FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426
March 7, 2019

OFFICE OF ENERGY PROJECTS

Project No. 2701-059 – New York
West Canada Creek Hydroelectric Project
Erie Boulevard Hydropower, L.P.

Mr. Steven Murphy, Director of Licensing
Brookfield Renewable
33 West 1st Street South
Fulton, NY 13069

Reference: Study Plan Determination for the West Canada Creek Hydroelectric Project

Dear Mr. Murphy:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for the West Canada Creek Hydroelectric Project (West Canada Creek Project) located on West Canada Creek, a tributary of the Mohawk River, in the counties of Oneida and Herkimer, New York. The determination is based on the study criteria set forth in section 5.9(b) of the Commission's regulations, applicable law, Commission policy and practice, and the record of information.

Background

On August 13, 2018, the Commission issued a Scoping Document that included a process plan and schedule for pre-filing milestones. On the same date, Erie Boulevard Hydropower, L.P. (Erie) filed its proposed plan for seven studies covering water quality, aquatic habitat and fishery resources, recreation resources, and aesthetics in support of its intent to relicense the project.

Erie held its initial Study Plan Meeting on September 11, 2018. Comments on the Proposed Study Plan (PSP) were filed by Commission staff, the U.S. Fish and Wildlife Service (FWS), the New York State Department of Environmental Conservation (New York DEC), American Whitewater (AW), the New York State Council of Trout Unlimited, and Blake Bellinger on behalf of the Citizens for Hinckley Lake (Citizens for Hinckley).

On December 11, 2018, Erie filed a Revised Study Plan (RSP) that includes revisions to seven studies included in the PSP and two new studies, *Fish Assemblage Assessment* and *Whitewater Boating Flow and Access Study*. Comments on the RSP were filed by FWS, New York DEC, and AW. AW and New York DEC filed comments on the RSP by December 26, 2018, in accordance with the process plan and schedule in Scoping Document 2. Due to the funding lapse at certain federal agencies between December 22, 2018, and January 25, 2019, FWS filed its comments on February 6, 2019. As such, a revised process plan and schedule is included in Appendix B.

General Comments

Some comments received were not filed in regards to the RSP or do not directly address study plan issues. These include comments from the Citizens for Hinckley Lake regarding the management of water levels in Hinckley Lake, the reservoir for the Gregory B. Jarvis Hydroelectric Project No. 3211 (Jarvis Project), operated by the New York Power Authority (NYPA). This determination does not address all comments, but rather addresses comments specific to the merits of the proposed studies submitted pursuant to section 5.13 of the Commission's regulations and comments received thereon.

Clarification of Jarvis Project Effects

New York DEC requests that FERC clarify which entity, NYPA or Erie, is responsible for influencing flows downstream of the West Canada Creek Project. To clarify, operation of the Jarvis Project and operation of the West Canada Creek Project can affect flow in the lower reach of West Canada Creek. As described in the Scoping Document, issued August 13, 2018, staff will use information from both projects to evaluate cumulative effects on flow in West Canada Creek. Commission staff will evaluate the direct effects of water level changes in Hinckley Lake as part of its environmental analysis for the Jarvis Project relicensing.

Study Plan Determination

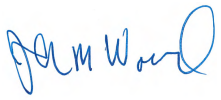
Erie's RSP is approved with the staff-recommended modifications discussed in Appendix C. As indicated in Appendix A, of the nine studies proposed by Erie, eight are approved with staff-recommended modifications and one is approved as filed by Erie. This determination also addresses two additional studies requested by stakeholders, not adopted by Erie, and not required by this determination (see Appendix A). In Appendix C, we explain the specific modifications to the study plan and the bases for modifying, adopting, or not adopting requested studies. Although Commission staff considered all study plan criteria in section 5.9 of the Commission's regulations, staff only reference the specific study criteria that are particularly relevant to the determination.

Studies for which no issues were raised in comments on the RSP are not discussed in this determination. Unless otherwise indicated, all components of the approved studies not modified in this determination must be completed as described in Erie's RSP. Pursuant to section 5.15(c)(1) of the Commission's regulations, the initial study report for all studies in the approved study plan must be filed by January 10, 2020.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. In addition, Erie may choose to conduct any study not specifically required herein that it feels would add pertinent information to the record.

If you have any questions, please contact Emily Carter at emily.carter@ferc.gov or (202) 502-6512.

Sincerely,



for
Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of studies subject to this determination
Appendix B – Revised Process Plan and Schedule
Appendix C – Staff's recommendations on proposed and requested studies

APPENDIX A

SUMMARY OF DETERMINATIONS ON PROPOSED AND REQUESTED STUDY MODIFICATIONS AND STUDIES REQUESTED BUT NOT ADOPTED BY ERIE

Study	Recommending Entity	Approved	Approved with Modifications	Not Required
Aquatic Mesohabitat Assessment	Erie, FWS, New York DEC		X	
Macroinvertebrate and Freshwater Mussel Surveys	Erie, FWS, New York DEC		X	
Impoundment Shoreline Characterization Study	Erie, FWS	X		
Fish Assemblage Assessment	Erie, FWS, New York DEC		X	
Fish Entrainment and Turbine Passage Survival Assessment	Erie, FWS, New York DEC		X	
Water Quality Study	Erie, FWS, New York DEC		X	
Recreation Use, Needs, and Access Study	Erie, AW		X	
Whitewater Boating Flow and Access Study	Erie, AW		X	
Aesthetics Flow Assessment	Erie, AW		X	
Baseflow Study	FWS, NYDEC			X
Minimum Bypassed Reach Flow Study	FWS, NYDEC			X

Appendix B

REVISED PROCESS PLAN AND SCHEDULE

The process plan and schedule include a list of pre-filing milestones, but do not include all post-filing milestones that will be needed to process the final license application. Shaded milestones are unnecessary if there are no study disputes. If the due date falls on a weekend or holiday, the due date is the following business day. Early filings or issuances will not result in changes to these deadlines.

