have no adverse effects on cultural resources in or eligible for inclusion in the National Register provided that the following conditions are met: (1) the Higley powerhouse is mothballed and all equipment retained in place; (2) prior to mothballing, the facility be recorded in accordance with HABS/HAER[16] standards; and (3) the new powerhouse should be of a material consistent with the color and texture of the existing powerhouse (letter from Julia S. Stokes, Deputy Commission for Historic Preservation, NYSOPRHP, Albany, New York, to Jerry Sabattis, Relicensing Coordinator, NMPC, Syracuse, New York, dated May 1, 1991).

The SHPO commented on the scoping document 1 dated February 1995 that it had previously reviewed these projects in accordance with Section 106 of the NHPA. It stated that unless there was a change in project scope, relicensing these projects would have no effect on any historic properties (letter from Linda Garofalini, Historic Preservation Program Analyst, NYSOPRHP, Waterford, New York, dated February 22, 1995). In the Settlement the SHPO reviewed, NMPC reiterated that all of the previously proposed power upgrades, except for the proposed new powerhouse at the Higley development, have been eliminated. Further, NMPC substituted the recreational enhancements in the Settlement for those previously proposed in the applications for relicense.

Potsdam Water Power Project

Interior filed a motion to intervene on December 18, 1998, in opposition to the proposed Potsdam amendment, citing potential affects to the fishing rights of the Tribe whose reservation is located about 20 miles downstream of the Raymondville development of the Lower Raquette River Project. Interior contends that the proposed action would affect the water quality and quantity of water flowing on the reservation and the capability of the river to sustain fish. On October 12, 1999, Interior filed mandatory terms and conditions for the amendment of application for amendment of exemption that require that Potsdam operate the project in an ROR mode such that the reservoir elevations are unchanged from those that currently exist with only the East powerhouse in operations. The conditions also require that Potsdam provide a plan to

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[16] Historic American Buildings Survey/Historic American Engineering Record.

assess project impacts on the Sugar Island bypassed reach.

The SHPO concurred that the proposed project would have no adverse effect on cultural resources in or eligible for inclusion in the National Register provided that Potsdam submit drawings to enable the SHPO to review building elevations and specifications detailing materials proposed for the exterior of the new powerhouse, including walls and visible roofs. The SHPO requests preliminary drawings and drawings at 30 percent, 60 percent, and 100 percent design completion. The SHPO further recommends that the new powerhouse be constructed of compatible materials such as red brick or Potsdam sandstone, and be designed to be compatible with the National Register-eligible buildings in terms of scale, massing, and details (letter from T. Opolka, NYSOPRHP, to F. Christie, Christie Engineering, dated July 18, 1996).

Our Analysis

Raquette River Projects

Erie's proposed enhancement measures for recreational resources at all four projects and the construction of a new powerhouse at the Higley development at the Lower Raquette River Project may affect properties included in or eligible for inclusion in the National Register.

Erie's proposal to construct a new powerhouse and to mothball the existing powerhouse would have an adverse effect on an historic property under the criteria of adverse in the regulations implementing Section 106 of the NHPA.. Specifically, the proposed undertaking would discontinue the current use of the building as a powerhouse and introduce a new structure to replace that function.[17]

The recreational enhancements that Erie proposes as specified in the Settlement (section V.C.6.b describes the proposed facilities) would involve land-clearing and ground-disturbing activities at shoreline locations for canoe put-in and take-out, boat launches and associated parking, and along portage paths and trails between these locations. None of the proposed locations of these facilities are near any known

[17] 36 CFR Part 800.5 (a)(2)(iv) specifies that an adverse effect includes a change in the character of the property's use or of physical features within the properties setting that contribute to its historic significance.

archeological sites. Therefore, we agree that construction of the proposed recreational facilities would have no effect on any known archeological sites because none exists in these locations. The final locations of the canoe portage facilities would be determined in consultation with the Settlement parties. Land-clearing and ground-disturbance necessary to implement the proposed recreational enhancements, however, could affect as yet unknown archeological sites along the reservoir shorelines.

The Commission executed a PA among the Commission and the SHPO, with NMPC concurring, on July 19, 1996, for managing historic properties that may be affected by licenses issuing for the continued operation of 14 hydroelectric projects in New York State, including the four Raquette River Projects. In accordance with Stipulation II.D of the existing PA, we prepared and circulated drafts of Appendices A.VI - A. IX of the existing PA for the four Raquette River Project to the original signatories to the PA for their review and approval on November 27, 2000. These draft appendices include a site-specific description of the project facilities, a description of the proposed modifications and enhancement measures, identification of historic properties that might be affected, and a summary of the anticipated effects of the proposed modifications and enhancements.

Although the exiting PA does not specifically require Erie to consult with the St. Regis Mohawk Tribe, the need to do so is implicit in the requirement that Erie consult with "interested persons." The following stipulations of the existing PA extend rights and privileges that Erie must respect:

(1) page 4, stipulation I.A, the Licensee is required to consult, during the development of the CRMP, with the SHPO and with "interested persons";

(2) page 6, stipulation I.C.9, the Licensee is required to include in the CRMP principles and procedures to address "coordination with the SHPO and interested persons during implementation of the CRMP;"

(3) page 6, stipulation II.A, requires the Licensee to "submit the CRMP, along with documentation of the views of the SHPO and interested persons, to the Commission for review and approval;"

(4) page 8, stipulation III.A, requires the Licensee to "consult with the SHPO and interested persons regarding" certain identified effects, "pending review and implementation of the CRMP;"

(5) page 8, stipulation IV.A, an "interested person" may object "to any action or any failure to act" pursuant to the Programmatic Agreement or the CRMP;

(6) page 9, stipulation IV.A, continues the right of an "interested person" to object by requiring the Commission to consult with "interested persons, as appropriate, to resolve the objection; and

(7) "interested persons" have no rights with respect to the amendment or termination of the Programmatic Agreement. See stipulation V.

To ensure that Erie consults with the St. Regis Mohawk Tribe, the BIA, and the RRAC in the development of each CRMP, and in the interim procedures, we have revised the appendices to clearly indicate at the beginning of the appendices that the St. Regis Mohawk, the BIA, and the RRAC are "interested persons" within the meaning ascribed to this term in the existing PA. We will afford the St. Regis Mohawk Tribe a reasonable opportunity to comment on the revised Appendices A.VI - A.IX before they are approved. The final Appendices A.VI - A.IX would be included as conditions in any licenses issued to Erie for these four projects. As provided in Stipulation II.D., once the Commission has approved the Appendices, they will be attached to the executed PA, and the Commission's responsibilities under Section 106 of the NHPA will be satisfied.

The PA requires that Erie prepare a project-specific cultural resources management plan (CRMP) within 1 year of the issuance of a project license and provides interim procedures to consult with the SHPO prior to commencing any land-clearing or land-disturbing activities at a project. Erie proposes to consult with the SHPO, RRAC, BIA, and St. Regis Mohawk Tribe in the development of each CRMP. Erie proposes to comply with the provisions of the PA and subsequent CRMPs for these four projects. Specifically, to avoid unnecessary harm to any as yet unknown archeological sites that may be eligible for inclusion in the National Register, Erie would consult with the SHPO, the RRAC, and the St. Regis Mohawk Tribe prior to the commencement of any land-clearing or ground-disturbing activities necessary for implementation of the Settlement provisions. We agree with Erie that complying with the provisions of the PA would help to avoid any undue effects on known and as yet unknown historic properties.

The PA interim procedures also apply to any changes to historic buildings in or eligible for inclusion in the National Register. Erie would be required under the PA to

consult with the SHPO on measures to avoid or mitigate the adverse effect to the Higley powerhouse. The SHPO has indicated that measures should include steps taken by Erie to record and mothball the existing Higley powerhouse with its existing equipment and on the design of the new powerhouse to ensure its compatibility with the historic powerhouse. We agree that implementation of the provisions of the PA would help to ensure that the project would mitigate any adverse effects to the Higley powerhouse and would have no adverse effects on any other historic properties.

Potsdam Water Power Project

Potsdam's proposed installation of an inflatable flashboard on the West dam would maintain the existing reservoir elevations. The plan to assess the impacts of the Potsdam operations with the new powerhouse in operation, as required by Interior, would verify that operation with the inflatable flashboard provides the same approximate rating curves as the existing operations. The plan would include mitigation measures should operations fail to maintain the existing water levels in the reservoir. The BIA in comments filed on December 3, 1998, concludes that the provisions of the Settlement, if implemented, would be adequate to protect the tribal trust resources of the Tribe. The Settlement would govern the operations at the Lower Raquette River Project which is located in between the Potsdam Water Power Project and the tribal trust lands. We conclude, therefore, that the measured proposed by Potsdam and Interior to ensure that the existing reservoir elevations are maintained would also be adequate to protect the tribal trust resources of the Tribe.

Potsdam's proposed new powerhouse and installation of a inflatable flashboard on the West dam could affect the visual qualities of adjacent National Register-eligible properties. To avoid any adverse effects, the SHPO requests that Potsdam provide drawings of elevations specifying materials for use on the exterior at the preliminary stage and at 30, 60, and 100 percent completion. The SHPO further recommends that the new powerhouse be constructed of compatible materials such as red brick or Potsdam sandstone. We agree with the SHPO that further consultation with the SHPO and the Commission on the design of the proposed facilities would be needed to ensure that the final designs do not result in any adverse effects on the visual qualities of neighboring historic properties. Given that the mass, scale, and detailing of the new building could affect neighboring historic properties, we find it reasonable to provide the SHPO with drawings at the preliminary and subsequent stages of completion.

D. No Action

Under the no-action alternative, Erie would continue to operate the Carry Falls,

Upper Raquette, Middle Raquette, and Lower Raquette River Projects under the terms and conditions of the original licenses, and no new environmental protection or enhancement measures would be implemented. Potsdam would continue to operate the exempted project under the existing mandatory conditions and would not implement any capacity upgrades or new environmental measures.

VI. DEVELOPMENTAL ANALYSIS

In this section, we analyze the projects' use of the Raquette River's available water resources to generate hydropower, estimate the economic benefits of the proposed projects, and estimate the cost of various environmental protection and enhancement measures and the effects of these measures on project operations.

We base our independent economic analyses on existing electric power conditions. We do not consider future inflation, escalation, or deflation beyond the potential license issuance date.[18]

We would typically base our estimate of the value of project-related capacity on a cost of alternative capacity of $109/kW-year (at a fixed charge rate of 14 percent), based on a combined-cycle combustion turbine plant fueled by natural gas. We would typically base our estimate of the value of project-related energy on the 1999 cost of natural gas to electric generators in the Middle Atlantic Division of the United States. The 1999 cost of fuel would be based on information in Energy Information Administration, Supplement to the Annual Energy Outlook, March 1998. Our estimate of the amount of fuel that would be displaced would be based on fuel consumption at a heat rate of 6,200 British thermal units per kilowatt-hour (Btu/kWh).[19]

In this case, however, the replacement energy and capacity values used in our analyses were developed for the Vischer Ferry, Crescent, and School Street Projects. We consider these values to be applicable to the Raquette River Projects because the Applicant for the School Street Project is the same and all the projects are located within the NYISO.

To determine the impact of operational changes at these peaking projects, generation and annual power benefits were modeled taking into account peak versus off-peak generation and power value rate. Each enhancement effecting project generation was modeled, and the total annual generation and power value were used to develop a composite project power value rate for each operational scenario. These composite rates were used as part of our analysis of the economic feasibility of the

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[18] See Mead Corporation, Publishing Paper Division, 72 FERC ¶ 6,027 (July 13, 1995).

[19] This fuel consumption rate is for a new plant designed for maximum efficiency.

projects' alternatives.

Table 11 shows the staff's assumptions of the economic parameters, values, and sources used in these analyses.

Table 11. Staff's assumptions for the economic analyses of the Raquette River Projects (Source: Staff).

Assumption	Value
On-peak Energy value[a] (1999)	25.51 mills/kWh
Off-peak Energy value[a] (1999)	17.94 mills/kWh
On-peak Capacity value[a] (1999)	$53/kW-yr
Period of analysis	30 years
Interest/Discount rate[b]	10 percent
Cost of money[b]	10 percent
Bond/debt ratio[c]	0.5
Federal tax rate	34 percent
Local tax rate[d]	3 percent
Insurance rate	0.25 percent of cost of construction
Term of financing	20 years
Escalation rate	0 percent

[a] Energy and capacity valuation from the April 12, 1999, Staff memorandum entitled "Evaluation of total power generation and economic impacts of pre-relicense, existing, and proposed operation restriction conditions for the Vischer Ferry Project No. 4679, Crescent Project No. 4678, and School Street Project No. 2539."

[b] Discount rate of 10 percent is typical for this type of analysis and reflects the average cost of debt financing.

[c] Assuming 50 percent of project capital costs would be financed, while remainder would be paid for out of internal capital.

[d] Initial local tax values used in this analysis were obtained from the Carry Falls, Upper, Middle, and Lower Raquette River License Applications, Exhibit D. These values were increased by the 3.0 percent local tax rate multiplied by the cost of each enhancement measure evaluated.

A. Carry Falls Project

1. Power and Economic Benefits of the Project

The Carry Falls Project does not generate power. Based on the assumptions in table 11, the cost assumptions shown in table 12, and the cost of enhancements shown in table 13, we estimate that the annual cost of Erie's proposed Carry Falls Project would be $642,460.

Table 12. Summary of cost assumptions for the Carry Falls Project (Source: Staff)

Assumption	Value (1999$)
Net Investment	$317,193[a]
Relicensing	$400,000[b]
Annual O&M	$173,526[c]
Local Taxes	$369,833[d]
FERC Fees	0[e]

[a] We depreciate the net investment value provided by the applicant in Exhibit D of the license application (page D-4) to 1999$ through the use of a double declining balance method with a 20 year life-span.

[b] Relicensing value provided by the applicant in comments on the draft EA.

[c] Summation of capital additions, operations and maintenance, and general administrative costs provided by the applicant in Exhibit D of the license application (page D-7) as adjusted to 1999$ through the use of a price inflator.

[d] Local tax value provided by the applicant in comments on the draft EA.

[e] Value provided by the applicant in Exhibit D of the license application (page D-7).

Table 13. Summary of cost of applicant's proposed enhancement measures for the Carry Falls Project (Source: Staff)

Protection or enhancement measure	Capital cost (1999$)	O&M costs (1999$)	Annual cost (1999$)
Implementation of Revised Guide Curve	$50,440[a]	-	$7,690
Canoe Portage: Carry Falls Dam	$5,040[a]	$1,000[b]	$1,770
Canoe Portage: Jordan River	$5,040[a]	$1,000[b]	$1,770
Total	$60,520	$2,000	$11,230

[a] We adjust estimates provided by the applicant in Exhibit D of the license application (page D-5) to 1999$ through the use of a price inflator.

[b] We assume that there would be annual maintenance costs for these enhancements and provide an estimate of these costs.

2. Proposed Action with Additional Staff-recommended Measures

The only additional staff-recommended measure proposed for the Carry Falls Project is the preparation of site-specific ESCPs necessary to comply with the WQC. We estimate that the annual cost for any site-specific ESCPs required by NYSDEC during the implementation of enhancements at the Carry Falls Project would be $500.

Based on the assumptions in table 11 and the costs of the proposed enhancement measures, we estimate that the cost of the Carry Falls Project, as proposed by the applicant and with our one additional staff-recommended measure, would be $642,960.

3. No-action

Under the no-action alternative, the project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented. The annual cost of the no-action alternative would be $631,220.

4. Economic Comparison of the Alternatives

The applicant's proposed action would increase the annual costs of the Carry Falls Project by $11,230. The applicant's proposed action with the one additional staff-recommended measure would increase the annual costs of the Carry Falls Project by $11,730.

B. Upper Raquette River Project

1. Power and Economic Benefits

Based on the assumptions in table 11, the cost assumptions shown in table 14, and the cost of enhancements shown in table 15, we estimate that the annual cost of Erie's proposed Upper Raquette River Project would be $7,247,420 (16.48 mills/kWh). The annual power benefit would be $12,796,970 (29.10 mills/kWh), with an estimated annual generation of 439.79 GWh. The resulting annual net benefit would be $5,549,550 (12.62 mills/kWh).

Table 14. Summary of cost assumptions for the Upper Raquette River Project (Source: Staff)

Assumption	Value (1999$)
Net Investment	$3,664,411[a]
Relicensing	$1,900,000[b]
Annual O&M	$3,428,145[c]
Local Taxes	$2,681,925[d]
FERC Fees	$219,934[e]

[a] We depreciate the summation of the net investment values the applicant provided in Exhibit D of the license application (pages D-7,13, 19, 25, and 31) to 1999$ through the use of a double declining balance method with a 20 year life span.

[b] Relicensing value provided by the applicant in comments on the draft EA.

[c] Summation of capital additions, operations and maintenance, and general administrative costs the applicant provided in Exhibit D of the license application (pages D-10, 16, 22, 28, and 34) as adjusted to 1999$ through the use of a price inflator.

[d] Local tax value provided by the applicant in comments on the draft EA.

[e] Summation of the FERC fees provided by the applicant in Exhibit D of the license application (pages D-10, 16, 22, 28, and 34), as adjusted to 1999$ through the use of a price inflator.

Table 15. Summary of cost of applicant's proposed enhancement measures for the Upper Raquette River Project (Source: Staff)

Protection or enhancement measure	Capital cost (1999$)	O&M costs (1999$)	Annual cost (1999$)
Implementation of Revised Carry Falls Guide Curve:			
Stark	-	-	-$57,630[e]
Blake	-	-	$12,890[f,o]
Rainbow	-	-	$10,340[g,o]
Five Falls	-	-	$1,800[h,o]
South Colton	-	-	$6,700[i,o]
Instream Flows:			
Stark	-	-	$71,030[j]
Blake	-	-	$61,400[k]
Rainbow	-	-	$31,040[l]
Five Falls	-	-	$97,980[m]
South Colton	-	-	$77,650[n]
Fish Passage:			
Stark	$35,310[a]	$2,500[b]	$7,890
Blake	$35,310[a]	$2,500[b]	$7,890
Rainbow	$35,310[a]	$2,500[b]	$7,890
Five Falls	$35,310[a]	$2,500[b]	$7,890
South Colton	$50,440[a]	$2,500[b]	$10,190
Fish Protection:	$221,560[a]	$3,000[c]	$36,790
Stark	$207,440[a]	$3,000[c]	$34,640
Blake	$225,080[a]	$3,000[c]	$37,330
Rainbow	$220,380[a]	$3,000[c]	$36,610
Five Falls	$213,710[a]	$3,000[c]	$35,590
South Colton			
Canoe Portage:			
Stark Dam	$5,040[a]	$1,000[d]	$1,770
Blake Dam	$5,040[a]	$1,000[d]	$1,770
Rainbow Dam	$5,040[a]	$1,000[d]	$1,770
Five Falls Dam	$5,040[a]	$1,000[d]	$1,770
South Colton Dam	$5,040[a]	$1,000[d]	$1,770
Access to Dead Creek Tributary:			
Blake Development	$5,040[a]	$1,000[d]	$1,770

Clear Pond Wild Forest Trail:			
Rainbow Development	$7,570[a]	$1,250[d]	$2,400
Total	$1,317,660	$34,750	$548,930

[a] We adjust estimates provided by the applicant in Exhibit D of the license application (pages D-8, 14, 20, 26, and 32) to 1999$ through the use of a price inflator.

[b] Staff estimate ($2,500/Development).

[c] Staff estimate ($3,000/Development).

[d] We assume that there would be annual maintenance costs for these enhancements and provide an estimate of these costs.

[e] Implementation of the Carry Falls guide curve increases annual project generation from 449.318 GWh to 451.611 GWh, an increase of 2.293 GWh.

[f] Implementation of the Carry Falls guide curve increases annual project generation from 451.611 GWh to 451.615 GWh, an increase of 0.004 GWh.

[g] Implementation of the Carry Falls guide curve increases annual project generation from 451.615 GWh to 451.653 GWh, an increase of 0.038 GWh.

[h] Implementation of the Carry Falls guide curve increases annual project generation from 451.653 GWh to 451.690 GWh, an increase of 0.037 GWh.

[i] Implementation of the Carry Falls guide curve increases annual project generation from 451.690 GWh to 451.757 GWh, an increase of 0.067 GWh.

[j] Instream flow requirements reduce the annual project generation from 451.757 GWh to 449.276 GWh, a reduction of 2.481 GWh.

[k] Instream flow requirements reduce the annual project generation from 449.276 GWh to 447.046 GWh, a reduction of 2.230 GWh.

[l] Instream flow requirements reduce the annual project generation from 447.046 GWh to 445.968 GWh, a reduction of 1.078 GWh.

[m] Instream flow requirements reduce the annual project generation from 445.968 GWh to 442.520 GWh, a reduction of 3.448 GWh.

[n] Instream flow requirements reduce the annual project generation from 442.520 GWh to 439.786 GWh, a reduction of 2.734 GWh.

[o] Although there is a gain in generation there is also a shift from peak to off-peak power production which results in a net reduction in power value.

2. Proposed Action with Additional Staff-recommended Measures

The only additional staff-recommended measure proposed for the Upper Raquette River Project is the preparation of site-specific ESCPs necessary to comply with the WQC. We estimate that the annual cost for any site-specific ESCPs required by NYSDEC during the implementation of enhancements at the Upper Raquette River Project would be $500.