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
FERC	Issue Director's Study Plan Determination	3/7/19	5.13(c)
Mandatory Conditioning Agencies	File Any Study Disputes	3/27/19	5.14(a)
Dispute Panel	Select Third Dispute Resolution Panel Member	4/9/19	5.14(d)
Dispute Panel	Convene Dispute Resolution Panel	4/16/19	5.14(d)(3)
Erie	File Comments on Study Disputes	4/21/19	5.14(i)
Dispute Panel	Dispute Resolution Panel Technical Conference	5/2/19	5.14(j)
Dispute Panel	Issue Dispute Resolution Panel Findings	5/16/19	5.14(k)
FERC	Issue Director's Study Dispute Determination	6/05/19	5.14(l)
Erie	First Study Season	Spring – Fall 2019	5.15(a)
Erie	File Initial Study Report	1/10/20	5.15(c)(1)
All Stakeholders	Initial Study Report Meeting	1/25/20	5.15(c)(2)
Erie	File Initial Study Report Meeting Summary	2/9/20	5.15(c)(3)
All Stakeholders	File Disagreements/Requests to Amend Study Plan	3/10/20	5.15(c)(4)

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
All Stakeholders	File Responses to Disagreements/Amendment Requests	4/9/20	5.15(c)(5)
FERC	Issue Director's Determination on Disagreements/Amendments	5/9/20	5.15(c)(6)
Erie	Second Study Season	Spring- Fall 2020	5.15(a)
Erie	File Preliminary Licensing Proposal (or Draft License Application)	10/1//20	5.16(a)-(c)
All Stakeholders	File Comments on Preliminary Licensing Proposal (or Draft License Application)	12/30/20	5.16(e)
Erie	File Updated Study Report	1/10/21	5.15(f)
All Stakeholders	Updated Study Report Meeting	1/25/21	5.15(f)
Erie	File Updated Study Report Meeting Summary	2/9/21	5.15(f)
Erie	File Final License Application	2/28/21	5.17
All Stakeholders	File Disagreements/Requests to Amend Study Plan	3/11/21	5.15(f)
Erie	Issue Public Notice of Final License Application Filing	3/15/21	5.17(d)(2)
All Stakeholders	File Responses to Disagreements/Amendment Requests	4/10/21	5.15(f)
FERC	Issue Director's Determination on Disagreements/Amendments	5/10/21	5.15(f)

APPENDIX C

STAFF'S RECOMMENDATIONS ON PROPOSED AND REQUESTED STUDY MODIFICATIONS AND STUDIES REQUESTED

The following discusses staff's recommendations on studies proposed by Erie, requests for study modifications, and requests for additional studies. We base our recommendations on the study criteria outlined in the Commission's regulations [18 C.F.R. section 5.9(b)(1)-(7)].

I. General Issues

Minimum Flow Release Valve

Background

The current license requires that Erie release a minimum flow of 160 cfs as measured immediately downstream of Morgan dam, a non-project diversion dam owned and operated by the New York State Canal Corporation (NYSCC).[1] Erie provides the minimum flow by releasing 160 cfs, or more, through the West Canada Creek Project's powerhouse (Trenton powerhouse) or from the West Canada Creek Project's Trenton dam, depending on NYSCC's operation of Morgan dam. In order to maintain minimum flows during unexpected outages, Erie maintains an automated minimum flow release valve at the Trenton powerhouse that is capable of releasing the required 160-cfs minimum flow.

Comments

The U.S. Fish and Wildlife Service (FWS) requests that the Commission issue an additional information request seeking details regarding the capacity and operation of the Trenton powerhouse's minimum flow release valve so that FWS can better understand how Erie provides the required minimum flow release at the project.

[1] Morgan dam, also known as the Nine-Mile Creek feeder dam, operates during the navigation season (May 18 to October 10) and is located approximately 1,300 feet downstream of the Trenton powerhouse.

Discussion and Staff Recommendation

The Pre-Application Document (PAD) lacks sufficient detail to evaluate whether or not the Trenton Development[2] is capable of providing a minimum flow of 160 cfs during unexpected outages independent of the operation of Morgan dam. In the Revised Study Plan (RSP), Erie states that it will provide more information regarding the minimum flow valve in the draft license application. FWS does not explain why this information is necessary for any of the proposed studies; thus, we agree that providing this information in the draft license application is appropriate.

Geographic Scope

Background

In the RSP, Erie identifies the impoundment of Newport dam[3] as the downstream boundary for its proposed studies. Erie states that West Canada Creek downstream of Newport dam is subject to other influences (tributaries, dams, abutting land use) that are outside the control of the West Canada Creek Project and, therefore, is not included in the geographic scope of its studies.

Comments

FWS recommends that Erie extend the geographic scope to West Canada Creek's confluence with the Mohawk River and identifies six potential study locations for all of Erie's proposed studies. In addition, FWS recommends that final study locations be determined in consultation with FWS and the New York State Department of Environmental Conservation (New York DEC).

Discussion and Staff Recommendation

In general, we agree that the project can affect flow and other resources in West Canada Creek to the confluence with the Mohawk River. We address specific comments and recommendations on the geographic scope of individual studies and the need for stakeholder consultation in the following section.

[2] The West Canada Creek Project consists of two developments: the Prospect Development, the most upstream development, and the Trenton Development.

[3] Newport dam is part of the Newport Hydroelectric Project, FERC No. 5196.

II. Required Studies

Aquatic Mesohabitat Assessment

Applicant's Proposed Study

Erie proposes to conduct a mesohabitat study of all fluvial parts of the project area including the bypassed reach of the Prospect Development, the bypassed reach of the Trenton Development, and the reach downstream of the Trenton Development to the Newport dam impoundment (approximately 12.5 miles long). Erie would survey the study area using a GPS-enabled aerial drone equipped with a high-resolution camera capable of providing images that would allow Erie to identify aquatic mesohabitat types (riffle, run, pool, etc.), substrate, cover, and wetland vegetation. Erie would verify drone imagery with field surveys at selected locations to ensure accuracy of the drone imagery. In addition, Erie would conduct field surveys in any areas where drone use is not feasible or data is inadequate to meet the study objectives. Erie also proposes to deploy water level loggers, set to record every 30 minutes, in representative mesohabitats, including six loggers in the reach downstream of the Trenton Development to document the extent of hydraulic change that occurs between baseflow and peaking flow events. Data collection for this study would occur during a period of seasonally low flow (July through September) when mesohabitats are readily observable. Ultimately, Erie would quantify and map the georeferenced mesohabitat data and evaluate project effects on habitat using stage-discharge curves to estimate wetted area and depth for each mesohabitat at different flows. Operation data from the Trenton Development and stage data from the water level loggers would provide information to develop the stage-discharge curves. In addition, Erie proposes to deploy dissolved oxygen and water temperature monitors for 4 weeks in July and August to document water quality during summer conditions.

Study Area

Comments on the Study

In its comments on the Proposed Study Plan (PSP), FWS provides information from the United States Geological Survey (USGS) Gage 0134600 at Kast Bridge, located 26 miles downstream of the Trenton Development, that shows project operation has a strong effect on in-stream flow. As such, FWS recommends extending the study area to include all of West Canada Creek from the Trenton Development to the confluence with the Mohawk River (approximately 31 miles). The New York DEC recommends this study extend, at a minimum, to Newport dam.

Discussion and Staff Recommendation

According to the gage data from Kast Bridge, operation of the Trenton Development would affect water quantity and aquatic habitat downstream to the confluence with the Mohawk River; however, it is not necessary to survey the entire affected reach to evaluate project effects on habitat or inform license conditions. Habitat surveys within representative areas are common at FERC-licensed projects and would provide adequate information for our analysis [section 5.9(b)(6); section 5.9(b)(7)]. While Erie's proposal would focus on a reach closest to the project, where effects on habitat would likely be greatest, Erie would not include the lower 18 miles of West Canada Creek. Information in the PAD indicates that West Canada Creek has a slightly higher gradient downstream of Middleville, New York (18.5 miles downstream of the Trenton Development; 6 miles downstream of Newport dam); thus, habitat conditions and project effects on the reach downstream of Middleville, New York might not be represented in Erie's proposed survey.

Therefore, we recommend Erie expand the study area to the confluence with the Mohawk River and include additional study reaches downstream of Newport dam, with at least one reach downstream of Middleville, New York. Erie's proposed total survey length of 12.5 miles should be adequate to characterize habitat in this 31 mile section of West Canada Creek; therefore, Erie could offset the cost of additional survey areas by reducing the length of the survey between the Trenton Development and Newport dam. To ensure that key habitats for fish and other representative habitats are included in the study, we recommend Erie consult with FWS and New York DEC to identify potential study reaches. Erie should consider the comments received, and if recommendations are not adopted, the initial study report should provide Erie's reasons based on the study criteria and project-specific information. We anticipate the cost of this consultation process would be minimal.

Field Surveys

Comments on the Study

In its comments on the PSP, FWS states that Erie's proposed drone survey is not consistent with standard practices and methods. Therefore, FWS recommends that Erie ground-truth the survey results by subsampling with in-field measurements in at least 20 transects. New York DEC expresses an interest in requesting additional data collection and identifying data collection locations based on the results of this study.

Discussion and Staff Recommendation

The use of drones to conduct aquatic habitat surveys is a recently developed method but is acceptable in the scientific community.[4] Erie proposes field surveys to verify the drone survey results and gather aquatic mesohabitat information in areas where drone use is not feasible. However, Erie does not describe the methods for its proposed field survey nor does Erie describe the level of effort for verifying the drone survey or gathering field data through a traditional field survey. Habitat transects where depth, substrate, and cover data are recorded along a transect within specific mesohabitats could be a useful method to describe habitat during field surveys, but may not be necessary to verify or map aquatic mesohabitat in the study area. Furthermore, it is impossible to determine a reasonable level of field effort needed to verify and/or supplement the drone survey at this time because any field survey effort would depend on the quality and extent of the aerial imagery.

Therefore, we recommend Erie conduct the drone survey and consult with the FWS and New York DEC on supplemental field survey methods (e.g., qualitative habitat assessments, GPS mapping, pebble counts, transects, wetland ground-truthing, photographs, etc.) and level of effort for verifying drone survey results and mapping aquatic mesohabitat. Erie should describe its proposed methods and solicit comments from the agencies. If Erie does not adopt agency recommendations, the initial study report should provide Erie's reasons based on the study criteria and project-specific information. We anticipate the cost of this consultation process would be minimal.

Water Level Loggers

Comments on the Study

The New York DEC states that it is unclear where water level and water quality loggers would be deployed in the project area and downstream of the project and requests that the data collection locations be made known prior to data collection so that stakeholders can comment on the locations.

In comments on the PSP, we requested that Erie identify whether or not discharge data would be collected at one or more logger sites. We also requested that Erie clarify the specific timing and duration the loggers would be deployed. In addition, we indicated that direct measurements of discharge would allow Erie to describe the relationship

[4] Woodget, A.S., Austrums, R., Maddock, I.P., and E. Habit. 2017. Drones and Digital Photogrammetry: from Classifications to Continuums for Monitoring River Habitat and Hydromorphology. Accessible at: https://onlinelibrary.wiley.com/doi/full/10.1002/wat2.1222

between project operation and discharge. We also suggested Erie use water level loggers that record temperature because it would provide information to evaluate project effects on water temperature.

Discussion and Staff Recommendation

Erie does not explain how it determined that two water level loggers in the Prospect bypassed reach and six water level loggers in the 12.5-mile-long reach downstream of the Trenton Development are adequate to document stage changes in the study area, nor does Erie describe what information would inform the deployment locations of the loggers. In addition, it is unknown if the relationship between project generation and hydraulic discharge from the project is fully understood or if some data collection is needed to verify project discharge estimates. As such, it is unclear how a stage-project discharge relationship at each logger site would effectively translate to estimates of wetted perimeter and depth or maps of wetted habitat at different flows.