Based on the assumptions in table 11 and the costs of the proposed enhancement measures, we estimate that the annual cost of the Upper Raquette River Project as proposed by the applicant with our one additional staff-recommended measure would be $7,247,920 (16.48 mills/kWh). The annual power benefit would be $12,796,970 (29.10 mills/kWh), with an estimated annual generation of 439.79 GWh. The resulting annual net benefit would be $5,549,050 (12.62 mills/kWh).

3. No-action

Under the no-action alternative, the project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented. The annual cost of the no-action alternative would be $7,011,710 (15.61 mills/kWh). The estimated average annual output of the project would be 449.32 GWh. This would provide an annual power benefit of $13,110,160 (29.18 mills/kWh). The resulting annual net benefit for the no-action alternative would be $6,098,450 (13.57 mills/kWh).

4. Economic Comparison of the Alternatives

Table 16 presents a summary of the current net annual power benefits for the applicant's proposed action, the proposed action with the one additional staff-recommended measure, and no-action.

The additional enhancements proposed by Erie would increase annual costs by $235,710 and decrease annual power benefits by $313,190, for a total decrease in annual net benefits of $548,900. The annual generation would decrease from 449.32 GWh to 439.79 GWh.

The staff's enhancement measure would increase annual costs by an additional amount of $500 above Erie's proposal and would decrease the annual net benefits by the same value. As with Erie's proposal, the annual generation for the proposed project

with our additional recommended measure would remain at 439.79 GWh.

5. Pollution Abatement

The Upper Raquette River Project annually generates 449.32 GWh of electricity. This amount of hydropower generation, when contrasted with the generation of an equal amount of energy by fossil-fueled facilities, avoids the unnecessary emission of atmospheric pollutants. Assuming that the 449.32 GWh of hydropower generation would be replaced by an equal amount of natural gas-fired generation, generating electrical power equivalent to that produced by the Upper Raquette Project would require combustion of 4,640 million cubic feet of natural gas annually. Removal of pollutants from the emissions to levels presently achievable by state-of-the-art technology would cost $221,730 (1999$) annually.

Table 16. Summary of net annual benefits of alternatives for the proposed Upper Raquette River Project (Source: Staff)

	Proposed action	Proposed action with staff-recommended measures	No-action
Installed capacity (MW)	102.4[a]	102.4[a]	102.4[a]
Annual generation (GWh)	439.79[b]	439.79[b]	449.32[c]
Annual power benefit:[b]			
(thousands $)	12,797.0	12,797.0	13,110.2
(mills/kWh)	29.10	29.10	29.18
Annual cost:[b]			
(thousands $)	7,247.4	7,247.9	7,011.7
(mills/kWh)	16.48	16.48	15.61
Annual net benefit:[b]			
(thousands $)	5,549.6	5,549.1	6,098.5
(mills/kWh)	12.62	12.62	13.57

[a] Applicant provided summation of values in the license application, Exhibit A (page A-2).
[b] Staff calculated values.
[c] Staff calculated value approximating the summation of values provided by the applicant in Exhibit B of the license application (pages B-23, 29, 34, and 39).

C. Middle Raquette River Project

1. Power and Economic Benefits

Based on the assumptions in table 12, the costs in table 18, and the cost of enhancements shown in table 19, we estimate that the annual cost of Erie's proposed Middle Raquette River Project would be $12,285,440 (41.05 mills/kWh). The annual power benefit would be $8,327,550 (27.82 mills/kWh) for the estimated annual generation of 299.31 GWh. The resulting annual net benefit would be -$3,957,890 (-13.23 mills/kWh).

2. Proposed Action with Additional Staff-recommended Measures

In this section, we present the annual costs of the proposed action with additional staff-recommended measures. Table 19 shows the annual costs of these staff-recommended enhancements.

Based on the assumptions in table 12 and the costs of the proposed enhancement measures, we estimate that the annual cost of the Middle Raquette as proposed by the applicant, with two additional staff-recommended measures would be $12,285,940 (41.05 mills/kWh). The annual power benefit would be $8,327,550 (27.82 mills/kWh) with an estimated annual generation of 299.31 GWh. The resulting annual net benefit would be
-$3,958,390 (-13.23 mills/kWh).

Table 17. Summary of cost assumptions for the Middle Raquette River Project (Source: Staff)

Assumption	Value (1999$)
Net Investment[f]	$2,730,295[a]
Relicensing	$4,200,000 [b]
Annual O&M	$5,492,996[c]
Local Taxes	$1,770,214 [d]
FERC Fees	$96,600[e]
Project with Proposed Upgrades[g]	
Additional Net Investment	$23,446,157
Additional Annual O&M	$334,356[h]
Additional Local Taxes	$589,504[h,i]
Additional FERC Fees	$5,880[e]

[a] We depreciate the summation of the net investment values provided by the applicant in Exhibit D (page D-3) of the license application through the use of a double declining balance method with a 20 year life span.

[b] Relicensing value provided by the applicant in comments on the draft EA.

[c] Summation of expenses, capital additions, and operations and maintenance costs provided by the applicant in Exhibit D of the license application (pages D-9, 10, 11, and 12) as adjusted to 1999$ through the use of a price inflator.

[d] Local tax value provided by the applicant in comments on the draft EA. Taxes on the Higley upgrade are not included in this value (see footnote i).

[e] Staff calculated value ($2,100/MW * Installed Capacity). The $/MW value was calculated by averaging the (FERC Fee) / (Generation) for each development in the Middle Raquette River Project.

[f] Value does not includes the total inservice cost associated with a 2.8MW increase in capacity for the Higley development provided by the applicant in Exhibit D of the license application (page D-5) as adjusted to 1999$ through the use of a price inflator.

[g] Additional net investment of the proposed 2.3 MW upgrade.

[h] O&M rate calculated, as a function of the existing O&M costs and the existing installed capacity, to be $119,413 per MW-year, multiplied by the proposed 2.8-MW increase in installed capacity.

[i] Additional taxes due to Higley upgrade (new capital), escalated to 1999$.

Table 18. Summary of cost of applicant's proposed enhancement measures for the Middle Raquette River Project (Source: Staff).

Protection or enhancement measure	Capital cost (1999$)	O&M costs (1999$)	Annual cost (1999$)

Implementation of Revised Carry Falls Guide Curve:			
Higley	-	-	$22,090[f]
Colton	-	-	$129,960[g]
Hannawa	-	-	$32,600[h]
Sugar Island	-	-	$16,340[i]
Instream Flows:			
Higley	-	-	$14,160[j]
Colton	-	-	$182,200[k]
Hannawa	-	-	$23,510[l]
Sugar Island	-	-	$56,360[m]
Impoundment Fluctuations:	-	-	$2,220[n]
Higley	-	-	-$10,540[o]
Colton			
Fish Passage:			
Higley	$35,000[a]	$2,500[b]	$7,840
Colton	$35,000[a]	$2,500[b]	$7,840
Hannawa	$35,000[a]	$2,500[b]	$7,840
Fish Protection:			
Higley	$194,710[p]	$3,000[c]	$32,700
Colton	$95,740[p]	$3,000[c]	$17,600
Hannawa	$204,400[p]	$3,000[c]	$34,170
Whitewater Budget	-	$6,060[d]	$6,060
Canoe Portage:			
Higley	$5,000[a]	$1,000[e]	$1,760
Colton	$5,000[a]	$1,000[e]	$1,760
Hannawa	$5,000[a]	$1,000[e]	$1,760
Sugar Island	$5,000[a]	$1,000[e]	$1,760
Whitewater Access:			
Colton	$15,000[a]	$2,000[e]	$4,290
Hannawa	$15,000[a]	$2,000[e]	$4,290
Sugar Island	$15,000[a]	$2,000[e]	$4,290
Car-top Boat Launch Overnight Parking:			
Colton	$50,000[a]	$2,000[e]	$9,630

Scenic Overlook			
Picnic Facilities:			
Hannawa	$10,000[a]	$1,500[c]	$3,030
Roadside Parking:			
Hannawa	$15,000[a]	$1,000[c]	$3,290
Red Sandstone Trail Southern Terminus:			
Hannawa	$7,500[a]	$1,250[c]	$2,390
Red Sandstone Trail Northern Terminus:			
Sugar Island	$7,500[a]	$1,250[c]	$2,390
Day Use Area:			
Sugar Island	$25,000[a]	$2,000[c]	$5,810
Total	$779,850	$41,560	$629,400

[a] Staff estimate based upon values provided by the applicant for the Carry Falls and Upper Raquette River developments.

[b] Staff estimate ($2,500/Development).

[c] Staff estimate ($3,000/Development).

[d] Whitewater budget value calculated as follows: Value = 800MWh * Difference in Peak and Off-peak Prices where the difference in generation is computed using a peak value of 25.51 mills/kWh and an off-peak value of 17.94 mills/kWh. Value neglects ramping losses and storage capacity impacts.

[e] We assume that there would be annual maintenance costs for these enhancements and provide an estimate of these costs.

[f] Implementation of the Carry Falls guide curve reduces annual project generation from 316.114 GWh to 315.694 GWh, a reduction of 0.420 GWh. The 316.114 includes the proposed 2.3 MW increase in capacity at the Higley Development.

[g] Implementation of the Carry Falls guide curve reduces annual project generation from 315.694 GWh to 310.758 GWh, a reduction of 4.936 GWh.

[h] Implementation of the Carry Falls guide curve reduces annual project generation from 310.758 GWh to 309.483 GWh, a reduction of 1.275 GWh.

[i] Implementation of the Carry Falls guide curve reduces annual project generation from 309.483 GWh to 308.733 GWh, a reduction of 0.749 GWh.

[j] Instream flow requirements reduce the annual project generation from 308.733 GWh to 308.369 GWh, a reduction of 0.365 GWh.

[k] Instream flow requirements reduce the annual project generation from 308.369 GWh to 302.001 GWh, a reduction of 6.329 GWh.

[l] Instream flow requirements reduce the annual project generation from 302.001 GWh to 301.230 GWh, a reduction of 0.771 GWh.

[m] Instream flow requirements reduce the annual project generation from 301.230 GWh to

299.309 GWh, a reduction of 1.921 GWh.

n Proposed change in allowable impoundment fluctuation from 2.5 to 2.0 feet.

o Proposed change in allowable impoundment fluctuation from 0.3 to 0.4 feet.

p Fish protection values (1997$) provided by the applicant in comments on the draft EA and escalated to 1999$.

Table 19. Summary of annual cost of the additional staff-recommended measures for the Middle Raquette River Project (Source: Staff).

Protection or enhancement measure	Capital cost (1999$)	O&M costs (1999$)	Annual cost (1999$)
Erosion and Sediment Control	-	$500[a]	$500
Total	-	$500	$500

a Staff estimate.

3. No-action

Under the no-action alternative, the project would continue to operate under the current mode of operation. No new environmental protection or enhancement measures would be implemented.

The annual cost of the no-action alternative for the Middle Raquette River Project would be approximately $8,208,850 (26.64 mills/kWh). The estimated average annual output of the project would be 308.09 GWh. This would provide an annual power benefit of $8,532,490 (27.69 mills/kWh). The resulting annual net benefit for the no-action alternative would be approximately $323,640 (1.05 mills/kWh).

4. Economic Comparison of the Alternatives

Table 20 presents a summary of the current net annual power benefits for the applicant's proposed action, the proposed action with the one additional staff-recommended measure, and no-action.

Table 20. Summary of net annual benefits of alternatives for the proposed Middle Raquette River Project (Source: Staff).

	Proposed action	Proposed action with staff-recommended measures	No-action

Installed capacity (MW)	49.4[a]	49.4[a]	47.1[a,b]
Annual generation (GWh)	299.31[b]	299.31[b]	308.09[c]
Annual power benefit:[b]			
(thousands $)	8,327.6	8,327.6	8,532.5
(mills/kWh)	27.82	27.82	27.69
Annual cost:[b]			
(thousands $)	12,285.4	12,285.9	8,208.9
(mills/kWh)	41.05	41.05	26.64
Annual net benefit:[b]			
(thousands $)	-3,957.8	-3,958.3	323.6
(mills/kWh)	-13.23	-13.23	1.05

[a] Summation of values provided by the applicant in Exhibit B of the license application (page B-10).

[b] Values for the No-Action Alternative do not include costs and benefits associated with the proposed 2.3 MW increase in capacity at the Higley development.

[c] Values include increased capacity associated with generator rewinds and turbine upgrades at the Higley and Colton developments of 492 kW and 581 kW, respectively.

The additional enhancements proposed by Erie including the 2.3-MW upgrade would increase annual costs by $4,076,590 and decrease annual power benefits by $204,930 for a total decrease in annual net benefits of $4,281,452. The annual generation would decrease from 308.09 GWh to 299.31 GWh.

The staff's recommended enhancements would increase annual costs by an additional amount of $500 above Erie's proposal and would decrease the annual net benefits by the same value. Under the staff alternative, the annual generation for the proposed project would be 299.31 GWh.

5. Pollution Abatement

The Middle Raquette River Project annually generates 308.09 GWh of electricity. This amount of hydropower generation, when contrasted with the generation of an equal amount of energy by fossil-fueled facilities, avoids the unnecessary emission of atmospheric pollutants. Assuming that the 308.09 GWh of hydropower generation would be replaced by an equal amount of natural gas-fired generation, generating electrical power equivalent to that produced by the Middle Raquette Project would require combustion of 3,179 million cubic feet of natural gas annually. Removal of pollutants from the emissions to levels presently achievable by state-of-the-art technology would cost $152,030 (1999$) annually.

D. Lower Raquette River Project

1. Power and Economic Benefits

Based on the assumptions in table 12, the costs in table 22, and the cost of enhancements shown in table 23, we estimate that the annual cost of the Lower Raquette River Project as proposed by Erie would be $3,936,080 (55.73 mills/kWh). The annual power benefit would be $1,930,670 (27.34 mills/kWh) for the estimated annual generation of 70.63 GWh. The resulting annual net benefit would be -$2,005,410 (-28.39 mills/kWh).

Table 21. Summary of cost assumptions for the Lower Raquette River Project (Source: Staff).

Assumption	Value (1999$)
Net Investment	$1,330,475[a]
Relicensing	$2,500,000[b]
Annual O&M	$2,687,988 [c]
Local Taxes	$624,613[d]
FERC Fees	$25,200[e]

[a] We depreciate the summation of the net investment values provided by the applicant in Exhibit D (page D-3) of the license application to 1999$ through the use of a double declining balance method with a 20 year life span.

[b] Relicensing value provided by the applicant in comments on the draft EA.

[c] Summation of capital additions, working capital, and operations and maintenance costs provided by the applicant in Exhibit D of the license application (pages D-9 and 10) as adjusted to 1999$ through the use of a price inflator. Administrative costs were added to this value and were assumed to be 35 percent of total annual operations and maintenance cost associated with each development.

[d] Local tax value provided by the applicant in comments on the draft EA.

[e] Staff calculated value ($2,100/MW * Installed Capacity). The $/MW value was calculated by averaging the (FERC Fee) / (Generation) for each development in the Lower Raquette River Project.

Table 22. Summary of cost of applicant's proposed enhancement measures for the Lower Raquette River Project (: Staff).

Protection or enhancement measure	Capital cost (1999$)	O&M cost (1999$)	Annual cost (1999$)
Implementation of Revised Carry Falls Guide Curve:			
Norwood	-	-	$8,300[e]
East Norfolk	-	-	$14,040[f]
Norfolk	-	-	$20,340[g]
Raymondville	-	-	$9,040[h]
Instream Flows:			
Norwood	-	-	$1,210[i]
East Norfolk	-	-	$9,720[j]
Norfolk	-	-	$15,370[k]
Raymondville	-	-	$1,600[l]
Impoundment Fluctuations:			
East Norfolk	-	-	$2,270[m]
Raymondville	-	-	$790[m]
Fish Passage:			
Norwood	$35,000[a]	$2,500[b]	$7,840
East Norfolk	$35,000[a]	$2,500[b]	$7,840
Norfolk	$35,000[a]	$2,500[b]	$7,840
Raymondville	$35,000[a]	$2,500[b]	$7,840
Fish Protection:			
Norwood	$119,610[n]	$3,000[c]	$21,240
East Norfolk	$86,800[n]	$3,000[c]	$16,240
Norfolk	$127,760[n]	$3,000[c]	$22,490
Raymondville	$118,080[n]	$3,000[c]	$21,010
Canoe Portage:			
Norwood Dam	$5,000[a]	$1,000[d]	$1,760
East Norfolk Dam	$5,000[a]	$1,000[d]	$1,760
Norfolk Dam	$5,000[a]	$1,000[d]	$1,760
Raymondville Dam	$5,000[a]	$1,000[d]	$1,760
Car-top Boat Launch and Overnight Parking:			
Raymondville	$50,000[a]	$2,000[d]	$9,630

Total	$662,250	$28,000	$211,690

[a] Staff estimate based upon values provided by the applicant for the Carry Falls and Upper Raquette River developments.
[b] Staff estimate ($2,500/Development).
[c] Staff estimate ($3,000/Development).
[d] We assume that there would be annual maintenance costs for these enhancements and provide an estimate of these costs.
[e] Implementation of the Carry Falls guide curve reduces annual project generation from 73.657 GWh to 73.317 GWh, a reduction of 0.340 GWh.
[f] Implementation of the Carry Falls guide curve reduces annual project generation from 73.317 GWh to 72.785 GWh, a reduction of 0.532 GWh.
[g] Implementation of the Carry Falls guide curve reduces annual project generation from 72.785 GWh to 72.039 GWh, a reduction of 0.746 GWh.
[h] Implementation of the Carry Falls guide curve reduces annual project generation from 72.039 GWh to 71.699 GWh, a reduction of 0.340 GWh.
[i] Instream flow requirements reduce the annual project generation from 71.699 GWh to 71.637 GWh, a reduction of 0.063 GWh.
[j] Instream flow requirements reduce the annual project generation from 71.637 GWh to 71.255 GWh, a reduction of 0.382 GWh.
[k] Instream flow requirements reduce the annual project generation from 71.255 GWh to 70.691 GWh, a reduction of 0.563 GWh.
[l] Instream flow requirements reduce the annual project generation from 70.691 GWh to 70.630 GWh, a reduction of 0.062 GWh.
[m] Proposed change in allowable impoundment fluctuation from 1.0 to 0.5 feet.
[n] Fish protection values (1997$) provided by the applicant in comments on the draft EA and escalated to 1999$.

2. Proposed Action with Additional Staff-recommended Measures

In this section, we present the annual costs of the proposed action with additional staff-recommended measures. Table 23 shows the annual costs of these staff-recommended enhancements.

Based on the assumptions in table 12 and the costs of the proposed enhancement measures, we estimate that the annual cost of the Lower Raquette as proposed by the applicant, with the additional staff-recommended measures would be $3,936,580 (55.74 mills/kWh). The annual power benefit would be $1,930,670 (27.34 mills/kWh) for the estimated annual generation of 70.63 GWh. The resulting annual net benefit would be -$2,005,910 (-28.40 mills/kWh).

Table 23. Summary of annual cost of the additional staff-recommended measures for the Lower Raquette River Project (Source: Staff).

Protection or enhancement measure	Capital cost (1999$)	O&M costs (1999$)	Annual cost (1999$)
Erosion and Sediment Control	-	$500[a]	$500
Total	-	$500	$500

[a] Staff estimate.

3. No-action

Under the no-action alternative, the project would continue to operate under the current mode of operation, and no new environmental protection or enhancement measures would be implemented.

The annual cost of the no-action alternative would be approximately $3,807,080 (51.69 mills/kWh). The estimated average annual output of the project would be 73.66 GWh. This would provide an annual power benefit of $2,013,340 (27.33 mills/kWh). The resulting annual net benefit for the no-action alternative would be approximately -$1,793,740 (-24.36 mills/kWh).

4. Economic Comparison of the Alternatives

Table 24 presents a summary of the current annual net benefits for Erie's proposed action, the proposed action with the additional staff-recommended measures, and no-action for the Lower Raquette River Project.

The additional enhancements proposed by Erie would increase annual costs by $129,000 and decrease annual power benefits by $82,670, for a total decrease in annual net benefits of $211,670. The annual generation would decrease from 73.66 GWh to 70.63 GWh.

The staff's recommended enhancement would increase annual costs by an additional amount of $500 above Erie's proposal, and would decrease the annual net benefits by the same value. Under the staff alternative, the annual generation for the proposed project would be 70.63 GWh.

Table 24. Summary of the annual net benefits of alternatives for the proposed

Lower Raquette River Project (Source: Staff).

	Proposed action	Proposed action with staff-recommended measures	No-action
Installed capacity (MW)	12.0[a]	12.0[a]	12.0[a]
Annual generation (GWh)	70.63[b]	70.63[b]	73.66[c]
Annual power benefit:[b]			
(thousands $)	1,930.7	1,930.7	2,013.3
(mills/kWh)	27.34	27.34	27.33
Annual cost:[b]			
(thousands $)	3,936.1	3,936.6	3,807.1
(mills/kWh)	55.73	55.74	51.69
Annual net benefit:[b]			
(thousands $)	-2,005.4	-2,005.9	-1,793.8
(mills/kWh)	-28.39	-28.40	-24.36

[a] Applicant provided summation of values in the license application, Exhibit B (page B-8).

[b] Staff calculated values.