We assume that enough water level loggers would be deployed at various habitat types and channel shapes to provide a sufficient estimate of stage changes throughout the study area. If eight loggers is insufficient, we expect that Erie would add additional loggers to ensure adequate information is collected to analyze project effects on water levels and habitat in the study area. To ensure Erie can provide accurate estimates of discharge from the project, we recommend Erie directly measure streamflow at a range of flows at or near the first water level logger deployed downstream of Morgan dam. Similar to our recommendation above for *Field Surveys*, we recommend that Erie consult with the New York DEC and FWS on the location and number of water level loggers to ensure an adequate diversity of habitats are monitored.

Erie would deploy the water level loggers to document the extent of hydraulic change that occurs between baseflow and peaking flow, but this may not capture a sufficient range of ambient flow conditions, including summer low-flow conditions, at sites farther downstream of the Trenton Development. As such, we recommend that Erie deploy the loggers and collect stage information throughout the proposed study period, July 1 through September 30, and that Erie set the loggers to record every 15 minutes. A shorter recording interval will improve data resolution to ensure changes in project operation and discharge are adequately described. We anticipate that collecting streamflow data, expanding the deployment time, and recording data at 15-minute intervals would increase the study cost by $5,000. We anticipate the cost of the consultation process would be minimal.

Monitoring dissolved oxygen and temperature for 4 weeks in July/August as Erie proposes could provide some information to evaluate the effects of project operation. However, if water level loggers are located with water quality loggers described below

for the *Water Quality Study*, there would be no need to deploy additional dissolved oxygen and temperature loggers that Erie proposes for this study.

Study Structure

Comments on the Study

In its comments on the RSP, FWS notes that it originally requested three separate studies, one study each pertaining to habitats in the Prospect bypassed reach, Trenton bypassed reach, and West Canada Creek downstream of the Trenton Development. FWS expresses concern that the proposed *Aquatic Mesohabitat Study* includes the bypassed reaches and West Canada Creek downstream of the Trenton Development and combines methodologies from its original requests. FWS suggests that the proposed study lacks focus on specific resources and that variability of information across study reaches may lead to data gaps and inconsistencies. Therefore, FWS recommends that Erie utilize the study structure FWS proposed in its original study request.

Discussion and Staff Recommendation

Erie's proposal would generally use the same methodologies in each of the three study areas identified by FWS to map aquatic mesohabitat and provide information to evaluate potential project effects. While each study reach may be unique, it is unclear why three separate studies would be necessary to meet the goals and objectives of this study. Further, our recommendations for consultation with stakeholders described above should provide sufficient opportunity to address any data gathering or reporting concerns across study reaches. As such, we do not recommend that Erie conduct a separate mesohabitat study for the Prospect bypassed reach, Trenton bypassed reach, and West Canada Creek downstream of the Trenton Development.

Macroinvertebrate and Mussel Surveys

Applicant's Proposed Study

Erie proposes to conduct macroinvertebrate and mussel surveys within the littoral zone (mussels only) of the project's impoundments, the bypassed reaches, and the 12.5-mile reach downstream of the Trenton Development to the Newport dam impoundment. The purpose of this study is to document the status of and assess potential project effects on current macroinvertebrate and mussel communities and water quality conditions. Erie would collect macroinvertebrate and mussel samples using standard New York DEC methods, including kick net sampling for macroinvertebrates and timed searches for mussels. Downstream of the Trenton Development, Erie would collect approximately eight macroinvertebrate samples and conduct timed searches for mussels

at 20 sites, each with an area of approximately 100 square meters. In the impoundments, Erie would snorkel or use a viewing scope in the littoral zone (depths less than 6 feet) to survey for mussels. Erie proposes to identify all collected organisms to the lowest practical taxon and analyze the macroinvertebrate samples using common metrics, including species richness, EPT richness, and the Hilsenhoff Biotic Index.[5]

Study Area

Comments on the Study

In its comments on the PSP, FWS recommends that Erie extend the study area to the confluence with the Mohawk River.

Discussion and Staff Recommendation

As discussed above, the Trenton Development affects water quantity and habitat downstream to the Mohawk River. In order to evaluate the macroinvertebrate and mussel communities and potential project effects throughout the affected area, we recommend that Erie extend the study area to the confluence with the Mohawk River. Erie's proposed sampling effort for both the macroinvertebrate and mussel surveys would be adequate for our analysis; thus, some of the proposed sample locations could be shifted downstream of Newport dam. Similar to our recommendations above, Erie should consult with FWS and New York DEC when identifying locations to sample macroinvertebrates and survey for mussels. We expect the additional cost of consultation would be minimal.

Biological Assessment Profile

Comments on the Study

In our comments on the PSP, we acknowledged that Erie's proposed metrics for analysis of macroinvertebrate samples (species richness, EPT Richness, and the

[5] Species Richness - The total number of species or taxa found in the sample. Higher species richness values are often associated with good water quality conditions.

EPT Richness - The total number of mayfly (Ephemeroptera), stonefly (Plecoptera), and caddisfly (Trichoptera) taxa in the sample. These are considered mostly clean-water organisms and their presence is associated with good water quality.

Hilsenhoff Biotic Index - This index is a measure of the tolerance of the organisms in the sample to organic pollution and low dissolved oxygen levels. The presence of intolerant organisms is associated with good water quality.

Hillsenhof Biotic Index) would be useful to evaluate the existing macroinvertebrate community. However, we indicated that New York DEC's Biological Assessment Profile (BAP), which plots individual community metrics on a common scale from 0 to 10 (severe impact to non-impacted) would provide additional information useful to evaluate project effects on the macroinvertebrate community and water quality.

Discussion and Staff Recommendation

The three metrics Erie proposes for its analysis are typically part of the BAP for macroinvertebrate assessments in New York. Another metric commonly used for streams in New York is Percent Model Affinity (PMA), a measure of similarity to a model non-impacted community based on percent abundance in seven major taxonomic groups.[6] PMA is useful to describe the macroinvertebrate community and water quality in West Canada Creek within a regional context. Using these metrics and scaling the results to create a BAP, in accordance with standard New York DEC procedures, would allow staff to easily compare results from this study to previous macroinvertebrate surveys in West Canada Creek and evaluate cumulative effects on the macroinvertebrate community. Therefore, we recommend that Erie include PMA and scale results to create a BAP for each sample location. We anticipate the additional analysis would increase the study cost by $3,500.

Mussel Surveys in the Littoral Zone

Comments on the Study

In our comments on the PSP, we requested more detail on Erie's proposed mussel sampling methodologies, including survey depth in the impoundments. In the RSP, Erie indicated that its surveys would extend to a maximum depth of 6 feet.

Discussion and Staff Recommendation

Erie maintains the water level elevation in the Prospect impoundment between 1,156.5 feet and 1,161.5 feet[7] and maintains the Trenton impoundment between 1,011.9 and 1,023.9 feet. Under normal conditions, Erie might utilize the entire operating band of each impoundment on a daily basis. However, mussels would not be likely to inhabit the

[6] New York DEC. 2018. Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State. Available at: https://www.dec.ny.gov/docs/water_pdf/sop20818biomon.pdf

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

operating band in either impoundment, especially the higher elevations, because mussels would tend to avoid being stranded when the impoundment is drawn down. To ensure that Erie conducts the proposed surveys at depths where mussels may be present, we recommend that Erie expand its survey of the littoral zone to 6 feet below the lowest operational elevation in each impoundment. Timing the surveys when the impoundment elevations are low or using SCUBA gear to conduct the surveys would likely be necessary. We anticipate that surveying at greater depth would increase the cost of the study by $1,000 to $3,500.

Macroinvertebrate Identification

Comments on the Study

New York DEC recommends that Erie identify all macroinvertebrates and mussels to species.

Discussion and Staff Recommendation

Erie proposes to identify organisms to the lowest practical taxon. For some macroinvertebrates (e.g., midges), it is not typically necessary to identify each organism to species because a broader group may share very similar characteristics and tolerance levels to environmental stressors [(section 5.9)(b)(6)]. Therefore, we see no reason to require Erie at the onset, to identify all organisms to the species taxon, but instead recommend that Erie, as it proposes, have the flexibility to select the lowest taxon in the process of conducting the study. We expect that Erie will explain its specific rationale for each selected taxon rank higher than the species level in its Initial Study Report.

Fish Assemblage Assessment

Applicant's Proposed Study

Erie proposes to conduct a fish survey in the project's impoundments to document species occurrence, distribution, and relative abundance. Erie would also use data from this study to inform the *Fish Entrainment and Turbine Passage Survival Assessment*. Erie proposes to sample the Prospect impoundment using boat electrofishing in shallow water (less than 6 feet deep) and gill nets in deeper water. Erie would electrofish along three transects in the Prospect impoundment and one transect in the Prospect power canal for 500 seconds per transect, or a total of 33 minutes. Erie would conduct boat electrofishing during the day and night.

Gill nets would be 12 feet high and 100 feet in length and would include 4 to 5 panels of increasing mesh size with a range of 1.5 to 3.5 inches. Erie would set two gill

nets in the Prospect impoundment and one gill net in the Prospect power canal for a minimum of 4 hours each and would conduct the sampling in late summer. Erie would collect supporting information to characterize depth, substrate, water quality, and cover at each sample location. In the Trenton impoundment, Erie would use similar gill net methods as described above and proposes to set two gill nets. Erie would not conduct electrofishing in the Trenton impoundment because shallow water habitat is limited.

Study Area

Comments on the Study

FWS recommends the fish assemblage assessment include the Prospect bypassed reach and West Canada Creek from the Trenton Development to the confluence with the Mohawk River. Specifically, FWS recommends two 100-meter-long removal-depletion surveys downstream of Prospect Falls in the Prospect bypassed reach and six 200-meter-long removal-depletion surveys downstream of the Trenton Development. In addition, FWS recommends at least two seine net samples in each of the six sampling locations downstream of the Trenton Development. New York DEC recommends Erie conduct stream electrofishing surveys downstream of the Trenton tailrace and states that electrofishing would be acceptable in the bypassed reaches, though minnow traps are preferred in deep pools.

Discussion and Staff Recommendation

FWS states that no fish surveys have been completed in the Prospect bypassed reach and no recent fish surveys have been completed downstream of the Trenton Development. In the PAD and RSP, Erie did not provide information on the fish assemblage in the bypassed reaches; however, Erie did reference some information on the fish assemblage downstream of the Trenton Development. New York DEC conducted several electrofishing surveys within West Canada Creek or adjoining tributaries between 1988 and 2010 and collected a total of 32 fish species.[8] Most of these surveys were conducted near the town of Newport, but it is unclear if the surveys occurred upstream or downstream of Newport dam. Further, the distribution and relative abundance of several fish species that potentially inhabit the mainstem of West Canada Creek downstream of the Trenton Development are not clear.

In the Trenton bypassed reach, numerous natural barriers reduce habitat connectivity and few fish species are likely present. Therefore, the cost of fish surveys in the Trenton bypassed reach is not justified. Habitat in the Prospect bypassed reach and

[8] Pre-Application Document for Gregory B. Jarvis Hydroelectric Project No. 3211 filed on June 30, 2017.

West Canada Creek downstream of the Trenton Development is more suitable for fish. As such, current information on the occurrence, distribution, and relative abundance within the Prospect bypassed reach and West Canada Creek downstream of the Trenton Development is necessary to evaluate project effects and inform potential license conditions [section 5.9(b)(5)]. We recommend Erie conduct backpack electrofishing surveys in the Prospect bypassed reach and West Canada Creek downstream of the Trenton Development. The survey methods recommended by FWS are commonly used to assess fish population size and density; however, this information is not necessary for our analysis. New York DEC describes methods for a single pass backpack electrofishing survey, including guidelines to determine survey length and specific data collection, that would provide information to describe species occurrence, distribution, and relative abundance (catch per unit effort).[9] Seine netting or minnow trapping could be effective in pool habitat and/or collecting smaller species of fish relative to backpack electroshocking. If pool depth or other features prevent effective electrofishing, we recommend Erie deploy minnow traps within these habitats. Erie should determine specific minnow trap methods in consultation with New York DEC as necessary.