[c] Staff calculated value approximating the summation of values provided by the applicant in Exhibit B of the license application (pages B-9, 12, 14, and 17).

VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVES

Sections 4(e) and 10(a) of the FPA require that Commission to give equal consideration to all uses of the waterway on which the projects are located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreational, cultural, and other nondevelopmental values of the involved waterway equally with its electric energy and other developmental values. In determining whether, and under what circumstances to license a project, the Commission must weigh the various economic and environmental tradeoffs involved in the decision.

A. Recommended Alternative

Based on our independent review and evaluation of the proposed actions, as described in the Settlement, the proposed actions with the additional staff-recommended measures, and no action, we select the Settlement with the additional staff-recommended measures as the preferred alternative.

We recommend this alternative because: (1) issuance of licenses would allow Erie to continue to operate the four projects as dependable sources of electric energy; (2) continued operation of the projects would avoid the need for an equivalent amount of fossil-fuel fired electric generation and capacity, continuing to help conserve these nonrenewable energy resources and reduce atmospheric pollution; and (3) the recommended environmental protection and enhancement measures would improve water quality, protect and enhance fish and terrestrial resources, improve public use of recreational facilities and resources, improve multiple use and management of project lands, and maintain and protect historic and archeological resources within the area affected by the operations of the projects.

We recommend including the following environmental measures in any licenses issued for the Carry Falls and Raquette River Projects:

(1) prepare site-specific ESCPs for proposed construction activities;

(2) operate the projects in a store and release mode, consistent with the terms of the Settlement;

(3) maintain instream flows and seasonal flows for walleye in all the developments except Higley, Norwood, and Raymondville, consistent

with the terms of the Settlement;

(4) limit normal reservoir fluctuations at all developments, consistent with the terms of the Settlement;

(5) implement a new rule curve at Carry Falls that limits drawdowns to an elevation of 1,355.0 feet;

(6) maintain a base flow below Raymondville at least 560 cfs in wet and normal years, 290 cfs in dry years, and inflow in drought years;

(7) plan and implement an effective streamflow monitoring system;

(8) provide flow structures and make appropriate modifications for such structures to facilitate downstream fish movement at all developments;

(9) install 1-inch trashracks to replace existing trashracks at all developments except Sugar Island;

(10) provide scheduled whitewater releases, consistent with the terms of the Settlement, and based on an annual whitewater budget and a flow notification system at the Colton, Hannawa, and Sugar Island developments;

(11) develop and implement a final recreation plan, consistent with the terms of the Settlement, that includes canoe portage around all developments of all four projects, cooperative development of primitive and whitewater access trails, modification of project boundaries to include all lands occupied by Erie recreational facilities, and measures to minimize disturbance to potential bald eagle habitat; and

(12) implement the provisions of the Appendices to the existing PA.

Implementation of these measures would protect and enhance fisheries, cultural, and recreational resources in the project areas, and provide for the best use of the waterway.

The costs of some of these measures would reduce the net benefit of the projects. As discussed in section VI, we conclude that two of the projects, as proposed by Erie, would cost more than currently available alternative power. Moreover, our proposed additional measures would decrease the benefits of the projects. Specifically,

one of our additional recommended measures, site-specific ESCPs for proposed construction activities at all four projects, would reduce the economic benefits of the projects.

We also recommend amendments to the PA for the protection of cultural resources, and will provide these amendments to the PA signatories prior to licensing any of these projects. Therefore, we consider the costs associated with the PA amendments to be included in the relicensing costs.

1. Site-Specific ESCPs

The Settlement does not provide for erosion and sediment control measures to protect water quality in the Raquette River during any proposed construction or maintenance activities. The WQCs issued by NYSDEC for the Raquette River Projects specify that Erie must receive NYSDEC approval of an ESCP prior to commencing activities that could adversely affect water quality.

NMPC developed an ESCP for the Middle and Lower Raquette River Projects in response to our requests for additional information of August 7, 1992. However, NYSDEC commented that this plan was too general. In implementing an ESCP, we expect that Erie would use best management practices for the site-specific control of erosion and sedimentation during any maintenance and/or construction required to implement the conditions of any licenses issued for these projects. We estimate that the annual cost for the site-specific ECSPs, necessary to implement this measure over the term of the licenses, would be about $500 for each project.

B. Conclusion

Based on our review of the agency and public comments filed on the projects, and on our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the projects as proposed by Erie and the agencies, with the additional staff-recommended measures, would provide for the best comprehensive use of the Raquette River.

C. Potsdam Water Power Project

We recommend approving Potsdam's application for amendment of exemption to add capacity to the existing exempted project with FWS's and NYSDEC's conditions and our staff modifications. Our analysis shows that Potsdam can construct a new powerhouse adjacent to the recently reconstructed West dam and install a new turbine

with a capacity of 700 kW using an inflatable flashboard to maintain the existing impoundment levels necessary to ensure the protection of existing environmental resources.

Our recommended modifications to Potsdam's proposal (as described in section III.E.3) are:

(1) prior to commencing any land-disturbing activities, Potsdam should file, for Commission approval, a site-specific ESCP, developed in consultation with FWS, NYSDEC, and the Corps. The ESCP should detail the soil and erosion control measures that would be implemented to minimize the erosion and transport of soils;

(2) prior to installing the inflatable flashboard, Potsdam should file a plan, developed in consultation with FWS and NYSDEC, for Commission approval, to assess the effects of project operations on the Sugar Island bypassed reach. The plan should be designed to determine if the negotiated flows in the Settlement for the Raquette River Projects still meet the management goal for the Sugar Island bypassed reach with the revised operations at the Potsdam Water Power Project. If the proposed project operations fail to meet the management goal, then Potsdam should develop, in consultation with the FWS and NYSDEC, a plan with an implementation schedule, for Commission approval, to mitigate any adverse effects resulting from the revised operations;

(3) prior to commencing construction of the new powerhouse, Potsdam should file, for Commission approval, after consultation with FWS and NYSDEC, designs for fish protection and passage facilities at both the East dam and West dam. These design should include trashracks with 1-inch clear bar spacing, a sluiceway, an adequate plunge pool at the sluiceway outlet, and adequate fish attraction and conveyance flows; and

(4) prior to commencing construction of proposed recreational facilities, Potsdam should file for Commission approval a final recreation plan including, in addition to the recreational enhancements proposed by Potsdam, a canoe portage sign. The final recreation plan should be developed in consultation with the NYSDEC, FWS, ADK, and village of Potsdam.

VIII. RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

A. Raquette River Projects

Section 10(j) of the FPA requires the Commission to include license conditions, based on recommendations provided by the federal and state fish and wildlife agencies for the protection of, mitigation of adverse impacts on, and enhancements of fish and wildlife resources affected by the project. We have addressed the concerns of the federal and state fish and wildlife agencies and made recommendations generally consistent with those of the agencies.

Interior filed terms and conditions under section 10(j) for each of the four Raquette River Projects on September 9, 1999.[20] Tables 25 through 28 contain 3 recommendations for the Carry Falls Project, 19 recommendations for the Upper Raquette River Project, 16 recommendations for the Middle Raquette River Project, and 15 recommendations for the Lower Raquette River Project, for a total of 53 recommendations.

Pursuant to section 10(j) of the FPA, we make a preliminary determination that 7 of Interior's recommendations are outside the scope of section 10(j) (one recommendation that is made for all four projects and one recommendation that is

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[20] In its response to Interior's section 10(j) terms and conditions, Erie contends that Interior is attempting to expand the Settlement by recommending that the final design and implementation of each flow release structure be approved by FWS and NYSDEC. Further, Erie contends that Interior has expanded the Settlement by recommending that Erie consult with Interior, and provide Interior an opportunity to comment, prior to any requests to the Commission, for an extension of time to comply with the requirement to develop a flow monitoring plan for the projects. Erie states that it would serve any such requests on Interior, and other parties to the proceeding, at the time such requests are filed with the Commission.

The Settlement does not specify FWS and NYSDEC approval of final flow release structures. Nor does it provide for notification to Interior of any potential requests for extensions of time to comply with provisions of the Settlement. We will address these procedural issues in any orders issuing licenses for the four Raquette River projects.

made for the Upper, Middle, and Lower Raquette River projects) because they are not specific measures for the protection of fish and wildlife. These recommendations are: (1) that all measures in the Settlement, except those that are specifically flagged by the signatories as not to be included in the project license, shall be included in their entirety, without modification, as

Table 25. Analysis of Interior's recommendations for the Carry Falls Project (Source: Staff)

Recommendation	Within scope of section 10(j)?	Annual cost of measure	Staff recommending adoption?
1. All measures included in the Settlement Offer, except those that are specifically flagged by the signatories as not to be included in the license, shall be included in their entirety, without modification, as numbered license articles in any license issued by the Commission and shall be enforceable by the Commission.	No	$0	No, not a specific fish and wildlife protection measure. However, we do recommend adopting these measures individually.
2. Provide continuous base flows below Raymondville of at least 560 cfs, except during dry and drought periods. During dry periods, provide minimum of 290 cfs; during drought conditions, provide flow equal to average daily flow at the Piercefield gage. Consult with NYSDEC to determine if modifications to the base flow and/or Carry Falls elevations are warranted.	Yes	$8,590	Yes

3. As described in the Settlement, modify existing guide curve no later than June 1, 2000,[a] for Carry Falls so that impoundment will remain above elevation 1,355 feet, except under emergency conditions or drought conditions to provide base flows below Raymondville (see 2. above).	Yes	$7,690	Yes

[a] The implementation schedule described in section 2.1 of the Settlement provides a process for modifying the schedule to reflect the actual date of license issuance. We assume that Interior's implementation dates also would be adjusted if the license is issued later than anticipated.

Table 26. Analysis of Interior's recommendations for the Upper Raquette River Project (Source: Staff)

Recommendation	Within scope of section 10(j)?	Annual cost of measure	Staff recommending adoption?
1. All measures included in the Settlement Offer, except those that are specifically flagged by the signatories as not to be included in the license, shall be included in their entirety, without modification, as numbered license articles in any license issued by the Commission and shall be enforceable by the Commission.	No	$0	No, not a specific fish and wildlife protection measure. However, we do recommend adopting these measures individually.
2. Implement the bypassed flow regime as described in section 3 of the Settlement according to the implementation schedule identified in section 2.1 of the Settlement.	Yes	$0	Yes[a]

3. As described in section 3 of the Settlement, release 45 cfs (42-48 cfs) into Stark bypassed reach through stoplog section of dam via structure approved by FWS no later than December 31, 2002.[a] Immediately after Taintor gate release of at least 24 hours, release 90 cfs through stoplog for at least 24 hours. In cooperation with FWS and NYSDEC, minimize flow through boulder berm in habitat segment 12A.	Yes	$71,030	Yes
4. As described in section 3 of the Settlement, release 120 cfs (112-128 cfs) into the Blake bypassed reach through stoplog section of dam via release structure approved by FWS beginning with walleye spawning season in 2002, through June 30. From July 1 until beginning of next walleye spawning season, release 55 cfs (52-58 cfs). Move gravel/cobble bar on left downstream from dam so material is wetted and useable at 55 cfs, no later than December 31, 2002.[a]	Yes	$61,400	Yes
5. As described in section 3 of the Settlement, release 20 cfs (19-21 cfs) into the Rainbow Falls bypassed reach through stoplog section of dam via a release structure approved by FWS, no later than December 31, 2004.[a]	Yes	$31,040	Yes

6. As described in section 3 of the Settlement, release 145 cfs (125-165 cfs) into the Five Falls bypassed reach through stoplog section of dam via release structure approved by FWS beginning with walleye spawning season in 2003 through end of walleye spawning season. After season ends, release 50 cfs until beginning of next walleye spawning season.	Yes	$97,980	Yes
7. As described in section 3 of the Settlement, release 60 cfs (52-68 cfs) into the South Colton bypassed reach through stoplog section of dam via a release structure approved by FWS, no later than December 31, 2003.[a] Alternatively, release only 20 cfs (17-23 cfs) if channel modifications ensure that the entire 20 cfs flow travels over the visible portion of the falls (viewed from downstream bridge). Channel modifications must be undertaken in consultation with FWS and NYSDEC.	Yes	$77,650	Yes
8. As described in section 4 of the Settlement, limit the daily draw down at the Stark impoundment to a maximum of 1 foot (as measured from 0.3 foot below the permanent dam crest); drawdown limitation shall begin no later than December 31, 2002.[a]	Yes	$7,880	Yes

9. As described in section 4 of the Settlement, limit the daily draw down at the Blake impoundment to a maximum of 1 foot (as measured from 0.3 foot below the permanent dam crest); drawdown limitation shall begin no later than December 31, 2002.[a]	Yes	$8,460	Yes
10. As described in section 4 of the Settlement, limit the daily draw down at the Rainbow Falls impoundment to a maximum of 1 foot (as measured from 0.3 foot below the permanent dam crest); drawdown limitation shall begin no later than December 31, 2004.[a]	Yes	$8,610	Yes
11. As described in section 4 of the Settlement, limit the daily draw down at the Five Falls impoundment to a maximum of 2 feet (as measured from 0.3 foot below the permanent dam crest); drawdown limitation shall begin no later than December 31, 2003.[a]	Yes	$1,820	Yes
12. As described in section 4 of the Settlement, limit the daily draw down at the South Colton impoundment to a maximum of 2 feet (as measured from 0.3 foot below the permanent dam crest); drawdown limitation shall begin no later than December 31, 2003.[a]	Yes	$6,880	Yes

13. Develop a flow monitoring plan in consultation with the signatories to the Settlement Offer within 6 months of license issuance. Gages/equipment shall monitor: Raquette River flow, all other project flows, and project headpond and tailwater elevation. NYSDEC shall review and concur with plan. Staff gages shall be installed and visible to the public.	Yes	$0[b]	Yes
14. Consult with Interior, and provide opportunity for comment, on any request for time extension to develop flow monitoring plan.	No	$0	No, not a specific fish and wildlife protection measure
15. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Stark with a maximum 1" clear spacing at the existing trashracks before December 31, 2018[a]; downstream passage structure no later than December 31, 2002[a]; and a minimum conveyance flow equal to the bypassed reach flow via stoplog structure near the left shore of the dam, to be designed in consultation with and approved by FWS and NYSDEC.	Yes	$44,680	Yes

16. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Blake with a maximum 1" clear spacing at the existing trashracks before December 31, 2018[a]; downstream passage structure no later than December 31, 2002[a]; and a minimum conveyance flow equal to the bypassed reach flow via stoplog structure near the left shore of the dam, to be designed in consultation with and approved by FWS and NYSDEC.	Yes	$42,530	Yes
17. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Rainbow Falls with a maximum 1" clear spacing at the existing trashracks before December 31, 2015[a]; downstream passage structure no later than December 31, 2004[a]; and a minimum conveyance flow equal to the bypassed reach flow via stoplog structure near the left shore of the dam, to be designed in consultation with and approved by FWS and NYSDEC.	Yes	$45,220	Yes

18. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Five Falls with a maximum 1" clear spacing at the existing trashracks before December 31, 2015[a]; downstream passage structure no later than December 31, 2003[a]; and a minimum conveyance flow equal to the bypassed reach flow via stoplog structure near the left shore of the dam, to be designed in consultation with and approved by FWS and NYSDEC.	Yes	$44,500	Yes
19. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at South Colton with a maximum 1" clear spacing at the existing trashracks before December 31, 2015[a]; downstream passage structure no later than December 31, 2003[a]; and a minimum conveyance flow equal to the bypassed reach flow via stoplog structure near the left shore of the dam, to be designed in consultation with and approved by FWS and NYSDEC.	Yes	$45,780	Yes

[a] The implementation schedule described in section 2.1 of the Settlement provides a process for modifying the schedule to reflect the actual date of license issuance. We assume that Interior's implementation dates also would be adjusted if the license is issued later than anticipated.

[b] We assumed that this cost would be included in Erie's O&M cost.

Table 27. Analysis of Interior's recommendations for the Middle Raquette River Project (Source: Staff)

Recommendation	Within scope of section 10(j)?	Annual cost of measure	Staff recommending adoption?
1. All measures included in the Settlement Offer, except those that are specifically flagged by the signatories as not to be included in the license, shall be included in their entirety, without modification, as numbered license articles in any license issued by the Commission and shall be enforceable by the Commission.	No	$0	No, not a specific fish and wildlife protection measure. However, we do recommend adopting these measures individually.
2. Implement the bypassed flow regime as described in section 3 of the Settlement according to the implementation schedule identified in section 2.1 of the Settlement.	Yes	$0	Yes[a]
3. As described in section 3 of the Settlement, release specified flows into the Colton bypassed reach beginning with the walleye spawning season in 2000. Flows shall be via a FWS-approved release structure. Maintain existing interim bypassed reach flows until permanent flows are implemented.	Yes	$182,200	Yes
4. As described in section 3 of the Settlement, release specified flows into the Hannawa bypassed reach no later than December 31, 2000, via a FWS-approved release structure. Maintain existing interim bypassed reach flows until permanent flows are implemented.	Yes	$23,510	Yes

5. As described in section 3 of the Settlement, release specified flows into the Sugar Island bypassed reach beginning with the walleye spawning season in 2000. Flows shall be via a FWS-approved release structure. Institute permanent flow regime no later than December 31 of the year of license issuance. Maintain existing interim bypassed reach flows until permanent flows are implemented.	Yes	$56,360	Yes
6. As described in section 4 of the Settlement, institute impoundment fluctuation regime at the Higley impoundment to reregulate peaking flows from the Upper Raquette River developments, no later than December 31 of year license is issued.	Yes	$2,220	Yes
7. As described in section 4 of the Settlement, draw down the Colton impoundment to a maximum of 0.4 foot below the top of the flashboards (or below dam crest when no flashboards are in place), no later than December 31 of year license is issued.	Yes	-$10,540	Yes
8. As described in section 4 of the Settlement, continue to draw down the Hannawa impoundment to a maximum of 0.4 foot below the top of the flashboards (or below dam crest when no flashboards are in place), no later than December 31 of year license is issued.	Yes	$0	Yes

9. As described in section 4 of the Settlement, continue to draw down the Sugar Island impoundment to a maximum of 1 foot below the dam crest, no later than December 31 of year license is issued.	Yes	$0	Yes
10. Develop a flow monitoring plan in consultation with the signatories to the Settlement Offer within 6 months of license issuance. Gages/equipment shall monitor: Raquette River flow, all other project flows, and project headpond and tailwater elevation. NYSDEC shall review and concur with plan. Staff gages should be installed and visible to the public.	Yes	$0[b]	Yes
11. Consult with Interior, and provide opportunity for comment, on any request for time extension to develop flow monitoring plan.	No	$0	No, not a specific fish and wildlife protection measure.

12. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Higley with a maximum 1" clear spacing at existing trashracks before December 31, 2011[a]; downstream fish passage no later than December 31, 2001[a]; and a minimum conveyance flow of 20 cfs via stoplog structure between the intake canal and the spillway, to be designed in consultation with FWS and NYSDEC.	Yes	$40,540	Yes
13. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Colton with a maximum 1" clear spacing at the existing trashracks before December 31, 2011[a] and a conveyance flow of at least 20 cfs via rehabilitated trash sluice structure to be approved by FWS and NYSDEC.	Yes	$25,440	Yes
14. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier at Hannawa with a maximum 1" clear spacing at existing trashracks before December 31, 2008[a] and downstream fish passage no later than December 31, 2000.[a] Flow release structure shall be designed in consultation with FWS and NYSDEC.	Yes	$42,010	Yes

15. As described in section 6 of the Settlement, facilitate downstream fish passage at Sugar Island via instream flow release structure, no later than during the year of license issuance. Final structure shall be approved by FWS and NYSDEC, and must include adequate plunge pool.	Yes	$0	Yes[c]
16. As described in section 8 of the Settlement, implement whitewater boating releases. Peak flows for scheduled releases should be 1,250 cfs at Colton, 800 cfs at Hannawa, and 1,500 cfs at Sugar Island. Incorporate scheduled flow ramping; schedule may be revised with approval of FWS and NYSDEC. Releases shall not exceed more than six per whitewater boating season in any given reach; releases shall not be scheduled on consecutive days at any given development.	Yes	$6,060	Yes

[a] The implementation schedule described in section 2.1 of the Settlement provides a process for modifying the schedule to reflect the actual date of license issuance. We assume that Interior's implementation dates also would be adjusted if the license is issued later than anticipated.

[b] We assumed that this cost would be included in Erie's O&M cost.

[c] Erie currently provides an interim instream flow of 125 cfs through a minimum flow pipe located downstream of the powerhouse intake pipeline. We assume that Erie would continue to use this release structure for the 300 cfs instream flow recommended in the Settlement.