FWS identified several survey locations where backpack electrofishing should be conducted; however, it did not explain why two locations in the Prospect bypassed reach or six locations in West Canada Creek downstream of the Trenton Development are necessary to describe the existing fish assemblage. Surveys should occur in representative reaches within each study area. Therefore, we recommend that Erie consider existing habitat conditions and identify representative reaches within the Prospect bypassed reach and West Canada Creek downstream of the Trenton Development.

Similar to our recommendations for consultation on the *Aquatic Mesohabitat Study* above, we recommend that Erie consult with FWS and New York DEC to help determine specific locations and timing of the backpack electrofishing surveys. We expect Erie to conduct a minimum of one survey in the Prospect bypassed reach, two surveys between Morgan dam and Newport dam (one location near the project and one farther downstream), and one survey downstream of Newport dam. We anticipate that backpack electrofishing surveys in the Prospect bypassed reach and West Canada Creek downstream of the Trenton Development would increase the cost of the study by $15,000.

[9] New York DEC. 2018. Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State.

Fish Survey Methods in the Impoundments

Comments on the Study

New York DEC recommends the following methods for gill netting in the project's impoundments: (1) setting three gill nets per strata (i.e., epilimnion and hypolimnion); (2) setting gill nets overnight; (3) using a single mesh panel for each of the five mesh sizes identified in the RSP; (4) adding smaller mesh panels to the gill net to capture smaller fish; (5) conducting gill netting between September and October when water temperature is equal to or less than 68 degrees Fahrenheit; and (6) collecting standard water quality data such as dissolved oxygen and temperature profiles. FWS expresses concern with the level of effort of boat electrofishing and gill netting. In addition, FWS states that it supports New York DEC's recommendations for fish surveys in the impoundments.

Discussion and Staff Recommendation

The project's impoundments may or may not exhibit stratification. Regardless, Erie's proposal to conduct electrofishing in shallow water habitat would likely capture similar species as a shallow-set gill net. Erie would set two nets in the Prospect impoundment, one net in the Prospect power canal, and two nets in the Trenton impoundment. New York DEC standard procedures suggest at least three net sets in lakes smaller than 200 acres. However, considering the poor gill net catch during previous gill netting efforts in the Prospect impoundment and the larger surface area of the Prospect impoundment (176 acres) relative to the Trenton impoundment (9 acres), additional effort in the Prospect impoundment is warranted. We recommend a minimum of three gill net sets in the Prospect impoundment in addition to one gill net set in the power canal and two gill net sets in the Trenton impoundment.

Gill netting for 4 hours may reduce sampling mortality, but may limit the total catch as well. After review of several New York DEC technical briefs,[10] it is apparent that overnight gill netting is common and effective in waters of New York [(section 5.9)(b)(6)]. As such, we recommend Erie set gill nets overnight. Gill net mesh sizes and configurations vary greatly depending on the target fish community. While New York DEC recommends smaller mesh sizes, it did not specify which sizes are preferred for this study. To ensure an adequate mesh size range is used for this study, we recommend Erie

[10] https://www.dec.ny.gov/outdoor/112889.html

consult with the New York DEC to help determine the mesh size and configuration of the gill nets.

Erie's proposed timing for the study likely includes September, but does not specify that water temperature be equal to or less than 68 degrees. Standard procedures for lake sampling in New York indicate that gill netting should occur after surface water temperature is equal to or less than 68 degrees, likely to protect fish from the effects of heat and/or low dissolved oxygen concentrations [(section 5.9)(b)(6)]. Therefore, we recommend Erie conduct gill netting when surface water temperature is equal to or less than 68 degrees. Erie proposes to collect water quality data (temperature, dissolved oxygen, pH, and conductivity) during the survey, but it is not clear if data would be collected at different depths to examine stratification in the impoundment. Thermal and chemical stratification can affect the effectiveness of deep-set gill nets. Therefore, we recommend that Erie collect temperature and dissolved oxygen data at various depths prior to setting the gill nets to characterize the impoundment profiles and adjust deployment of the nets as needed.

Erie's proposed boat electrofishing would include four meandering transects along the shoreline with 500 seconds of electroshocking per transect or about 33 minutes of total sampling effort. New York DEC's sampling protocols recommend at least one hour of electrofishing in waters with a surface area of 200 acres or less.[11] It is unclear how many transects Erie proposes to collect during the day or night. Considering that day and night catch rates may vary, we recommend Erie conduct electrofishing along seven transects during the day and seven transects during the night for a total effort of approximately 2 hours. Sampling should occur in various habitat types representative of the available habitat in the Prospect impoundment and power canal.

We anticipate that an additional net set in the prospect reservoir, overnight net sets, and additional electrofishing would increase the cost of the study by $10,000. The cost of consultation with New York DEC, conducting the survey when water temperature is equal to or less than 68 degrees, and collecting water quality profile data would be minimal.

[11] New York DEC. 2013. Lake and Pond Fish Community Survey Protocols. Available at: https://www.researchgate.net/publication/269928772_LAKE_AND_POND_FISH_COMMUNITY_SURVEY_PROTOCOLS_NYSDEC_Bureau_of_Fisheries

Additional Gear Types and Sampling Events

Comments on the Study

New York DEC recommends that Erie use minnow traps, fyke nets, and bag seines, in addition to the proposed gear types, to adequately assess the fish community assemblage within the impoundments.

Discussion and Staff Recommendation

Gill netting and electrofishing should be able to capture a majority of species and size classes present in the Prospect impoundment. While gill netting only is proposed for the Trenton impoundment, this approach seems reasonable considering the lack of shallow-water habitat in the Trenton impoundment. Boat electrofishing is efficient in shallow habitat, but this method is biased towards larger fish, as smaller fish are less susceptible to capture during electrofishing surveys. To ensure all species and size classes are adequately targeted during this survey, we recommend Erie conduct bag seine sampling at a minimum of three sites within the Prospect impoundment, per standard protocols for New York.[12] Fyke nets and minnow traps would target similar species as boat electrofishing and seining, respectively; therefore, we do not recommend these methods. We anticipate that bag seine sampling would increase the cost of the study by $3,500.