Table 28. Analysis of Interior's recommendations for the Lower Raquette River Project (Source: Staff)

Recommendation	Within scope of section 10(j)?	Annual cost of measure	Staff recommending adoption?
1. All measures included in the Settlement Offer, except those that are specifically flagged by the signatories as not to be included in the license, shall be included in their entirety, without modification, as numbered license articles in any license issued by the Commission and shall be enforceable by the Commission.	No	$0	No, not a specific fish and wildlife protection measure. However, we do recommend adopting these measures individually.
2. Implement the bypassed flow regime as described in section 3 of the Settlement according to the implementation schedule identified in section 2.1 of the Settlement.	Yes	$0	Yes[a]
3. As described in section 3 of the Settlement, release 75 cfs (65-85 cfs) into East Norfolk bypassed reach through stoplog section of dam near left shore via a release structure approved by FWS no later than December 31, 2000.[a]	Yes	$9,720	Yes
4. As described in section 3 of the Settlement, release 75 cfs (70-80 cfs) into Norfolk bypassed reach. Maintain release of 37.5 cfs (35-40 cfs) through stoplog section of dam near right shore and headgates at upstream end of reach no later than December 31, 2000.[a] Maintain additional 37.5 cfs (35-40 cfs) in trash sluice channel at half-way point of bypassed reach.	Yes	$15,370	Yes

5. As described in section 4 of the Settlement, continue to limit daily impoundment fluctuation at Norwood to a maximum of 0.5 foot below the top of flashboards or below the dam crest (when flashboards are not in place).	Yes	$0	Yes
6. As described in section 4 of the Settlement, limit daily impoundment fluctuation at East Norfolk to a maximum of 0.5 foot below the dam crest.	Yes	$2,270	Yes
7. As described in section 6 of the Settlement, limit daily impoundment fluctuation at Raymondville to a maximum of 0.5 foot below the top of the pneumatic flashboard system or below the dam crest.	Yes	$790	Yes
8. As described in section 4 of the Settlement, provide continuous base flows below Raymondville of at least 560 cfs, except during dry and drought periods. During dry periods, provide minimum of 290 cfs; during drought conditions, provide flow equal to average daily flow at the Piercefield gage.	Yes	$8,590	Yes
9. Install and calibrate a timer system in the Lower Raquette River hydroelectric control scheme to ensure appropriate instantaneous minimum base flows.	Yes	$0[b]	Yes

10. Develop a flow monitoring plan in consultation with the signatories to the Settlement Offer within 6 months of license issuance. Gages/equipment shall monitor: Raquette River flow, all project flows, and project headpond and tailwater elevation. NYSDEC shall review and concur with plan. Staff gages should be installed and visible to the public.	Yes	$0[c]	Yes
11. Consult with Interior, and provide opportunity for comment, on any request for time extension to develop flow monitoring plan.	No	$0	No, not a specific fish and wildlife protection measure
12. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier with a maximum 1" clear spacing at existing trashracks at Norwood before December 31, 2008[a]; downstream fish passage no later than December 31, 2001[a]; and a minimum conveyance flow of 20 cfs via stoplog structure near left abutment of dam, to be approved by FWS and NYSDEC.	Yes	$29,080	Yes
13. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier with a maximum 1" clear spacing at existing trashracks at East Norfolk before December 31, 2004[a]; and downstream fish passage no later than December 31, 2000[a], to be approved by FWS and NYSDEC.	Yes	$24,080	Yes

14. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier with a maximum 1" clear spacing at existing trashracks at Norfolk before December 31, 2002[a]; and downstream fish passage at the trash sluice at the transition of the power canal and the pipeline, providing at least 37.5 cfs (35-40 cfs) conveyance flow, no later than December 31, 2000[a]; final structure shall be approved by FWS and NYSDEC.	Yes	$30,330	Yes
15. As described in section 6 of the Settlement, provide fish protection and downstream movement measures, including: a physical barrier with a maximum 1" clear spacing at existing trashracks at Raymondville before December 31, 2000[a]; install downstream fish passage at existing trash sluice, providing at least 20 cfs conveyance flow, no later than December 31, 2000[a]; final structure shall be approved by FWS and NYSDEC.	Yes	$28,850	Yes

[a] The implementation schedule in section 2.1 of the Settlement includes modifying the schedule to reflect the date of license issuance. We assume that Interior's dates also would be adjusted if the license is issued later than anticipated.

[b] This measure would be included in the flow monitoring plan.

[c] We assume that this cost would be included in Erie's O&M cost.

numbered license articles in any license issued by the Commission; and (2) that the Commission shall consult with Interior, and provide Interior the opportunity to comment, prior to any requests to the Commission for an extension of time to comply with the requirements to develop a flow monitoring plan for the Upper, Middle, and

Lower Raquette River projects.

Under section 10(j), we are making a preliminary determination that the 47 fish and wildlife recommendations filed by Interior that are within the scope of section 10(j) are consistent with the purposes and requirements of the FPA or other applicable law, and with the terms of the Settlement.

B. Potsdam Water Power Project

Section 30(c) of the FPA requires that the Commission consult with federal and state fish and wildlife agencies, in a manner consistent with the Fish and Wildlife Coordination Act (16 U.S.C. 661, et seq.), and include, in any exemption, such terms and conditions as the agencies determine are appropriate to prevent loss of, or damage to, such resources. NYSDEC and FWS filed terms and conditions in response to the application for amendment of exemption on October 7, and October 12, 1999, respectively. We will include NYSDEC's and FWS's terms and conditions (described in section III.E.3) in any amendment to the exemption.

IX. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a) (2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by a project. Under section 10(a)(2),

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[21] (1) National Park Service. 1982. Nationwide Rivers Inventory. U.S. Department of the Interior. Washington, D.C. January 1982. 432 pp; (2) Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American Waterfowl Management Plan: A Strategy for Cooperation. U.S. Department of the Interior and Environment Canada. Washington, D.C. May 1986. 19 pp. (3) Fish and Wildlife Service. Undated. Fisheries USA: the Recreational Fisheries Policy of the U.S. Fish and Wildlife Service. Washington, D.C. 11 pp. (4) Adirondack Park Agency. 1985. Adirondack Park state land master plan. Ray Brook, New York. January 1985. 78 pp. (5) Adirondack Park Agency. Undated. New York State wild, scenic, and recreational rivers system field investigation summaries. Albany, New York, 21 reports. (6) Fish and Wildlife Service. New York State Department of Environmental Conservation. 1994. Fisheries enhancement plan for the Raquette River, New York. Department of the Interior, Amherst, New York. March 1994. 58 pp. (7) New York State Department of Conservation. Bureau of Fisheries. 1995. Upper Raquette River reservoirs - assessment and management of coolwater fish stocks, 1990-1994. Watertown, New York. February 1995. 69 pp. (8) New York State

federal and state agencies filed a total of 29 qualifying comprehensive plans of which we identified 9 New York and 3 federal to be applicable.[21] We did not find any conflicts.

X. FINDING OF NO SIGNIFICANT IMPACT

We conclude that none of the resources that we studied — including geologic, water quantity and quality, fisheries, terrestrial, aesthetic, cultural, and recreational resources — would experience significant adverse effects under the proposed actions.

On the basis of the record and this final MPEA, issuing new licenses for the projects, as proposed by settling parties, and as modified by the additional staff-recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment. Amending the exemption for the Potsdam Water Power Project, as proposed by Potsdam, and as conditioned by resource agency and with staff recommendations, would not constitute a major federal action significantly affecting the quality of the human environment. For this reason, and pursuant to Commission regulations, no Environmental Impact Statement is required for either action.

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XII. LIST OF PREPARERS

Charles T. Raabe–Project Coordinator (Civil Engineer; M.S. Civil Engineering)

Allan Creamer (Fisheries Biologist; M.S. Fisheries Science)

William H.S. Diehl, P.E. (Civil Engineer; M.S. Civil Engineering)

Mohamad Y. Fayyad (Civil Engineer; M.S. Engineering Administration)

James T. Griffin–Cultural Resources (Archeologist; B.A. Anthropology; Master of Public Administration)

Steve Kartalia–Aquatic Resources (Fisheries Biologist; M..S. Fisheries Biology)

Peter Leitzke (Geologist; M.A. Geological Sciences)

Patrick Murphy–Terrestrial Resources (Wildlife Biologist; M.S. Wildlife Management)

John K. Novak (Fisheries Biologist; M.S. Zoology)

Karen Hardy–Recreation, Land Use, and Aesthetics (Recreation Planner; M.L.A.,
M.U.R.P, Regional Planning)

Wade Moore–Hydrology and Engineering (Hydrologist; M.S. Hydraulic Engineering)

Dana Otto–Terrestrial Resources (Biologist; B.S. Biology; M.S. Environmental Planning)

Leslie Smythe–Water Resources and Fisheries (Biologist; B.S. Biology; M.S. Aquatic Ecology)

Patricia Weslowski–Task Management and Cultural Resources (Preservation Planner; Master of Public Administration)

Appendix A

Comment Letters

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Adirondack Mountain Club	A- 1
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Erie Boulevard Hydropower LP	A- 9
St. Regis Mohawk Tribe	A- 20
Department of the Interior	A-23

Adirondack
ADK
Mountain Club

Conservation · Education · Recreation

Reply to: [illegible] Georgetown Square
Schenectady, NY 12303-5300
[illegible]
July 11, 2000

David P. Boergers
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: P[illegible]-005 Carry Falls Project
[illegible] Upper Raquette River Project
#2320-005 Middle Raquette River Project
#2330-007 Lower Raquette River Project
& #[illegible]-007 Potsdam Water Power Project
Draft Multiple Project Environmental Assessment (DMEA)

This is one of the best draft environmental assessments that ADK has seen, especially since it covers five projects and a total of 15 dams. There are no serious comments and most are editorial.

ADK-1 The new guide curve is described in the text of the DMEA but not shown as a figure. ADK has expected a figure since it apparently was in the expiring license as a figure. That original license was amended to change the guide curve to the one called "Existing Guide Curve" in the settlement (Fig. 5-1).

ADK-2 ADK was surprised that under "Description of Proposed Project" there was a reference to a minimum downstream discharge of 450 cfs when this was not in the Settlement for the Middle Raquette (see p.23, end of par. 2). The license application for the Middle Raquette (2320) states on p.B-7 that the (now expired) license requires 450 cfs base flow. However, base flow has little meaning since all four developments discharge into impoundments. Also noted is the puzzling statement (p.[illegible], par.1, line 1) "A base flow of 450 cfs is intermittently released from Rigley". Since a base flow is continuous, the ADK recommendation is to simply delete this sentence. The only one of the developments in the entire DMEA that discharges to a flowing river more than 0.1 mile long is Raymondville and the Settlement covers what that flow must be. ADK recommends that there be no base flow requirement in the new license for the Middle Raquette.

ADK wants to report, as we have in our prior letter of [illegible]/95 to Lois Cashell, that there is a significant archaeological site which was apparently unknown to the SHPO (State Historic Preservation Officer) when Niagara Mohawk made their required inquiries. The

Staff Responses to Comments of the Adirondack Mountain Club on the Draft Environmental Assessment for the Raquette River Projects
July 11, 2000

ADK-1 We added figure 19 to section V.C.2 to show the difference in the existing and proposed rule curve for Carry Falls.

ADK-2 Section III.C.1 (Middle Raquette) is intended to describe the existing project. We revised the subheading for all the projects to "Description of Existing Project" to clarify this intent. The 450 cfs base flow is part of the existing project but not of the proposed project as you point out. We also inserted "existing" at various places in the text to further clarify our intent.

ADK-3 site is a 500 by 42 foot foundation ruin of a tanning factory for sole leather, active from 1856 to 1996 and located on a shelf of land just downstream of the Colton dam and between the bypass reach and the Stone Valley hiking trail on the east side of the bypass. The trail has an interpretive sign about the tanning industry and the foundation. The tannery was a large employer in its day with 33 employees in 1870 and 69 at a seasonal peak in 1897 just before closure. This tannery site was intended to be the location for the minimum flow turbine at Colton, as proposed in Niagara Mohawk's license application (2320) but later dropped. ADK would like to see this site mentioned in the cultural resources section of the MPEA, based on the material sent to P&NC on 4/21/95. The site is within the Colton project boundary.

Detailed comments follow.

ADK-4 P.3, Fig.1: Correct the figure so that Yaleville (FERC#2322) is not included in the Lower Raquette.

ADK-5 P.7, par.1, lines 1 & 2: The New York Power Pool is now dead. It has been superseded by the NYISO (New York Independent System Operator). They are responsible for market administration and control and use the NYPP building.

P.115, par.4, line 5: also change NYPP to NYISO here.

ADK-6 P.13, par.5, line 3: add "above" just before "1355.0 feet"

ADK-7 P.13, par.6: Stark development omitted. see Settlement, p.4-3, table one footnote, & MPEA p.V, bullet 1.

ADK-8 P.23, last par., line 3: Colton's drawdown isn't 0.5 feet. It is presently 0.3 feet and the Settlement has it 0.4 feet in the future. Correct the elevations.

ADK-9 P.23, par.3: This is a mix of past and future operating procedures. The 2 ft. drawdown on weekends is future. The 3.5 ft. drawdown is past practice, year round. The weekend restricted drawdowns are not May 1 to Oct. 1, they are Memorial Day weekend thru Labor Day weekend. Delete words "slowly filled" since this is a reregulating impoundment not a pumped storage plant. Weekdays in summer and the rest of the year the drawdown will be 2.5 ft. Rewrite entire paragraph. Instead of "normal operation" discuss past or future operation. Most drawdown elevations will change.

ADK-10 P.26, bullet 1: Elevations for Colton and Hannawa are wrong because they are related to the crest of the dam instead of the top of the flashboards.

ADK-11 P.27, par.1, line 1: Change "put-location" to "put-in location".

ADK-3 We revised section V.C.7 of the EA to include a brief description of the tanning factory ruins as a publicly accessible historic archeological site.

ADK-4 We revised figure 1 to clarify that Yaleville is not part of the Lower Raquette River Project.

ADK-5 We revised section II.B to now state that the projects are in the New York Independent System Operator area.

ADK-6 We revised section III.B.1 to clarify that, when Carry Falls reservoir is at or above 1,355 feet, the Stark development fluctuates 1 foot.

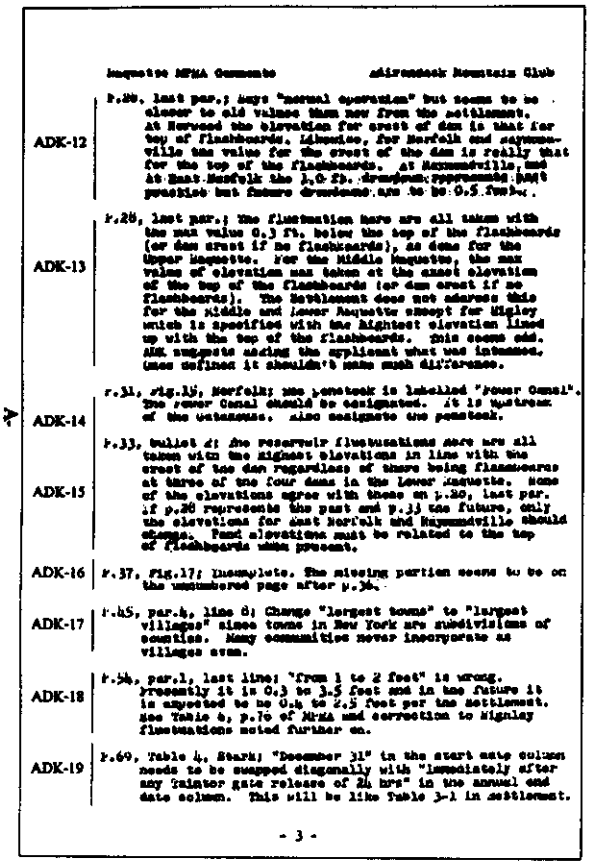
ADK-7 Section III.B.1 of the draft MPEA includes a description of impoundment fluctuation at the Stark development.

ADK-8 We made this correction in section III.C.1 of the MPEA.

ADK-9 We reviewed the license application (p. E-27) and determine that our description of existing operations is correct. We revised the text to clarify that we are describing existing operations.

ADK-10 We corrected the elevations of the Colton and Hannawa reservoirs in section III.C.2.

ADK-11 We made the correction in section III.C.2.



Iroquois MPEA Comments — Adirondack Mountain Club

ADK-12 | p.20, last par.; says "normal operation" but seems to be closer to old values than new from the settlement. At Harwood the elevation for crest of dam is that for top of flashboards. Likewise, for Norfolk and Raymondville the value for the crest of the dam is really that for the top of the flashboards. At Raymondville, and at East Norfolk the 1.0 ft. drawdown approximates past practice but future drawdowns are to be 0.5 feet.

ADK-13 | p.20, last par.; the fluctuation here are all taken with the max value 0.3 ft. below the top of the flashboards (or dam crest if no flashboards), as done for the Upper Iroquois. For the Middle Iroquois, the max value of elevations was taken at the exact elevation of the top of the flashboards (or dam crest if no flashboards). The Settlement does not address this for the Middle and Lower Iroquois except for Higley which is specified with the highest elevation lined up with the top of the flashboards. This seems odd. ADK suggests asking the applicant what was intended, once defined it shouldn't make much difference.

ADK-14 | p.31, Fig.15, Norfolk; the penstock is labelled "Power Canal". The Power Canal should be designated. It is upstream of the watercourse. Also designate the penstock.

ADK-15 | p.33, bullet d: the reservoir fluctuations here are all taken with the highest elevations in line with the crest of the dam regardless of there being flashboards at three of the four dams in the Lower Iroquois. Some of the elevations agree with those on p.20, last par. if p.20 represents the past and p.33 the future. Only the elevations for East Norfolk and Raymondville should change. Pond elevations must be related to the top of flashboards when present.

ADK-16 | p.37, Fig.17; Incomplete. The missing portion seems to be on the unnumbered page after p.36.

ADK-17 | p.45, par.4, line 8; Change "largest towns" to "largest villages" since towns in New York are subdivisions of counties. Many communities never incorporate as villages even.

ADK-18 | p.54, par.1, last line; "from 1 to 2 feet" is wrong. Presently it is 0.3 to 3.5 feet and in the future it is expected to be 0.4 to 2.5 feet per the Settlement. See Table 4, p.70 of MPEA and correction to Higley fluctuations noted further on.

ADK-19 | p.69, Table 4, Stark; "December 31" in the start date column needs to be swapped diagonally with "Immediately after any Painter gate release of 24 hrs" in the annual end date column. This will be like Table 3-1 in Settlement.

- 3 -

ADK-12 Please see our response to ADK-2.

ADK-13 We agree and have revised section III.C.3 accordingly.

ADK-14 We revised figure 15 to correctly depict the power canal and penstock.

ADK-15 We corrected the elevations in section III.D.2. They are now consistent throughout the MPEA.

ADK-16 Several figures exceeded margins in the CIPS version of the draft MPEA, and this resulted in shifting pages such the the page numbers seem incorrect. The RIMS version retained the image size of 8 x 11 inches, and, consequently, the pages did not shift and the page numbering is correct. We will check for codes to resolve this discrepancy in the final MPEA posting on CIPS.

ADK-17 We made the revision in section V.A.

ADK-18 We agree and have made the revision in section V.C.2.

ADK-19 We made these corrections to tables 4 and 6.

Raquette M/E Adirondack Mountain Club

p.69, Table 4, South Colton; Move "January 1" down one line so it is aligned with "60 cfs without". See settlement Table 3-5 if puzzled.

p.76, Table 6, Stark; For the text, values should be 23 feet for existing fluctuation and 1 foot for proposed.

p.76, Table 6, Rigley; Change existing fluctuation from 2.5 to 3.5 feet. Change proposed fluctuation to 2.5 feet or perhaps to 2.0/2.5 feet, keeping symbol for footnote. In the footnote, delete "(unchanged)". To verify 3.5 ft see Table B1, p.B-10, of the license application for 2380.

p.91, par.1, last line; Change "village" of South Colton to "hamlet" or "community".

ADK-20 p.91, par.2, line 6; Delete "south Colton" and add "Rigley". Since South Colton is in the Upper Raquette and Rigley is in the Middle Raquette. The statement is still correct.

p.96, Table 9, Rigley; Change "Boat launch" to "Boat launch".

ADK-21 p.93, par.2; The improvement in Stark's operation is dramatic but it isn't mentioned here.

p.93, par.2, line 1; The reference to section V.C.6 surely is incorrect.

p.93, par.2, line 7; Change "by 0.5 foot during the recreation season," to "by 1.0 foot and by 1.5 feet during summer weekends,".

p.97, Table 9 cont'd, Norwood; Change "Multi-use are" to "Multi-use site".

ADK-22 p.vo, par.1, line 1; Change "within the project boundary" to "under a transmission line".

p.98, par.3, line 9; Change "College," to "State University of New York,"

p.101, last par., line 4; Change "horsepower agreement" to "horsepower limit agreement".

p.102, par.5, line 4; Add "with parking" after "canoe take-out" for East Norfolk. This agrees with Table 10 and the Settlement.

p.104, par.5, line 2; Delete the repetition of "use records".

ADK-20 We made these revisions to section V.C.5.

ADK-21 We agree that the proposed fluctuation of 1 foot is dramatically less than the current 23 foot fluctuation. We revised section V.C.5 to state that Stark reservoir fluctuation also would be reduced.

ADK-22 We now refer to section V.C.2 and made these minor edits to the MPEA.

Marquette MPEA   Adirondack Mountain Club

ADK-23 P.106, par.2, line 2; add "Stark," after "Carry Falls,". Also add to the text under "Our analysis" explaining the big change in drawdown in Stark reservoir.

ADK-24 P.106, par.4, line 2; Change "by 0.5 feet" to "by 1.5 feet"

P.106, par.4, lines 4 & 5; Change "1.0 feet to proposed reservoir to 0.5 feet fluctuation." to "1.0 feet to a proposed 0.5 feet fluctuation."

ADK-25 P.112, par.3, line 9; Change "consultation with the resource agencies" to "consultation with the Settlement parties". Settlement parties includes the resource agencies. The NGO's (non-governmental organizations have been particularly involved in the recreation section of the settlement. The Settlement itself says the review is to be by the MRAC (Marquette River Advisory Council), which is almost synonymous with the Settlement parties, in case FERC doesn't want to put the MRAC into the NEPA.

ADK-26 P.119, Table 14; The value for annual O&M in this table has twice as many digits as corresponding values of annual O&M for the other projects. Thus I conclude that the O&M value for the Upper Marquette is vastly too high.

P.144, Recommendation 8; At Stark the cost of the change in fluctuation from 23 to 1 foot of drawdown should reflect more generation due to both more head and more water. Thus cost should be minus for this one.

ADK-27 P.145, Recommendations 9 thru 12; There is no change in the reservoir fluctuation limits for the rest of the Upper Marquette developments. Thus the cost should be zero for all four. I note that Rainbow, Sugar Island, Norwood, and Norfolk show no cost for reservoir fluctuations which are not to be changed.

ADK-28 It seems that the only concept not fully understood by the MPEA authors is that by keeping Carry Falls at 1355 feet and above, Stark will no longer be operating as a storage reservoir. Presently, when Carry Falls goes below 1355 feet, Stark is drawn down in tandem with Carry Falls, with both reservoirs maintaining essentially the same elevation.

Other Distribution:
C.T.Raabe, FERC
A.Hazard, Jordan Club
S.Turgartis, NGrau Adv.
J.Caschandre, AMA
K.Kinglee, ADK
M.Cosselman, NYRCC
T.Matiba, TU
P.Skinner, AW
K.Murphy, NMPC

Betty Lou Bailey
Betty Lou Bailey, Chrm.
Canoe Route Subcommittee
Conservation Committee

- 5 -

ADK-23 We agree and have added language to section V.C.6.b explaining the change in drawdown proposed at the Stark development.

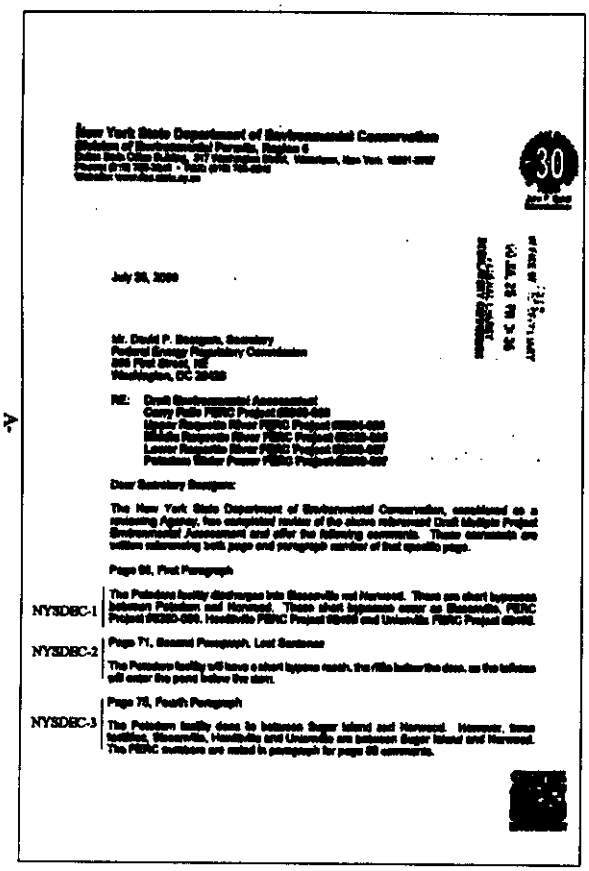
ADK-24 We made these corrections.

ADK-25 We agree and have changed section V.C.7 to state that consultation should be with the Settlement parties.

ADK-26 Table 14 of the MPEA now shows a much more reasonable value of $3,428,145 for annual O&M (we changed the value during internal review but had inadvertently left the prior value in the table).

ADK-27 The costs shown in Table 26 for recommendations 8 through 12 are the costs resulting from implementation of the Carry Falls guide curve.

ADK-28 We understand this relationship and describe it concisely in section V.C.2.



New York State Department of Environmental Conservation

July 20, 2000

Mr. David P. Boergers, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Draft Environmental Assessment
Corey Falls FERC Project #2000-000
Upper Raquette River FERC Project #2000-000
Middle Raquette River FERC Project #2000-000
Lower Raquette River FERC Project #2000-000
Potsdam Water Power FERC Project #2000-000

Dear Secretary Boergers:

The New York State Department of Environmental Conservation, considered as a reviewing Agency, has completed review of the above referenced Draft Multiple Project Environmental Assessment and offer the following comments. These comments are written referencing both page and paragraph number of text specific page.

Page 68, First Paragraph

NYSDEC-1 | The Potsdam facility discharges into Sissonville not Norwood. There are short bypasses between Potsdam and Norwood. There short bypasses occur as Sissonville, FERC Project #2000-000, Hoodville FERC Project #2000 and Unionville FERC Project #2000.

NYSDEC-2 | Page 71, Second Paragraph, Last Sentence

The Potsdam facility will have a short bypass reach, the rifle below the dam, as the tailrace will enter the pond below the dam.

Page 75, Fourth Paragraph

NYSDEC-3 | The Potsdam facility does lie between Sugar Island and Norwood. However, three facilities, Sissonville, Hoodville and Unionville are between Sugar Island and Norwood. The FERC numbers are noted in paragraph for page 68 comments.

A-

Staff Responses to Comments of
the New York State Department of Environmental Conservation
on the Draft Environmental Assessment for the
Raquette River Projects
July 20, 2000

NYSDEC-1 We revised section V.C.3 to state that the Potsdam Project discharges into the Sissonville reservoir.

NYSDEC-2 We agree and have modified the text in section V.C.3.b accordingly.

NYSDEC-3 We revised section V.C.3.b to clarify that these three other hydropower projects lie between Sugar Island and Norwood as well.

David Boergers, Secretary -3- July 20, 2000

Page 87, Third Paragraph

NYSDEC-4 Department staff have observed that the Common Loon has nested on two sites in the Upper Raquette River Project. On Stark Reservoir in 1985, one pair, one chick and in 1996 two adults, two chicks. Also on Rainbow Reservoir in 1985, one pair and one chick.

Page 88, Second Paragraph

NYSDEC-5 Department staff have observed nesting eagles on Blake Reservoir in the Upper Raquette River Project since 1990.

Page 88, Third Paragraph

NYSDEC-6 The yellow lamp mussel was found in the Sugar Island bypass in 1991. Live adults of both sexes were observed. This Department, along with the U.S. Fish & Wildlife Service has since reviewed and approved a proposal to evaluate all sections of both the Lower and Middle Raquette River projects for both habitat and individuals.

Page 102, Third Paragraph - Middle Raquette River Project, Second and Third Sentences

Please note next comment.

Page 109, Paragraph Potsdam Water Power Project

NYSDEC-7 It is noted in this paragraph that Potsdam proposes to develop a day use area on Sugar Island. The Middle Raquette River Project includes the Sugar Island Project on which Erie proposes a day use area with a gated road access. Potsdam is claiming this day use area as part of their recreation plan which is wholly inside the FERC project boundary of Sugar Island Project.

This Department thanks the Federal Energy Regulatory Commission for the opportunity to comment on the Draft Multiple Project Environmental Assessment.

Sincerely yours,

C. Randy Vaas
Regional Supervisor of
Environmental Permits
Region 6

CRV:[illegible]
cc: Len Oliver
Charles Reske
Anton Sidoti
Steve Patch
Raquette River Service List

NYSDEC-4 We revised section V.C.4 to include your observation of nesting sites for the Common loon in the Upper Raquette River Project, on Stark reservoir in 1985 and 1996, and on Rainbow reservoir in 1985.

NYSDEC-5 We revised section V.C.4 of the MPEA to state that NYSDEC staff have observed nesting eagles in Blake reservoir since 1990.

NYSDEC-6 We revised section V.C.4 of the MPEA to include the results of the yellow lampmussel survey conducted by Erie in July and August 2000.

NYSDEC-7 We omit the reference to a day-use area on Sugar Island in section V.C.6 as Potsdam includes a refuge on this island (also known as Snake Island) but does not propose any specific improvements as part of its recreation Master Plan.

ORION
POWER NEW YORK

July 27, 2000

July 27, 2000

Hon. David P. Boergers
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington DC 20426

Re: Carry Falls Project (No. 2060-[illegible]), Upper Raquette River Project (No. [illegible]), Middle Raquette River Project (No. 2320-[illegible]), Lower Raquette River Project (No. 2330-007), Village Of Potsdam Project (No. 2869-007)
Erie Boulevard Hydropower, L.P. Comments on Commission Staff's Draft Environmental Assessment

Dear Secretary Boergers:

Enclosed are an original and eight (8) copies of Erie Boulevard Hydropower's (Erie) comments pertaining to the above referenced Draft Multiple Project Environmental Assessment (DMPEA) for Erie's Carry Falls Project (No. 2060-[illegible]), Upper Raquette River Project (No. [illegible]), Middle Raquette River Project (No. 2320-[illegible]), Lower Raquette River Project (No. 2330-007), and the Village Of Potsdam Project (No. 2869-007) issued by the Commission on June 16, 2000.

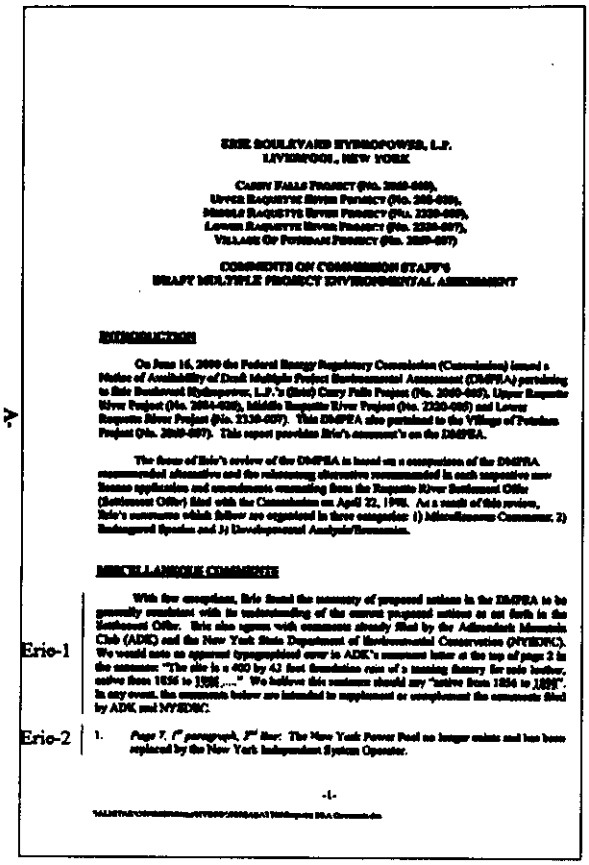
Should there be any questions or comments pertaining to this submittal, please do not hesitate to contact the undersigned at (315) 413-2787.

Very truly yours,

Jerry L. Sabattis

Jerry L. Sabattis
Hydro Licensing Coordinator

Enc.
cc: w/enc.: J. Mark Robinson, FERC
Ted Sorke, FERC
Sam Hirschey, Erie
William Madden, Esq. Winston and Strawn
Attached Service List



ERIE BOULEVARD HYDROPOWER, L.P.
LIVERPOOL, NEW YORK

CARRY FALLS PROJECT (No. 2040-000),
UPPER RAQUETTE RIVER PROJECT (No. 2056-000),
MIDDLE RAQUETTE RIVER PROJECT (No. 2320-000),
LOWER RAQUETTE RIVER PROJECT (No. 2330-007),
VILLAGE OF POTSDAM PROJECT (No. 2069-007)

COMMENTS ON COMMISSION STAFF'S
DRAFT MULTIPLE PROJECT ENVIRONMENTAL ASSESSMENT

INTRODUCTION

On June 16, 2000 the Federal Energy Regulatory Commission (Commission) issued a Notice of Availability of Draft Multiple Project Environmental Assessment (DMPEA) pertaining to Erie Boulevard Hydropower, L.P.'s (Erie) Carry Falls Project (No. 2040-000), Upper Raquette River Project (No. 2056-000), Middle Raquette River Project (No. 2320-000) and Lower Raquette River Project (No. 2330-007). This DMPEA also pertained to the Village of Potsdam Project (No. 2069-007). This report provides Erie's comment's on the DMPEA.

The focus of Erie's review of the DMPEA is based on a comparison of the DMPEA recommended alternative and the relicensing alternative recommended in each respective new license application and amendments emanating from the Raquette River Settlement Offer (Settlement Offer) filed with the Commission on April 22, 1998. As a result of this review, Erie's comments which follow are organized in three categories: 1) Miscellaneous Comments; 2) Background Species and 3) Developmental Analysis/Recreation.

MISCELLANEOUS COMMENTS

Erie-1 | With five exceptions, Erie found the recovery of proposed actions in the DMPEA to be generally consistent with its understanding of the current proposed actions as set forth in the Settlement Offer. Erie also agrees with comments already filed by the Adirondack Mountain Club (ADK) and the New York State Department of Environmental Conservation (NYSDEC). We would note an apparent typographical error in ADK's comment letter at the top of page 2 in the statement "The site is a 400 by 42 foot foundation rest of a tanning factory for sole leather, native from 1856 to 1898 ...." We believe this sentence should say "native from 1856 to 1898". In any event, the comments below are intended to supplement or complement the comments filed by ADK and NYSDEC.

Erie-2 | 1. *Page 7, 1st paragraph, 3rd line:* The New York Power Pool no longer exists and has been replaced by the New York Independent System Operator.

Staff Responses to Comments of
Erie Boulevard Hydropower, L.P.
on the Draft Environmental Assessment for the
Raquette River Projects
July 27, 2000

Erie-1 We noted this typographical error as well and now cite 1856-1898 in our brief description of the site in section V.C.7.

Erie-2 See our response to ADK-5.

Erie-3 | 2. *Page 9, 1st paragraph, 2nd to last line:* Erie's System Hydro Control Center (SHCC) is no longer located in Watertown, but rather in Liverpool, New York.

Erie-4 | 3. *Page 9, 1st Bullet, 1st line:* The statement "...that limits drawdowns to 1,355.0 feet..." should be changed to "...that limits drawdowns as part of normal operation to 1,355.0 feet...". This wording would then be consistent with wording of the Settlement (see Section 5.3.1).

Erie-5 | 4. *Page 13, 5th Paragraph, 3rd line:* The statement "...the Carry Falls reservoir is elevation 1,358.0 feet..." should be changed to "...the Carry Falls reservoir is at, or above, elevation 1,358.0 feet..."

Erie-6 | 5. *Page 23, 3rd paragraph, last line:* FERC should describe in more detail the background of the cited 450 cfs baseflow.

Erie-7 | 6. *Page 23, 3rd paragraph:* In this paragraph, FERC describes the weekday/weekend drawdowns at the Higley development. As mentioned in the ADK comment letter, this description is an intermingling of old and new. If seeking to cite the new proposed operation, FERC should refer to Table 4-2a (page 4-4) of the Settlement for a tabulated description of the proposed Higley drawdowns. If strictly describing the existing operation, FERC should state that is describing such.

Erie-8 | 7. *Page 28, 5th paragraph:* This paragraph incorrectly describes the typical operations of the Middle and Lower Raquette River projects. The developments of the Middle and Lower Raquette River projects are not operated in a peaking or load following mode, and Erie does not determine MW Targets for 24 hour periods for either the Middle or Lower Raquette River projects. The multi-unit developments of the Middle Raquette River Project operate in either run-of-river, or run-of-river with pondage mode as defined on page 2-5 of the Settlement. The single-unit developments of the Lower Raquette River Project are operated in a store-and-release peaking or store-and-release peaking mode as defined on page 2-5 of the Settlement.

Erie-9 | 8. *Page 35, Table 1:* This Settlement implementation table does not include columns for Carry Falls guide curve or baseflow implementation. To avoid confusion, FERC should cite directly the implementation table contained in the Settlement (Table 2-1, page 2-4).

Erie-10 | 9. *Page 54, 1st paragraph, 2nd to last line:* The 450 baseflow is characterized as being released from Higley intermittently. As cited in the ADK comment letter, FERC should clarify the background, meaning and use of the cited 450 baseflow.

Erie-11 | 10. *Page 61, 4th paragraph, 2nd to last line:* FERC describes the riverine habitat below Carry Falls reservoir. FERC may be meaning the general river. However, it reads as if there is riverine reach immediately downstream of Carry Falls – which there is not. Carry Falls discharges directly into the impoundment of the Stark Development

Erie-12 | 11. *Page 68, 3rd paragraph, 2nd line:* Erie only operates the Upper Raquette River Project in a true load following mode using the Automatic Generation Control (AGC) to direct this

-2-

[illegible]

Erie-3 We revised the text in section II.B to state that Erie's SHCC is located in Liverpool.

Erie-4 We added "as part of normal operation" to our description of this enhancement in section III.A.2 to be consistent with the provisions of the Settlement.

Erie-5 See our response to ADK-6.

Erie-6 See our response to ADK-2.

Erie-7 See our response to ADK-9.

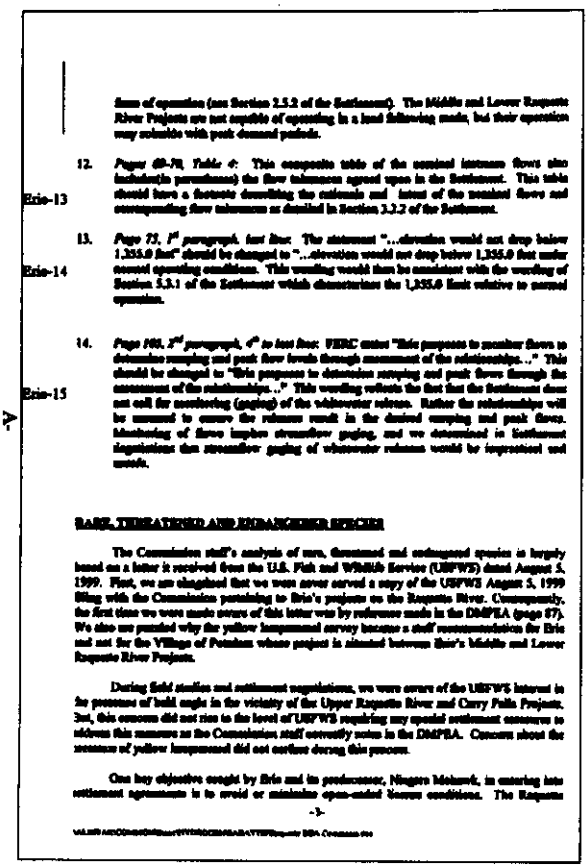
Erie-8 We agree and have revised the description of Middle and Lower Raquette River project operations in section III.D.1 accordingly.

Erie-9 Because the guide curve and base flow only pertain to Carry Falls and Raymondville, we provide the implementation schedule in footnotes e and f of table 1.

Erie-10 See our response to ADK-9.

Erie-11 We revised section V.C.3 to eliminate the sentence that suggests that the reach downstream of Carry Falls is riverine.

Erie-12 Please see our response to Erie-8.



flows of operation (see Section 2.5.2 of the Settlement). The Middle and Lower Raquette River Projects are not capable of operating in a load following mode, but their operation may coincide with peak demand periods.

12. *Pages 69-70, Table 4:* This composite table of the nominal instream flows also includes(in parentheses) the flow tolerances agreed upon in the Settlement. This table Erie-13 should have a footnote describing the rationale and intent of the nominal flows and corresponding flow tolerances as detailed in Section 3.3.2 of the Settlement.

13. *Page 73, 1st paragraph, last line:* The statement "...elevation would not drop below 1,355.0 feet" should be changed to "...elevation would not drop below 1,355.0 feet under Erie-14 normal operating conditions. This wording would then be consistent with the wording of Section 3.3.1 of the Settlement which characterizes the 1,355.0 limit relative to normal operation.

14. *Page 103, 2nd paragraph, 4th to last line:* FERC states "this proposes to monitor flows to determine ramping and peak flow levels through assessment of the relationships..." This should be changed to "this proposes to determine ramping and peak flows through the Erie-15 assessment of the relationships..." This wording reflects the fact that the Settlement does not call for monitoring (gaging) of the tailwater release. Rather the relationships will be assessed to ensure the releases result in the desired ramping and peak flows. Monitoring of flows implies streamflow gaging, and we determined in Settlement negotiations that streamflow gaging of whatever releases would be impractical and unsafe.

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RARE, THREATENED AND ENDANGERED SPECIES

The Commission staff's analysis of rare, threatened and endangered species is largely based on a letter it received from the U.S. Fish and Wildlife Service (USFWS) dated August 5, 1999. First, we are disgusted that we were never served a copy of the USFWS August 5, 1999 filing with the Commission pertaining to Erie's projects on the Raquette River. Consequently, the first time we were made aware of this letter was by reference made in the DMPEA (page 57). We also are puzzled why the yellow lampmussel survey became a staff recommendation for Erie and not for the Village of Potsdam whose project is situated between Erie's Middle and Lower Raquette River Projects.

During field studies and settlement negotiations, we were aware of the USFWS interest in the presence of bald eagle in the vicinity of the Upper Raquette River and Curry Falls Projects. But, this concern did not rise to the level of USFWS requiring any special settlement measures to address this measure as the Commission staff currently notes in the DMPEA. Concern about the presence of yellow lampmussel did not surface during this process.