Fish Entrainment and Turbine Passage Survival Assessment

Applicant's Proposed Study

Erie proposes to assess fish entrainment and turbine strike mortality at each development. As part of this study, Erie would collect some site-specific data, including intake depth and velocity.

Comments on the Study

FWS states that it concurs with Erie's proposal to collect site-specific data and to evaluate impingement potential, but Erie's goals and methods to collect these data are not described in the study plan. FWS recommends Erie provide this information prior to the start of the study.

[12] New York DEC. 2013. Lake and Pond Fish Community Survey Protocols.

Discussion and Staff Recommendation

Erie does not specifically propose to evaluate the potential for fish impingement on the trash racks. However, Erie would collect intake velocity data, presumably under different operating scenarios (e.g., minimum vs maximum hydraulic capacity) that would be useful for its entrainment analysis as well as an analysis of fish impingement. An evaluation of potential fish impingement would provide additional information for our analysis of project effects; therefore, we recommend Erie provide an analysis or discussion of potential impingement effects based on trash rack spacing, intake velocities, size of fish species present in the impoundment, and swimming speeds of these species. In addition, we recommend Erie describe its goals and methods for collecting site-specific data (e.g., intake velocity) and provide this information to FWS and New York DEC so that the agencies may provide comments and recommendations prior to conducting the study. We anticipate that the impingement evaluation would increase the study cost by $1,500.

Water Quality Study

Applicant's Proposed Study

Erie proposes to characterize baseline water quality and assess potential project effects on West Canada Creek. Specifically, Erie would continuously monitor temperature, dissolved oxygen, pH, and conductivity immediately downstream of the Prospect and Trenton powerhouses, in the upper and lower Prospect bypassed reach, and at sites between the Trenton Development and the Newport dam impoundment. Erie would deploy the water quality loggers between mid-April 2019 and mid-November 2019 and loggers would record water quality data every 30 minutes. Downstream of the Trenton tailrace (downstream of Morgan dam), Erie would deploy water quality loggers at the proposed water level logger sites (6 total).

Study Area

Comments on the Study

FWS recommends that Erie conduct continuous water quality sampling at 15-minute intervals in the project's impoundments and at six locations downstream of the Trenton Development to the confluence with the Mohawk River. New York DEC states that water quality monitoring in the impoundments and the Trenton bypassed reach is needed to determine potential cumulative effects of the project on water quality in West Canada Creek.

Discussion and Staff Recommendation

Erie would collect some water quality data in the impoundments during the fish assemblage study, but this single sampling event may not be adequate to describe water quality and stratification patterns in the Prospect impoundment. Therefore, we recommend additional water quality sampling in the Prospect impoundment, including water temperature and dissolved oxygen concentration at various depths, to characterize the water quality profile of the impoundment. Sampling should occur at least once per month from May through October. The Trenton impoundment is small, retention time of the water is short, and stratification is unlikely; therefore, water quality sampling during the fish survey, as discussed above, should provide adequate information for the Trenton Development.

Erie would collect water quality data at the top and bottom of the Prospect bypassed reach, but would not collect water quality data in the Trenton bypassed reach. Based on initial reconnaissance, Erie concludes that the Trenton bypassed reach has poor access, significant amounts of bedrock ledge and boulder substrate, large waterfalls that limit habitat connectivity, and limited value for aquatic resources. While data collection in this reach may assist in describing existing conditions, the lack of quality habitat for biological resources obviates the need for this information, as it is unlikely to inform license conditions. As such, collecting water quality data in this reach is not justified at this time [(section 5.9)(b)(7)].

Similar to our discussion above for the *Aquatic Mesohabitat Assessment* and *Macroinvertebrate and Mussel Surveys*, project effects on water quantity and quality likely extend downstream of Newport dam. As such, we recommend, Erie deploy six water quality loggers downstream of the Trenton tailrace (downstream of Morgan dam) to the mouth of the Mohawk River. We recommend that Erie locate the water quality loggers at the level logger sites described in the *Aquatic Mesohabitat Assessment* and synchronize the loggers to record at 15-minute intervals so that we can adequately evaluate the effect of peaking operations on river temperature and dissolved oxygen. A 15-minute recording interval would provide the needed resolution to evaluate effects on water quality because Erie's peaking operation can increase or decrease flow in West Canada Creek by as much as 1,265 cfs over short time intervals.[13] In addition, we recommend Erie collect continuous air temperature throughout the study period at a representative location downstream of the Trenton Development so that ambient air temperature can be characterized.

[13] Data from USGS Gage 01346000 at Kast Bridge, approximately 26 miles downstream of the Trenton Development, shows that peaking operation can cause flow changes of over 100 cfs in 15 minutes or less.

We anticipate that additional water quality sampling in the Prospect impoundment, recording data at 15-minute intervals, and collecting air temperature would increase the study cost by $5,000 and anticipate no additional study costs for extending the study area to the confluence with the Mohawk River.

Study Parameters and Study Period

Comments on the Study

In its comments on the PSP, FWS recommends that Erie collect continuous temperature and dissolved oxygen monitoring with monthly sampling for pH, turbidity, and conductivity for a period of 12 months. New York DEC recommends all water quality parameters should be monitored continuously for 1 year.

Discussion and Staff Recommendation

Monthly turbidity monitoring may provide some additional background information, but it is unclear how this information would be used to assess project effects. Project operation may have some effect on turbidity, but FWS does not demonstrate a clear nexus or need for this information and there is no information in the PAD that indicates turbidity is a concern. Therefore, we do not recommend turbidity monitoring.

FWS and New York DEC did not describe a need for year-round monitoring, nor did the agencies justify the cost of a 12-month monitoring effort [(section 5.9)(b)(7)]. Similar to other FERC-licensed projects in this region, the project has the greatest potential to affect water quality during the summer and early fall because higher temperatures could lead to low dissolved oxygen levels within and downstream of the project. As such, we do not recommend Erie extend the study period.