One key objective sought by Erie and its predecessor, Niagara Mohawk, in entering into settlement agreements is to avoid or minimize open-ended license conditions. The Raquette

-6-

Erie-13 We agree and have added a footnote to table 4 to explain nominal flows and flow tolerances consistent with section 3.3.2 of the Settlement.

Erie-14 We added this language to section V.C.3.b.

Erie-15 We agree and did not intend to suggest streamflow monitoring. We revised the text in section V.C.6.b to clarify your proposal to determine ramping and peak flow through an assessment of the relationships associated with the flow unit, gate opening, and spillage.

River Settlement Offer is no exception. We feel that the Commission staff's recommendation to address bald eagle and yellow lampmussel negates this objective.

1. **Bald Eagle**

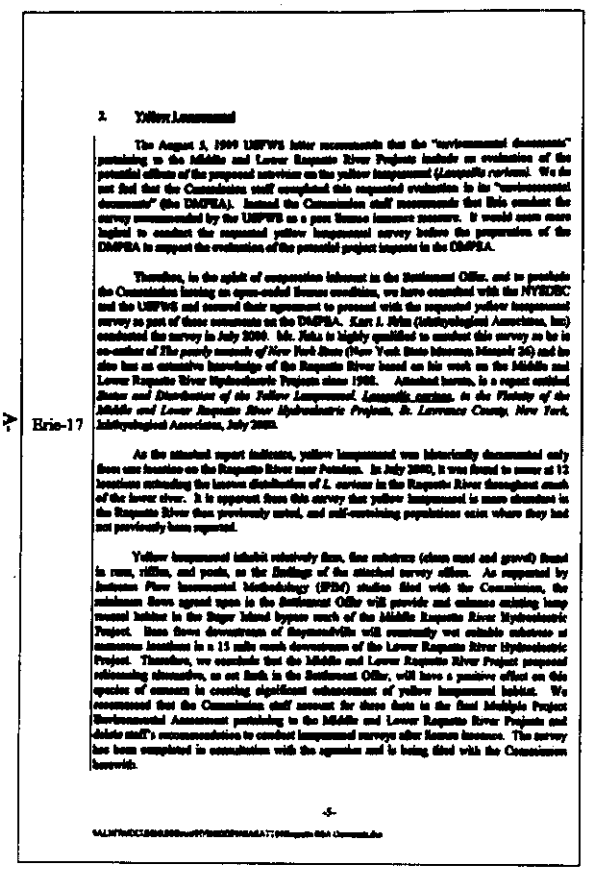
Erie-16

In the case of bald eagle, Commission staff recommends "that the final recreation plan, to be developed by Erie in consultation with the signatories to the Settlement, include measures to minimize the effect of increased recreational boating on on potential bald eagle habitat." One could argue that "minimizing" the effect on bald eagle habitat could go so far as to necessitate not constructing the agreed upon canoe portage trails if it is perceived that the added recreation could create impacts to bald eagle nesting areas. However, not constructing these recreational facilities would be in violation of the Settlement Offer. In addition, during settlement discussions the presence of the eagle nest site was periodically noted and did enter into the team's settlement plan for the Raquette River.

To avoid such open ended implications, we feel that the Commission staff's recommendation to consult with the signatories to the Settlement Offer must be based on actual site specific circumstances and focused on a finite measure designed to be compatible with the recreational measures conceptually agreed upon in the Settlement Offer. To confirm the site specific facts pertaining to bald eagle sightings, we have taken a proactive approach to contact the NYSDEC's Mark Wegthal (see License Application page E.3-47), Peter Nye and Blanche Town concerning the presence of the bald eagle in the vicinity of the Blake development (personal communications Mark Wegthal, Peter Nye and Blanche Town, NYSDEC, and J. Fleming, IA, July 2000). Based on these discussions it was confirmed that a single nesting pair of bald eagle has been documented by the NYSDEC to have utilized two trees for nests near and to the east of the upstream end of the Blake impoundment. Although, the exact nest locations cannot be provided, the nest site is located on the opposite side of the river from the canoe portage and some thousand feet distance from the proposed route of the canoe portage between the Stark and Blake impoundment (see Upper Raquette License Application Figure E.5-1, sheet 1, for the location of the proposed canoe portage route). NYSDEC files also noted, that historically, Niagara Mohawk and Erie staff have cooperated with the NYSDEC for the placement of appropriate signs in the vicinity of the nest site that warns of the presence of nesting eagle.

Given the information conducted via the foregoing consultation, Erie proposes that the scope of this finite measure should be in the form of cooperative installation (and design, if necessary) of appropriate signage in the vicinity of this specific canoe portage trail location. Signs, if determined to be appropriate by agencies, may give a clear message warning that nesting sites are to be avoided. However, because of the relatively isolated nature of the current nest site it may be more appropriate to avoid signage that could call attention to the site. Therefore, we recommend that the Commission amend its recommendation so as to require that Erie consult with the Settlement signatories to determine the appropriateness of utilizing signage intended to warn people not to disturb nesting sites so as to avoid impacting bald eagle.

Erie-16 We agree, given the distance of the nests from the proposed portage locations, that consultation with NYSDEC on the necessity of signage would be reasonable.



2. Yellow Lampmussel

The August 5, 1999 USFWS letter recommends that the "environmental documents" pertaining to the Middle and Lower Raquette River Projects include an evaluation of the potential effects of the proposed activities on the yellow lampmussel (*Lampsilis cariosa*). We do not find that the Commission staff completed this requested evaluation in its "environmental documents" (the DMPEA). Instead the Commission staff recommends that this resident the survey recommended by the USFWS as a post license issuance measure. It would seem more logical to conduct the requested yellow lampmussel survey before the preparation of the DMPEA to support the evaluation of the potential project impacts in the DMPEA.

Therefore, in the spirit of cooperation inherent in the Settlement Offer, and to preclude the Commission issuing an open-ended license condition, we have consulted with the NYSDEC and the USFWS and secured their agreement to proceed with the requested yellow lampmussel survey as part of these comments on the DMPEA. Kurt J. Kuhn (Ichthyological Associates, Inc) conducted the survey in July 2000. Mr. Kuhn is highly qualified to conduct this survey as he is co-author of *The yearly records of New York State* (New York State Museum Memoir 24) and he also has an extensive knowledge of the Raquette River based on his work on the Middle and Lower Raquette River Hydroelectric Projects since 1988. Attached hereto, is a report entitled *Status and Distribution of the Yellow Lampmussel, Lampsilis cariosa, in the Vicinity of the Middle and Lower Raquette River Hydroelectric Projects, St. Lawrence County, New York*, Ichthyological Associates, July 2000.

Erie-17

As the attached report indicates, yellow lampmussel was historically documented only from one location on the Raquette River near Potsdam. In July 2000, it was found to occur at 12 locations extending the known distribution of *L. cariosa* in the Raquette River throughout much of the lower river. It is apparent from this survey that yellow lampmussel is more abundant in the Raquette River than previously noted, and self-sustaining populations exist where they had not previously been reported.

Yellow lampmussel inhabit relatively fast, fine substrate (clean sand and gravel) found in runs, riffles, and pools, as the findings of the attached survey affirm. As supported by Instream Flow Incremental Methodology (IFIM) studies filed with the Commission, the minimum flows agreed upon in the Settlement Offer will provide and enhance existing lamp mussel habitat in the Stiger Island bypass reach of the Middle Raquette River Hydroelectric Project. Base flows downstream of Raymondville will constantly wet suitable substrate at numerous locations in a 15 mile reach downstream of the Lower Raquette River Hydroelectric Project. Therefore, we conclude that the Middle and Lower Raquette River Project proposed relicensing alternative, as set forth in the Settlement Offer, will have a positive effect on this species of concern in creating significant enhancement of yellow lampmussel habitat. We recommend that the Commission staff account for these facts in the final Multiple Project Environmental Assessment pertaining to the Middle and Lower Raquette River Projects and delete staff's recommendation to conduct lampmussel surveys after license issuance. The survey has been completed in consultation with the agencies and is being filed with the Commission herewith.

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Erie-17 Please see our response to NYSDEC-6.

DEVELOPMENTAL ANALYSIS/ECONOMICS

The immediate question an uninformed reader of the Commission staff's evaluation of the economics of the proposed licensing alternative for each of the Erie licenses covered in this DMPEA would ask is: "Why did Niagara Mohawk sign a settlement agreement that renders its projects uneconomic?" or more importantly: "Why did Erie purchase the Raquette River hydro projects with assignment of a settlement agreement that renders those projects uneconomic?" The Commission staff's economic analysis is wrought with unrealistic assumptions and errors that creates a false impression that Erie's projects will lose over $2 million per year if modified, relicensed and operated in accordance with the recommended licensing alternative as derived from the Settlement Offer.

The fact is that Erie's own analysis, reflecting more accurate and realistic cost estimates and assumptions, indicates that Erie's Raquette River projects can be modified in accordance with the Settlement Offer and achieve a positive net benefit over the new license period. Our analysis serves to demonstrate the [illegible] of the Commission staff's [illegible] estimates and economic assumptions. However, from experience, we know it is futile to submit our own economic analysis of the projects to attempt to persuade the Commission to amend its analysis.[1] This frustrates Erie as the licensee desiring to have the record documented in the Commission's environmental analysis at least reflect a somewhat accurate evaluation of the economics of the proposed project alternative.

We recognize that the Commission should apply its own independent analysis and assumptions and we do not intend to quarrel over every detailed estimate and assumption the Commission uses. However, we feel it is important to cite some of the more significant corrections the Commission staff should make in its analysis to better reflect reality.

1. Cost Estimates

In the DMPEA, the Commission staff indicates a variety of sources for its cost estimates used in the analysis ranging from the Applicant's Exhibit D numbers (adjusted "through the use of a price inflator") to its own independent unsubstantiated estimates of certain items. The following reflects some cost assumptions that we feel need to be revised.

Erie-18 The Commission staff uses energy values based on reference to an as yet undisclosed Commission staff memorandum dated April 12, 1999 pertaining to the Vischers Ferry Project No. 4679, the Crescent Project No. 4678 and Erie's School Street Project No. 2539. This does little to explain the actual assumptions used in estimating the energy value. With the inception of deregulation of the electric energy industry in New York, Erie will be subject to market based energy pricing. The New York Independent System Operator (NYISO) (See Miscellaneous Comment 1 above) publishes market based energy prices on a daily basis on the NYISO web site

[1] See June 30, 2000 NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT Hoosic River Project No. 2616-004. On page A-70 (PMPC-116) the Commission responded to Niagara Mohawk's proposed alternative financial analysis with: "Your alternative analysis and opinions are noted".

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[illegible]

Erie-18 The Commission analyzed the need for power in the Adirondack region of the NYISO and has used these energy values in all the current relicensing proceeding in this region. We are mindful of the new dynamics of the power market; however, we find that the difference between your estimates and ours would not dramatically change the analysis.

(www.nyiso.com). This NYISO energy pricing data is the appropriate source from which to derive current on peak and off peak energy pricing and cost trends to apply to escalation assumptions. NYISO pricing varies regionally such that pricing in the region where the Crescent, Vischers Ferry and School Street Projects would be inappropriate to apply to hydro projects on the Raquette River. The current energy prices we have determined for the projects on the Raquette River are $29.50/Mwh [mills/kWh] on peak energy (70 hours/week), $21.21/Mwh off peak energy (98 hours/week), and $ 33.75/kW-year ($3.85/Mwh) capacity value

It is not clear how the Commission staff is applying the relicensing cost to its analysis. We're not sure of the pertinence of the past relicensing process cost relative to the Commission staff's economic analysis. Nevertheless, the Commission staff should at least quote somewhat accurate costs for the license applicant to complete the relicensing process. In this case, the arbitrary relicensing cost estimated by Commission staff ($125,000 per development) is greatly

Erie-19 understated. The cost for Carry Falls relicensing is about $400,000, the Upper Raquette relicensing cost is about $1,900,000, the Middle Raquette River relicensing cost is about $4,700,000 and the Lower Raquette River relicensing cost is about $2,500,000. It especially disappointing to note that the Commission staff feels that the cost of relicensing is so low considering that the cost of Commission mandated fish entrainment and mortality studies on the Middle and Lower Raquette River Projects was in excess of $1,100,000 and $1,000,000, respectively, as reported by Niagara Mohawk back in 1995.

The Commission staff applies cost estimates for fish protection at the Upper Raquette Developments (Table 15) based on costs provided in Exhibit D of the application (adjusted to 1999$ through use of a price inflator). However, for the Middle and Lower Raquette

Erie-20 Developments, (Tables 18 and 22) the Commission staff applied an arbitrary $200,000 per development as its cost estimate for fish protection claiming the above referenced Exhibit D costs in the Upper Raquette application as its basis. In the aforementioned fish entrainment and mortality studies filed with the Commission in 1995, costs for 1 inch trashrack fish protection were provided and the Commission staff should have applied these more accurate estimates instead of its arbitrary numbers. The costs from the fish entrainment study reports are summarized below:

Project	Development	Total In-Service Cost
Lower Raquette River (1997$)	Norwood	117,400
	East Norfolk	85,300
	Norfolk	125,400
	Raymondville	115,900
Middle Raquette River (1998$)	Higley	193,000
	Colton	94,900
	Hannawa	202,600
	Sugar Island	not applicable

Erie-21a The annual O&M cost shown for Table 14 pertaining to the Upper Raquette River Project ($1,973,3903,428,145) appears to be a typographical error.

Erie-19 We revised our economic analysis to include your revised costs of relicensing for each project.

Erie-20 We revised our economic analysis to include the estimates included in the fish entrainment report adjusted to 1999$.

Erie-21a This is a typographical error that we have corrected.

Erie-21b

The Commission staff estimates local taxes (Tables 12, 14, 17 and 21) based on estimates shown in Exhibit D of the respective applications (adjusted to 1989$ through use of a price inflator). The fallacy of this approach is that first of all, the Exhibit D numbers in the 1991 applications for the Middle and Lower Raquette are outdated. The Commission staff appears to escalate the Middle and Lower Raquette local tax numbers only one year which would not reflect 1989 dollars. The 1991 application local tax figures in the respective Exhibit D's include added taxes for power enhancement measures that are no longer proposed and Niagara Mohawk used levelized tax estimates accounting for escalation and discounting over the license life. Such local tax estimates do not compare apples-to-apples to the local tax estimates the Commission staff is trying to apply. The current local taxes applicable to the affected hydro developments is tabulated below.

Project	Development	Colon 1989-2080 Taxes		FERC
Carry Falls		240,833	vs.	601,398
	Stark	394,194		
	Blake	477,879		
Upper Raquette	Rainbow	671,662	vs.	$3,405,936
	Five Falls	488,142		
	South Colton	450,048		
TOTAL		$2,481,925		
	Higley	231,097		
Middle Raquette	Colton	879,330	vs.	$2,584,027
	Hannawa	413,257		
	Sugar Island	246,487		
TOTAL		$1,770,214		
	Norwood	94,076		
Lower Raquette	E. Norfolk	105,747	vs.	$1,342,947
	Raymondville	132,970		
	Norfolk	291,820		
TOTAL		$624,613		

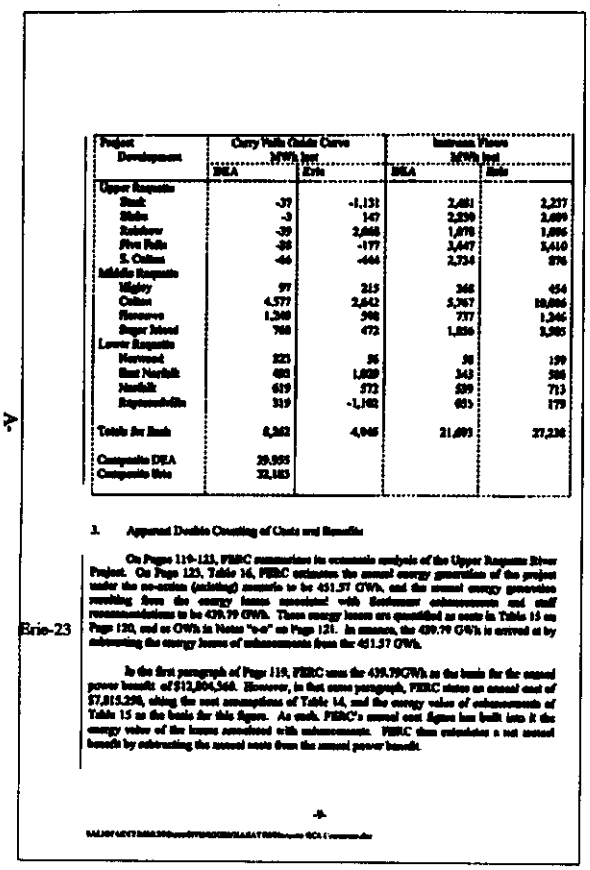
2. Energy Losses

Erie-22

In sketchy foot notes in Tables 15, 18 and 22, the Commission staff indicates its energy loss (or gain) estimates for the effects of the proposed new Carry Falls guide curve and the minimum flows proposed at various sites. These estimates differ significantly from Erie's estimates of the energy effects of these measures as tabulated below:

Erie-21b We revised our economic analysis to include the costs of local taxes that you provided for each project.

Erie-22 We note that our estimates based on data provided in the application are slightly higher or lower.



Project Development	Curry Volls Guide Curve MWh lost		Instream Flows MWh lost	
	DEA	Erie	DEA	Erie
Upper Raquette				
Stark	-37	-1,131	2,481	2,237
Blake	-3	147	2,250	2,089
Rainbow	-39	2,668	1,878	1,896
Five Falls	-88	-177	3,447	3,410
S. Colton	-66	-444	2,734	876
Middle Raquette				
Mighty	97	215	368	454
Colton	4,577	2,642	5,767	10,806
Reservoir	1,240	598	737	1,346
Sugar Island	768	472	1,836	2,505
Lower Raquette				
Norwood	223	36	98	159
East Norfolk	488	1,020	343	508
Norfolk	619	572	539	713
Raquetteville	319	-1,102	953	179
Totals for Each	8,262	4,946	21,693	27,236
Composite DEA	29,955			
Composite Erie	32,183			

3. Apparent Double Counting of Costs and Benefits

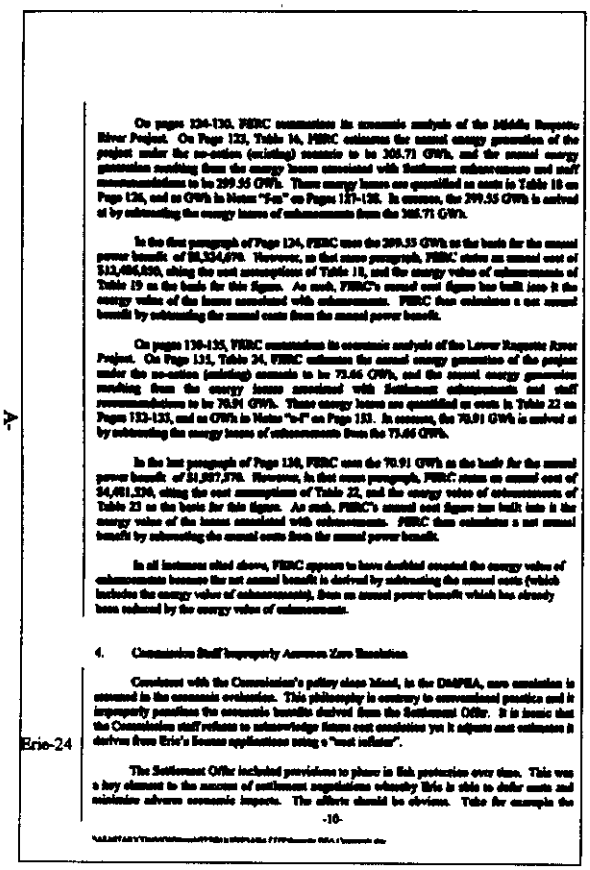
On Pages 119-123, FERC summarizes its economic analysis of the Upper Raquette River Project. On Page 123, Table 16, FERC estimates the annual energy generation of the project under the no-action (existing) scenario to be 451.37 GWh, and the annual energy generation resulting from the energy losses associated with fisheries enhancements and staff recommendations to be 439.79 GWh. These energy losses are quantified as costs in Table 15 on Page 120, and as GWh in Notes "b-e" on Page 121. In essence, the 439.79 GWh is arrived at by subtracting the energy losses of enhancements from the 451.37 GWh.

Erie-23

In the first paragraph of Page 119, FERC uses the 439.79GWh as the basis for the annual power benefit of $12,804,568. However, in that same paragraph, FERC states an annual cost of $7,815,220, citing the cost assumptions of Table 14, and the energy value of enhancements of Table 15 as the basis for this figure. As such, FERC's annual cost figure has built into it the energy value of the losses associated with enhancements. FERC then calculates a net annual benefit by subtracting the annual costs from the annual power benefit.

-A-

Erie-23 We have not double counted the energy value of the enhancements. For example, in table 15 only the guide curve and instream flow items include the cost of lost energy. The rest of the costs are all non-power costs. In table 16, the power benefits include only the loss energy costs associated with the guide curve and the instream flow. The annual costs presented do not include power values.



On pages 124-126, FERC summarizes its economic analysis of the Middle Raquette River Project. On Page 123, Table 34, FERC estimates the annual energy generation of the project under the no-action (existing) scenario to be 205.71 GWh, and the annual energy generation resulting from the energy losses associated with Settlement enhancements and staff recommendations to be 209.55 GWh. These energy losses are quantified as costs in Table 18 on Page 126, and as GWh in Notes "f-m" on Pages 127-128. In essence, the 209.55 GWh is arrived at by subtracting the energy losses of enhancements from the 205.71 GWh.

In the first paragraph of Page 124, FERC uses the 209.55 GWh as the basis for the annual power benefit of $8,334,679. However, in that same paragraph, FERC states an annual cost of $12,486,850, citing the cost assumptions of Table 18, and the energy value of enhancements of Table 19 as the basis for this figure. As such, FERC's annual cost figure has built into it the energy value of the losses associated with enhancements. FERC then calculates a net annual benefit by subtracting the annual costs from the annual power benefit.

On pages 130-135, FERC summarizes its economic analysis of the Lower Raquette River Project. On Page 131, Table 24, FERC estimates the annual energy generation of the project under the no-action (existing) scenario to be 73.66 GWh, and the annual energy generation resulting from the energy losses associated with Settlement enhancements and staff recommendations to be 70.91 GWh. These energy losses are quantified as costs in Table 22 on Pages 132-133, and as GWh in Notes "o-t" on Page 133. In essence, the 70.91 GWh is arrived at by subtracting the energy losses of enhancements from the 73.66 GWh.

In the last paragraph of Page 130, FERC uses the 70.91 GWh as the basis for the annual power benefit of $1,507,570. However, in that same paragraph, FERC states an annual cost of $4,491,330, citing the cost assumptions of Table 22, and the energy value of enhancements of Table 23 as the basis for this figure. As such, FERC's annual cost figure has built into it the energy value of the losses associated with enhancements. FERC then calculates a net annual benefit by subtracting the annual costs from the annual power benefit.

In all instances cited above, FERC appears to have doubled counted the energy value of enhancements because the net annual benefit is derived by subtracting the annual costs (which includes the energy value of enhancements), from an annual power benefit which has already been reduced by the energy value of enhancements.

4. Commission Staff Improperly Assesses Zero Escalation

Consistent with the Commission's policy since blind, in the DAEIA, zero escalation is assumed in the economic evaluation. This philosophy is contrary to conventional practice and it improperly penalizes the economic benefits derived from the Settlement Offer. It is ironic that the Commission staff refuses to acknowledge future cost escalation yet it adjusts cost estimates it derives from Erie's license applications using a "cost inflator".

The Settlement Offer included provisions to phase in fish protection over time. This was a key element to the success of settlement negotiations whereby Erie is able to defer costs and minimize adverse economic impacts. The effects should be obvious. Take for example the

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Erie-24

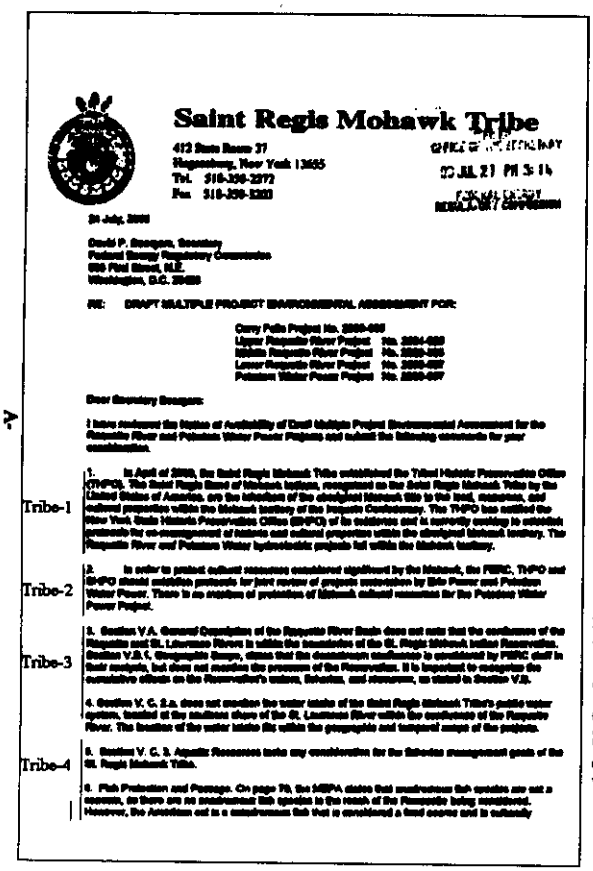
Erie-24 We currently use a model that does not escalates future costs.

estimated 1999 cost of fish protection at the Blake Development ($287,436). Pursuant to the Settlement Offer, Erie will not need to install this measure until at least 2016. Assuming a realistic average escalation rate of 2.5 percent and a discount rate of 10 percent, the present value cost impact of this deferred (2016) measure is only $82,447. The Commission staff's assumption reflects a cost impact over 300 percent higher than the more realistic present value cost impact that the Settlement Offer has achieved in this instance.

5. Conclusion

In recent years, the Commission has actively sought to encourage license applicants and other stakeholders to pursue collaborative licensing processes and to strive to develop comprehensive settlement agreements to ensure that the Commission will analyze in its NEPA analysis a proposed licensing alternative that will reflect an appropriate balance of resource values. Signatories to the Raquette River Settlement Offer concluded good faith negotiations with the understanding that the carefully configured package of non-power resource measures set forth in Settlement Offer would help maintain the economic viability of Erie's hydro projects on the Raquette River. The economic analysis that the Commission staff draws in the DMPEA denies these stakeholders an appropriate record showing that the give and take negotiating process achieved that goal.

Finally, given the shortcomings we have witnessed in this and prior economic analyses conducted by Commission staff, we question why the Commission even bothers to include in its environmental analyses such economic evaluations other than to claim it complied with some obligation to look at economics pursuant to NEPA. The analysis obviously has no bearing on its decision to adopt license conditions. If the Commission believes its own statement: "We conclude that two of the projects, as proposed by Erie, would cost more than currently available alternative power" (DMPEA page 137), then it is incredible how the Commission can legitimately conclude (DMPEA page 138) "that the licensing of the projects as proposed by Erie and the agencies, with the addition of staff-recommended measures, would provide for the best comprehensive use of the Raquette River".



Saint Regis Mohawk Tribe

412 State Route 37
Hogansburg, New York 13655
Tel. 518-358-2272
Fax 518-358-3203

OFFICE OF THE SECRETARY
00 JUL 21 PM 3:14
FEDERAL ENERGY REGULATORY COMMISSION

24 July, 2000

David P. Boergers, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: DRAFT MULTIPLE PROJECT ENVIRONMENTAL ASSESSMENT FOR:

Carry Falls Project No. 2699-000
Upper Raquette River Project No. 2904-000
Middle Raquette River Project No. 2905-000
Lower Raquette River Project No. 2906-000
Potsdam Water Power Project No. 2898-007

Dear Secretary Boergers:

I have reviewed the Notice of Availability of Draft Multiple Project Environmental Assessment for the Raquette River and Potsdam Water Power Projects and submit the following comments for your consideration.

Tribe-1 1. In April of 2000, the Saint Regis Mohawk Tribe established the Tribal Historic Preservation Office (THPO). The Saint Regis Band of Mohawk Indians, recognized as the Saint Regis Mohawk Tribe by the United States of America, are the inheritors of the aboriginal Mohawk title to the land, resources, and cultural properties within the Mohawk territory of the Iroquois Confederacy. The THPO has notified the New York State Historic Preservation Office (SHPO) of its existence and is currently working to establish protocols for co-management of historic and cultural properties within the aboriginal Mohawk territory. The Raquette River and Potsdam Water hydroelectric projects fall within the Mohawk territory.

Tribe-2 2. In order to protect cultural resources considered significant by the Mohawk, the FERC, THPO and SHPO should establish protocols for joint review of projects undertaken by Erie Power and Potsdam Water Power. There is no mention of protection of Mohawk cultural resources for the Potsdam Water Power Project.

Tribe-3 3. Section V.A. General Description of the Raquette River Basin does not note that the confluence of the Raquette and St. Lawrence Rivers is within the boundaries of the St. Regis Mohawk Indian Reservation. Section V.B.1. Geographic Scope, states that the downstream confluence is considered by FERC staff in their analysis, but does not mention the presence of the Reservation. It is important to recognize the cumulative effects on the Reservation's culture, fisheries, and resources, as stated in Section V.B.

4. Section V. C. 2.a. does not mention the water intake of the Saint Regis Mohawk Tribe's public water system, located at the southern shore of the St. Lawrence River within the confluence of the Raquette River. The location of the water intake fits within the geographic and temporal scope of the projects.

Tribe-4 5. Section V. C. 3. Aquatic Resources lacks any consideration for the fisheries management goals of the St. Regis Mohawk Tribe.

6. Fish Protection and Passage. On page 70, the MEPA states that anadromous fish species are not a concern, as there are no anadromous fish species in the reach of the Raquette being considered. However, the American eel is a catadromous fish that is considered a food source and is culturally

-V-

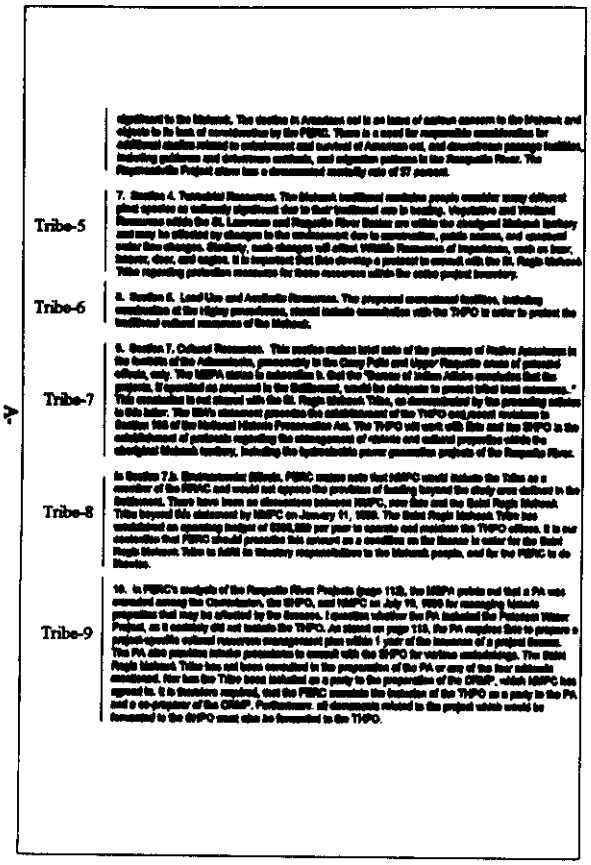
Staff Responses to Comments of
the Saint Regis Mohawk Tribe
on the Draft Environmental Assessment for the
Raquette River Projects
July 24, 2000

Tribe-1 Consultation with the THPO concerning undertakings that may affect National Register listed or eligible properties, that are located off Tribal lands, and to which the Tribe may attach religious and cultural significance, must proceed in strict accordance with Section 106 of the NHPA, and consistent with 36 CFR Part 800, as these authorities have been interpreted in the July 1996 PA.

Tribe-2 No properties of cultural or religious significance to the Tribe were identified within the Potsdam Project's area of potential effect.

Tribe-3 We added language to section V.A that the Raquette River forms the northwestern boundary of the reservation at the confluence with the St. Lawrence River.

Tribe-4 The American eel was considered in fish population and entrainment studies conducted during relicensing and we have added language to section V.C.3.a the EA. We also added our analysis of the effects of project operations on downstream eel movement to section V.C.3.b.



Tribe-5

Tribe-6

Tribe-7

Tribe-8

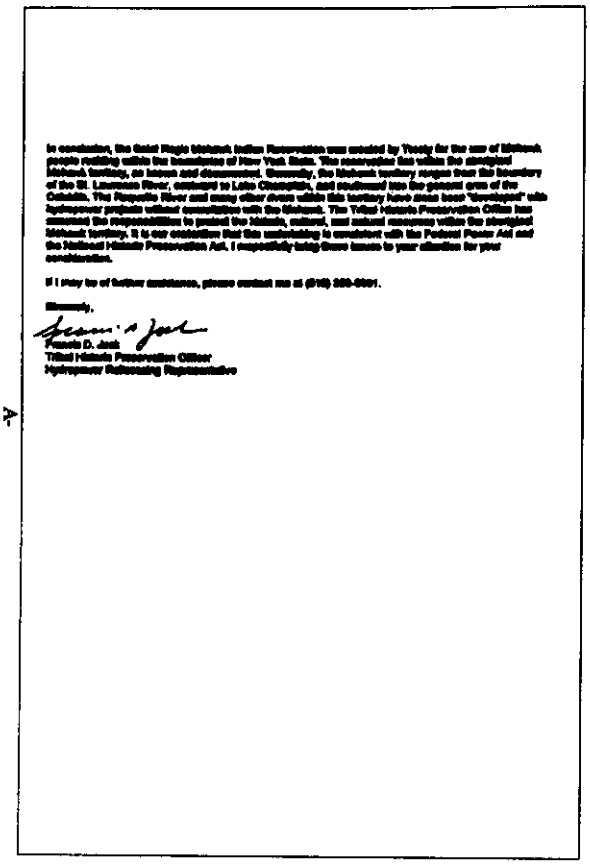
Tribe-9

Tribe-5 Our analysis indicates that reductions in fluctuation and increase in flows to the bypassed reach at each reservoir with the exception of Colton, which will increase by 0.1 foot, would benefit terrestrial resources. Furthermore, no National Register eligible properties, that are located off Tribal lands, and to which the Tribe may attach religious or cultural significance, have been identified in the Project's APE. If, in the future, such properties are identified, the July 1996 PA, which requires the licensee to include in the CRMP "principles and procedures to address…discovery of previously unidentified Historic Properties during project operations", would afford such properties the same reasonable degree of protection that is afforded identified properties.

Tribe-6 In its January 11, 1999, letter, Erie proposes (a) to consult with the Tribe on activities that may result in ground disturbance to ensure the reasonable protection of Historic Properties that are located off Tribal lands, and to which the Tribe attaches religious or cultural significance, and (b) to include the Tribe both as a member of the RRAC and as a reviewing party of the four appendices that will be added to the existing PA as required by the existing PA (please see stipulation II.D of the PA). While the existing PA does not mention the St. Regis Mohawk Tribe, the BIA, or the RRAC; several of its stipulations require consultation with "interested persons." To ensure that Erie consults with these parties, we will indicate clearly at the beginning of the appendix to the PA that they are "interested parties" within the meaning ascribed to this term in the July 1996 PA

Tribe-7 You did not file any clarification of BIA's opinion, and, therefore, it was reasonable for us to conclude that you shared this view.

Tribe-8 and Tribe 9 - See next page.



In conclusion, the Saint Regis Mohawk Indian Reservation was created by Treaty for the use of Mohawk people residing within the boundaries of New York State. The reservation lies within the aboriginal Mohawk territory, as known and documented. Currently, the Mohawk territory ranges from the boundary of the St. Lawrence River, contiguous to Lake Champlain, and southward into the general area of the Catskills. The Raquette River and many other rivers within this territory have since been "developed" with hydropower projects without consultation with the Mohawk. The Tribal Historic Preservation Office has assumed the responsibilities to protect the historic, cultural, and natural resources within the aboriginal Mohawk territory. It is our contention that this undertaking is consistent with the Federal Power Act and the National Historic Preservation Act. I respectfully bring these issues to your attention for your consideration.

If I may be of further assistance, please contact me at (518) 358-2321.

Sincerely,

Francis D. Jock
Tribal Historic Preservation Officer
Hydropower Relicensing Representative

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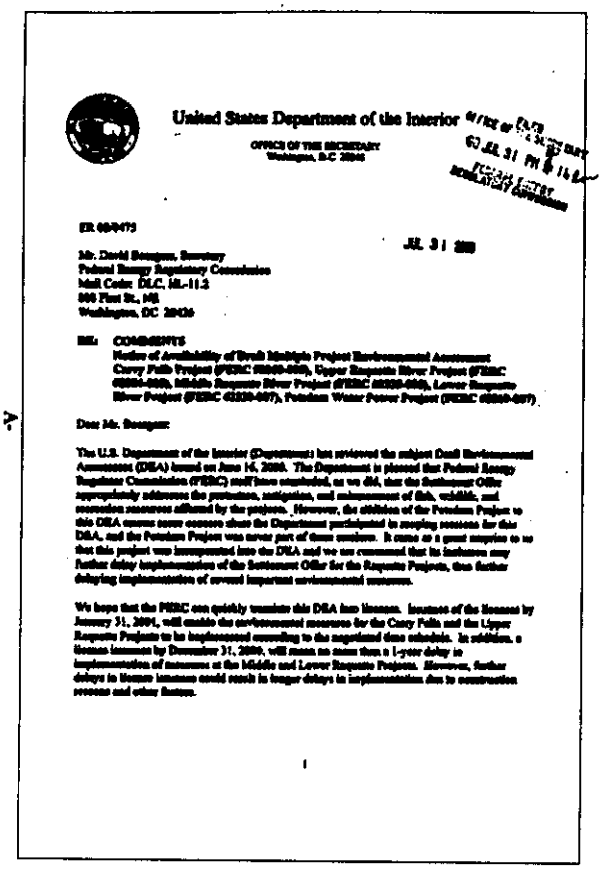
Tribe-8 Our analysis does not disclose any adverse effects on Tribal resources on the reservation or to properties of cultural or religious significance off the Tribal lands.

Tribe-9 The July 1996 PA does not include the Potsdam Project. Furthermore, since the Potsdam Project is, based on the record of that proceeding, deemed to pose no adverse effect on National Register eligible properties provided that the licensee submits design drawings to the SHPO and uses compatible building materials, the Potsdam Project needs no PA. See 36 CFR Part 800.6. Needed would be a condition upon which any amendment that is approved for the Potsdam Project, that the licensee consult with the St. Regis Mohawk Tribe concerning any planned construction or ground-disturbance that may affect such properties, and concerning any such properties that are encountered in the future that are as yet undiscovered. The PA was executed in accordance with the regulations in effect in July 1996. Those regulations did not require the inclusion of the THPO in consultations either in the development of the PA or in the development of the CRMPs in accordance with the PA. However, the interests of the St. Regis Mohawk Tribe can now be represented under the existing PA, in the preparation of both the Appendix to the PA and the CRMP, as those of an "interested person." Please see our response to Tribe-6.



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

ER 00/0475

JUL 31 2000

Mr. David Boergers, Secretary
Federal Energy Regulatory Commission
Mail Code: DLC, HL-11.3
888 First St., NE
Washington, DC 20426

RE: COMMENTS
Notice of Availability of Draft Multiple Project Environmental Assessment
Carey Falls Project (FERC #2830-000), Upper Raquette River Project (FERC #2826-000), Middle Raquette River Project (FERC #2828-000), Lower Raquette River Project (FERC #2830-000), Potsdam Water Power Project (FERC #2869-000)

Dear Mr. Boergers:

The U.S. Department of the Interior (Department) has reviewed the subject Draft Environmental Assessment (DEA) issued on June 14, 2000. The Department is pleased that Federal Energy Regulatory Commission (FERC) staff have concluded, as we did, that the Settlement Offer appropriately addresses the protection, mitigation, and enhancement of fish, wildlife, and recreation resources affected by the projects. However, the addition of the Potsdam Project to this DEA causes some concern about the Department participated in scoping sessions for this DEA, and the Potsdam Project was never part of those sessions. It came as a great surprise to us that this project was incorporated into the DEA and we are concerned that its inclusion may further delay implementation of the Settlement Offer for the Raquette Projects, thus further delaying implementation of several important environmental measures.

We hope that the FERC can quickly translate this DEA into licenses. Issuance of the licenses by January 31, 2001, will enable the environmental measures for the Carey Falls and the Upper Raquette Projects to be implemented according to the negotiated time schedule. In addition, a license issuance by December 31, 2000, will mean no more than a 1-year delay in implementation of measures at the Middle and Lower Raquette Projects. However, further delays in license issuance could result in longer delays in implementation due to construction seasons and other factors.

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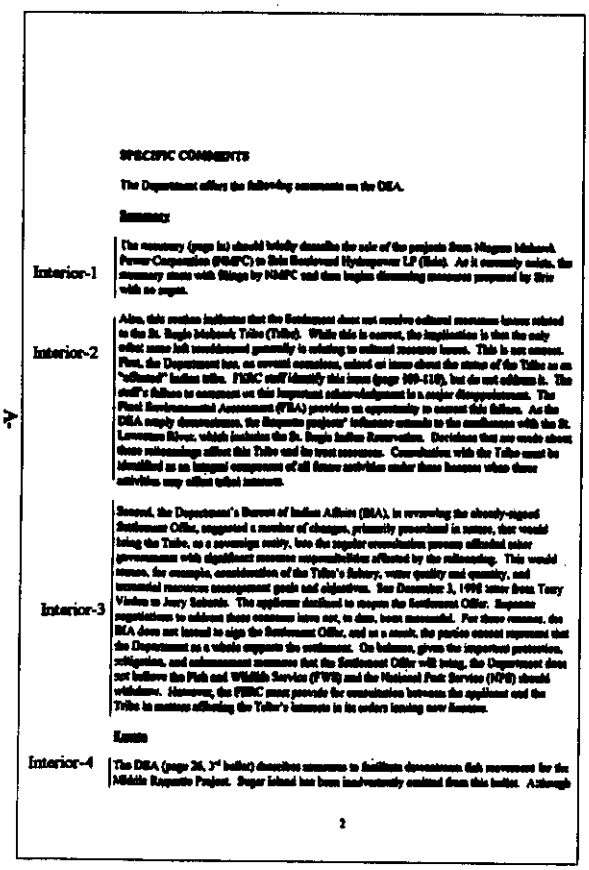
Staff Responses to Comments of
U.S. Department of the Interior
on the Draft Environmental Assessment for the
Raquette River Projects
July 31, 2000



SPECIFIC COMMENTS

The Department offers the following comments on the DEA.

Summary

Interior-1 The summary (page ix) should briefly describe the sale of the projects from Niagara Mohawk Power Corporation (NMPC) to Erie Boulevard Hydropower LP (Erie). As it currently exists, the summary starts with filings by NMPC and then begins discussing measures proposed by Erie with no segue.

Interior-2 Also, this section indicates that the Settlement does not resolve cultural resources issues related to the St. Regis Mohawk Tribe (Tribe). While this is correct, the implication is that the only other issue left unaddressed generally is relating to cultural resource issues. This is not correct. First, the Department has, on several occasions, raised an issue about the status of the Tribe as an "affected" Indian tribe. FERC staff identify this issue (page 108-110), but do not address it. The staff's failure to comment on this important acknowledgement is a major disappointment. The Final Environmental Assessment (FEA) provides an opportunity to correct this failure. As the DEA amply demonstrates, the Raquette projects' influence extends to the confluence with the St. Lawrence River, which includes the St. Regis Indian Reservation. Decisions that are made about these relicensings affect this Tribe and its trust resources. Consultation with the Tribe must be identified as an integral component of all future activities under these licenses when these activities may affect tribal interests.

Interior-3 Second, the Department's Bureau of Indian Affairs (BIA), in reviewing the already-signed Settlement Offer, suggested a number of changes, primarily procedural in nature, that would bring the Tribe, as a sovereign entity, into the regular consultation process afforded other governments with significant resource responsibilities affected by the relicensing. This would ensure, for example, consideration of the Tribe's fishery, water quality and quantity, and terrestrial resource management goals and objectives. See December 3, 1998 letter from Terry Virden to Jerry Sabattis. The applicants declined to reopen the Settlement Offer. Separate negotiations to address these concerns have not, to date, been successful. For these reasons, the BIA does not intend to sign the Settlement Offer, and as a result, the parties cannot represent that the Department as a whole supports the settlement. On balance, given the important protection, mitigation, and enhancement measures that the Settlement Offer will bring, the Department does not believe the Fish and Wildlife Service (FWS) and the National Park Service (NPS) should withdraw. However, the FERC must provide for consultation between the applicant and the Tribe in matters affecting the Tribe's interests in its orders issuing new licenses.

Issues

Interior-4 The DEA (page 26, 3rd bullet) describes measures to facilitate downstream fish movement for the Middle Raquette Project. Sugar Island has been inadvertently omitted from this bullet. Although

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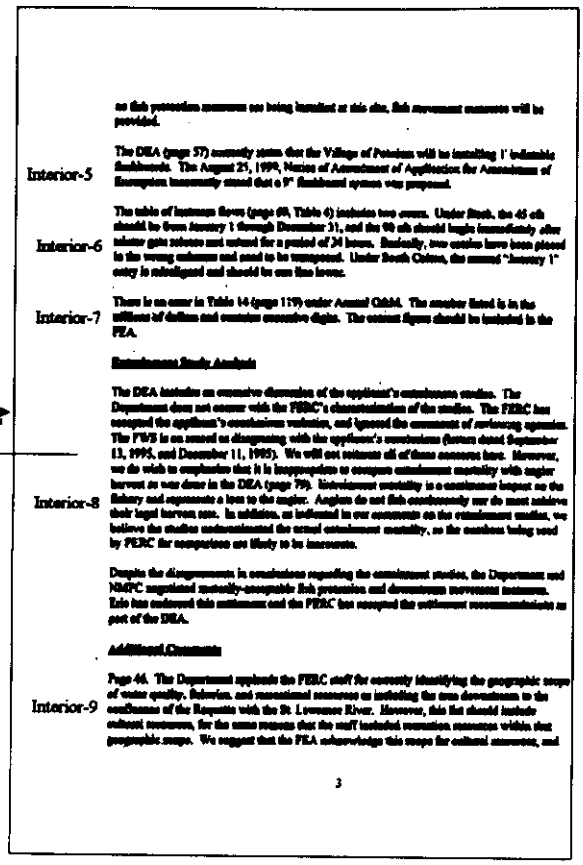
Interior-1 In footnote 1, we note that the projects were transferred from NMPC to Erie on July 26, 1999. NMPC filed the applications for the Middle and Lower Raquette River Projects whereas Erie filed the applications for the Carry Falls and Upper Raquette River Projects. We cite NMPC where it was responsible for activities prior to July 1999, and Erie for its activities subsequent to July 1999.

Interior-2 We have not identified the St. Regis Mohawk Tribe as an affected Indian Tribe in the MPEA because the reservation is located 20 miles downstream of the Lower Raquette River Project and the EA concludes that the proposed baseflow below Raymondville would enhance the downstream water quality and aquatic resources. Please see our response to Tribe-6.

Interior-3 Despite numerous opportunities to provide comments in these proceedings, the Tribe has not provided information on its fishery, water quality, or terrestrial management goals to Erie or to the Commission.

Interior-4 We note the 300 cfs through the minimum flow pipe in the first bullet in this section. The fifth bullet pertains only to modifications of the conveyance and collection systems, and no such modification is proposed at Sugar Island.



fish protection measures are being installed at this site, fish movement measures will be provided.

Interior-5 The DEA (page 57) currently states that the Village of Potsdam will be installing 1' inflatable flashboards. The August 25, 1999, Notice of Amendment of Application for Amendment of Exemption incorrectly stated that a 9" flashboard system was proposed.

Interior-6 The table of instream flows (page 60, Table 4) includes two errors. Under Stark, the 45 cfs should be from January 1 through December 31, and the 90 cfs should begin immediately after intake gate closure and extend for a period of 24 hours. Similarly, two entries have been placed in the wrong columns and need to be transposed. Under South Colton, the unused "January 1" entry is misaligned and should be one line lower.

Interior-7 There is an error in Table 14 (page 119) under Annual O&M. The number listed is in the millions of dollars and contains extraneous digits. The correct figure should be included in the FEA.

Entrainment Study Analysis

Interior-8 The DEA includes an extensive discussion of the applicant's entrainment studies. The Department does not concur with the FERC's characterization of the studies. The FERC has accepted the applicant's conclusions verbatim, and ignored the comments of reviewing agencies. The FWS is on record as disagreeing with the applicant's conclusions (letters dated September 13, 1995, and December 11, 1995). We will not reiterate all of those comments here. However, we do wish to emphasize that it is inappropriate to compare entrainment mortality with angler harvest as was done in the DEA (page 79). Entrainment mortality is a continuous impact on the fishery and represents a loss to the angler. Anglers do not fish continuously nor do most achieve their legal harvest rate. In addition, as indicated in our comments on the entrainment studies, we believe the studies underestimated the actual entrainment mortality, so the numbers being used by FERC for comparison are likely to be inaccurate.

Despite the disagreements in conclusions regarding the entrainment studies, the Department and NMFC negotiated mutually-acceptable fish protection and downstream movement measures. This has endorsed this settlement and the FERC has accepted the settlement recommendations as part of the DEA.

Additional Comments

Interior-9 Page 44. The Department applauds the FERC staff for correctly identifying the geographic scope of water quality, fisheries, and recreational resources as including the area downstream to the confluence of the Raquette with the St. Lawrence River. However, this list should include cultural resources, for the same reasons that the staff included recreation resources within that geographic scope. We suggest that the FEA acknowledge this scope for cultural resources, and

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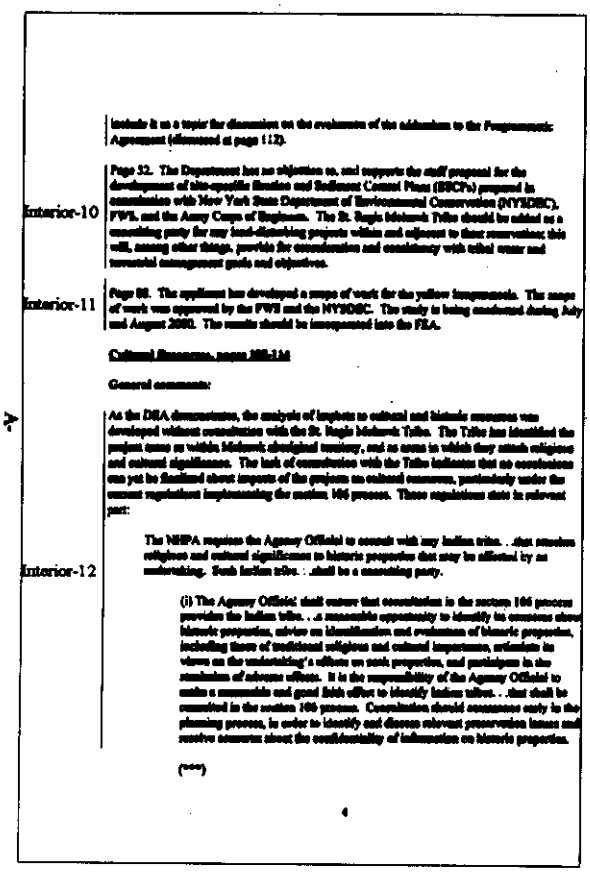
Interior-5 The August 25, 1999, letter states that the rubber dam would inflate about 4 inches. Analysis of the supplemental backwater study led Potsdam to propose a 1-foot rubber dam because this height offers the least variation from existing conditions.

Interior-6 We made these corrections to table 4.

Interior-7 We corrected this error in table 14.

Interior-8 We acknowledge that the entrainment and mortality studies were less than ideal. We continue to conclude, however, based on these studies, that entrainment and mortality are not a significant problem at these projects. We find that the modest fish protection and downstream movement measures are reasonable. However, we modified the text in section V.C.3 to delete the reference to angler harvest.

Interior-9 The geographic scope of analysis for cultural resources (which, unlike water, fish, and water users, are typically location-specific) for these projects has been determined in accordance with the definition of "Area of Potential Effects" found at 36 CFR Part 800.16(d). A rigorous application of this definition to these projects results in the exclusion from the APE, and therefore from the geographic scope of analysis, the area downstream of the projects to the confluence of the Raquette and St. Lawrence Rivers.



include it as a topic for discussion on the evaluation of the addendum to the Programmatic Agreement (discussed at page 112).

Interior-10 Page 52. The Department has no objection to, and supports the staff proposal for the development of site-specific Erosion and Sediment Control Plans (ESCPs) prepared in consultation with New York State Department of Environmental Conservation (NYSDEC), FWS, and the Army Corps of Engineers. The St. Regis Mohawk Tribe should be added as a consulting party for any land-disturbing projects within and adjacent to their reservation; this will, among other things, provide for consideration and consistency with tribal water and terrestrial management goals and objectives.

Interior-11 Page 88. The applicant has developed a scope of work for the yellow loosestrife. The scope of work was approved by the FWS and the NYSDEC. The study is being conducted during July and August 2000. The results should be incorporated into the FEA.

Cultural Resources, pages 108-114

General comments:

Interior-12 As the DEA demonstrates, the analysis of impacts to cultural and historic resources was developed without consultation with the St. Regis Mohawk Tribe. The Tribe has identified the project areas as within Mohawk aboriginal territory, and as areas in which they attach religious and cultural significance. The lack of consultation with the Tribe indicates that no conclusions can yet be finalized about impacts of the projects on cultural resources, particularly under the current regulations implementing the section 106 process. These regulations state in relevant part:

> The NHPA requires the Agency Official to consult with any Indian tribe. . .that considers religious and cultural significance to historic properties that may be affected by an undertaking. Such Indian tribe. . .shall be a consulting party.
>
> (i) The Agency Official shall ensure that consultation in the section 106 process provides the Indian tribe. . .a reasonable opportunity to identify its concerns about historic properties, advise on identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects. It is the responsibility of the Agency Official to make a reasonable and good faith effort to identify Indian tribes. . .that shall be consulted in the section 106 process. Consultation should commence early in the planning process, in order to identify and discuss relevant preservation issues and resolve concerns about the confidentiality of information on historic properties.
>
> (***)

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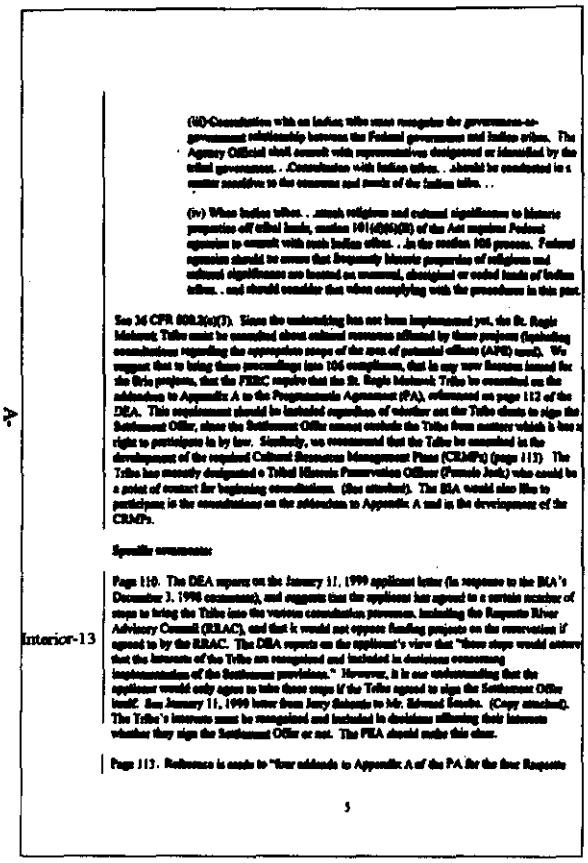
Interior-10 We agree and have revised section V.C.1 of the MPEA to include the St. Regis Mohawk Tribe as a party to be consulted in the development of any site-specific ESCP involving land within or adjacent to the reservation.

Interior-11 Please see our response to NYSDEC-6.

Interior-12 Please see our responses to Tribe-6.



(iii) Consultation with an Indian tribe must recognize the government-to-government relationship between the Federal government and Indian tribes. The Agency Official shall consult with representatives designated or identified by the tribal governments. . .Consultation with Indian tribes. . .should be conducted in a manner sensitive to the concerns and needs of the Indian tribe. . .

(iv) When Indian tribes. . .attach religious and cultural significance to historic properties off tribal lands, section 101(d)(6)(B) of the Act requires Federal agencies to consult with such Indian tribes. . .in the section 106 process. Federal agencies should be aware that frequently historic properties of religious and cultural significance are located on ancestral, aboriginal or ceded lands of Indian tribes. . .and should consider that when complying with the procedures in this part.

See 36 CFR 800.2(c)(2). Since the undertaking has not been implemented yet, the St. Regis Mohawk Tribe must be consulted about cultural resources affected by these projects (including considerations regarding the appropriate scope of the area of potential effects (APE) used). We suggest that to bring these proceedings into 106 compliance, that in any new licenses issued for the Erie projects, that the FERC require that the St. Regis Mohawk Tribe be consulted on the addendum to Appendix A to the Programmatic Agreement (PA), referenced on page 112 of the DEA. This requirement should be included regardless of whether nor the Tribe elects to sign the Settlement Offer, since the Settlement Offer cannot overlook the Tribe from matters which it has a right to participate in by law. Similarly, we recommend that the Tribe be consulted in the development of the required Cultural Resources Management Plans (CRMPs) (page 113). The Tribe has recently designated a Tribal Historic Preservation Officer (Pamela Jock) who could be a point of contact for beginning consultations. (See attached). The BIA would also like to participate in the consultations on the addendum to Appendix A and in the development of the CRMPs.

Specific comments:

Page 110. The DEA reports on the January 11, 1999 applicant letter (in response to the BIA's December 3, 1998 comments), and suggests that the applicant has agreed to a certain number of steps to bring the Tribe into the various consultation processes, including the Raquette River Advisory Council (RRAC), and that it would not oppose funding projects on the reservation if agreed to by the RRAC. The DEA reports on the applicant's view that "these steps would ensure that the interests of the Tribe are recognized and included in decisions concerning implementation of the Settlement provisions." However, it is our understanding that the applicant would only agree to take these steps if the Tribe agreed to sign the Settlement Offer itself. See January 11, 1999 letter from Jerry Sabattis to Mr. Edward Sondra. (Copy attached). The Tribe's interests must be recognized and included in decisions affecting their interests whether they sign the Settlement Offer or not. The FEA should make this clear.

Page 113. Reference is made to "four addenda to Appendix A of the PA for the four Requests

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Interior-13

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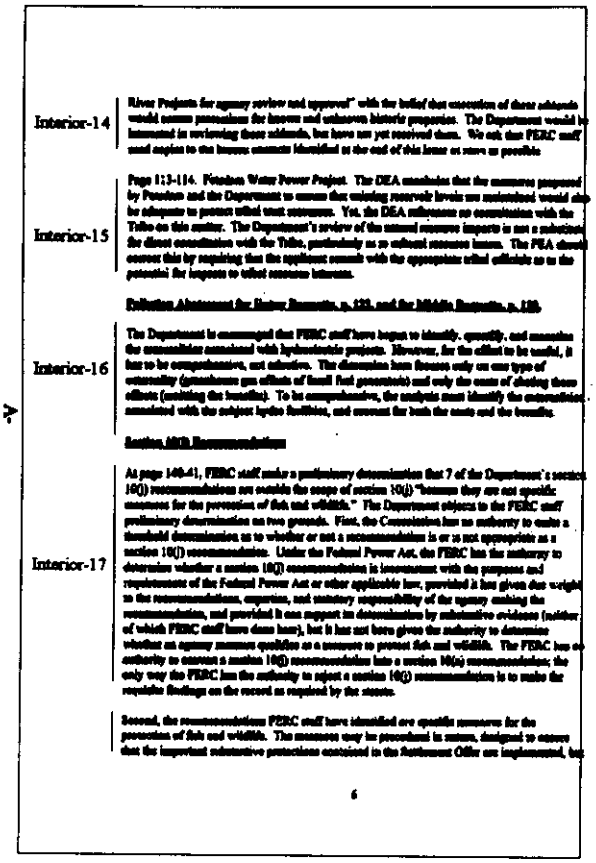
Interior-13 Please see our response to Tribe-6. You are correct in stating that Erie has offered to extend the geographic limits of funding decisions if the St. Regis Mohawk Tribe were to sign the SA and become a member of the RRAC. The EA is correct as written.



Interior-14 These addenda have not been distributed for review as yet. We will provide review copies to both BIA and the Tribe.

Interior-15 Please see our response to Tribe-9.

Interior-16 You provide no specifics on the externalities associated with hydropower projects that you believe should be analyzed in this MPEA.

Interior-17 We will address the question of our authority to find recommendations outside the scope of Section 10(j) in any license issued for these projects.

Interior-18 procedural measures are no less important to the protection of fish and wildlife resources as the associated substantive measures, and nothing in the Federal Power Act provides the FERC staff with a basis to make such a distinction. Moreover, the section 10(j) recommendations requiring that the Department be consulted prior to requests for extensions of time are made necessary by FERC decisions. FERC has decided that in order for the Department to be consulted on extensions of time which the Department considers important to the substance of the requirement, then the Department must request to be consulted as a part of the recommendation or terms and conditions. *See* Bangor Hydro-Electric Co., 87 FERC ¶ 61,035 (1999)(footnote 6), and City of Tacoma, Washington, 89 FERC ¶ 61,058(1999)(footnote 9). Thus, the Department cannot be faulted for responding to the specific decisions of FERC on this issue of extensions.

Again, if the FERC intends to reject the Department's section 10(j) recommendations, it must do so by making a finding on the record, with substantial supporting evidence, that such procedural recommendations are inconsistent with the purposes of the Federal Power Act or other applicable provision of law, and that the FERC conditions selected will protect fish and wildlife. There is no other means for removing or modifying the section 10(j) recommendations.

* * * * *

The Department appreciates the opportunity to provide comments on the DEA and looks forward to a quick turnaround on license issuance to ensure timely implementation of the negotiated environmental protection, mitigation, and enhancement measures. However, the Department remains concerned about the lack of consultation with the Tribe, and strongly urges the FERC staff to address in the FEA a process for appropriate consultation concerning tribal interests relating to the projects.

If you have any questions or need additional information, contact Mellie Pattison of the Bureau of Indian Affairs, at (202) 208-4043, or Steve Patch of the Fish and Wildlife Service at (607) 753-9334.

Sincerely,

Willie R. Taylor

Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

Attachments

cc:
Raquette River Service Lists
Potsdam Service List
REO, Boston

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A-

Interior-18 The measures you discuss are not consistent with the provisions of the Settlement. Nor do we determine that they fall within the scope of Section 10(j).

PLEASE NOTE:

Appendix A is available on hard copies of the FEA and may be viewed at www.ferc.fed.us/online/RIMS.htm. For assistance, please call (202) 208-2222.