Recreation Use, Needs, and Access Study

Applicant's Proposed Study

Erie proposes a *Recreation Use, Needs, and Access Study* to gather information on existing recreation facilities, use, estimated future demand and needs, and public safety and access at the project. Under the study, Erie would conduct a recreation site facility inventory and condition assessment, recreation use counts and visitor surveys, an assessment of public access opportunities and safety considerations at the project, and a characterization of downstream recreation opportunities. The recreation site facility inventory and condition assessment would be conducted at the Prospect Boat Launch and the Trenton Falls Scenic Trail area, which are project recreation facilities.

Recreation use counts would be conducted at the Prospect Boat Launch via a traffic counter and random spot counts from Memorial Day through Labor Day 2019 including weekend days and holidays. Total counts of participants would be collected at the seasonal Trenton Falls Scenic Trail special events.[14] Visitor surveys would be administered during the Trenton Falls Scenic Trail special events, provided in a drop box at the Prospect Boat Launch, and available online (with notice of the online survey provided on Erie's West Canada Creek Project relicensing site, at downstream public access parking areas, and in the local newspaper).

Erie's assessment of public access opportunities would inventory and map existing formal and informal public access within and directly abutting the project boundary using aerial drone footage and targeted on-site field assessments to identify site constraints and safety considerations. Erie would characterize existing recreation opportunities downstream of the Trenton Development, including angling, whitewater boating, and tubing opportunities. Erie would also characterize existing public safety mechanisms immediately downstream of the project, as well as flow notification systems for the Trenton tailrace to Newport dam reach of West Canada Creek.

Recreation Working Group

Comments on the Study

American Whitewater (AW) requests that Erie form a working group with recreation stakeholders to refine the study methodology and instruments to collect the information necessary to complete the study of recreation needs. AW requests that Erie's study also evaluate: (1) whether additional access to view the falls in both bypassed reaches would provide enhanced recreation opportunities; (2) whether changes in project operation would improve the recreation experience; and (3) whether access limitations, the conditions of Erie's facilities, or project operation are impediments to or discourage recreational use. FWS states that it is concerned with the lack of a proposed methodology, criteria, and stakeholder involvement in determining what constitutes safe access at the project.

Discussion and Staff Recommendation

While Erie's study incorporates commonly used techniques to gather information on recreation use, needs, and access, Erie has not proposed to create a working group for

[14] For 1 or 2 weekends each spring and fall, Erie and the Town of Trenton provide controlled public access to the Trenton Falls Scenic Trails, which provides the public the opportunity to view the Trenton Falls Gorge and its waterfalls.

the *Recreation Use, Needs, and Access Study*. A working group typically consists of a small, collaborative group of stakeholders that works with the licensee to address significant resource-related topics and provide resource-specific guidance in accomplishing the goals and objectives of the study. A working group could identify information needs that may not have been addressed in the proposed study plan, provide input and recommendations on methodology and study techniques, and assist with information gathering. The incorporation of a working group for the refinement of this study, similar to those included in the *Whitewater Boating Flow and Access Study* and *Aesthetics Flow Assessment* discussed below, would provide Erie with additional expertise in collecting information regarding recreation use, needs, and access at the project. So that stakeholders can more fully contribute to addressing specific recreation-related topics, we recommend that Erie incorporate a Recreation Use, Needs, and Access working group for this study. The working group should include, to the extent of their willingness to participate, members from stakeholder groups that have interests in the recreation-related studies. We do not anticipate any additional costs associated with this recommendation.

Visitor Surveys

Comments on the Study

AW notes that Erie intends to collect visitor surveys between Memorial Day and Labor Day 2019, and recommends that Erie also collect visitor surveys at the Trenton Falls Scenic Trail special events, which typically are held outside of the Memorial Day to Labor Day time period.

New York DEC recommends that the proposed study methods to characterize angling opportunities be the same as the standard survey methods used in New York DEC's 2007 West Canada Creek angler survey, to permit comparison between 2007 and 2019, and to provide additive value in determining project impacts to the downstream fishery. New York DEC also states that the survey should include the same angler opinion questions that are included in the Prospect Boat Launch drop box survey and the online survey proposed by Erie. FWS states that one of the primary recreation areas affected by project operation is the area immediately below Morgan dam and any visitor or angler survey should specifically target this area.

Discussion and Staff Recommendation

In section 4.7.7 of the RSP, *Methodology*, Erie states that visitor surveys[15] would be administered during the Trenton Falls Scenic Trail special events. Visitor surveys would also be available at a drop box at the Prospect Boat Launch from Memorial Day to Labor Day 2019, as well as online at the West Canada Creek Project relicensing website. In section 4.7.9 of the RSP, *Deliverables and Schedule*, Erie states that the visitor surveys would be conducted from Memorial Day to Labor Day 2019, but does not mention administering the visitor surveys at the Trenton Falls Scenic Trail special events. In order to provide clarity on the timeline and locations of visitor survey collection, Erie should provide visitor surveys online, via a drop box at the Prospect Boat Launch from Memorial Day to Labor Day 2019, and should conduct visitor surveys at each of the 2019 Trenton Falls Scenic Trail special events.

In order to provide expertise in the formulation of pertinent angling questions for the visitor survey, New York DEC and FWS should be included in the working group for the *Recreation Use, Needs, and Access Study*. Using similar methods and survey questions from a previous study can provide valuable insight into changes that may have occurred in the intervening years. This information could help Erie characterize angling opportunities at the project and ensure Erie targets the recreation areas most affected by project operation. Therefore, we recommend that the working group for this study, including New York DEC, review New York DEC's 2007 angler survey to incorporate relevant questions regarding angling at the project and in the downstream fishery of West Canada Creek. We do not anticipate any additional costs associated with this recommendation.

Geographic Scope

Comments on the Study

AW recommends that Erie evaluate recreational facilities, use, and the effect of project operation on boating from the Prospect impoundment to the confluence of West Canada Creek with the Mohawk River (approximately 31 miles), and include two boating reaches downstream of the project in the geographic scope of this study. AW identifies these boating reaches (about 26 miles total) as Dover Road to Middleville and Middleville to the Route 7 Kast Bridge.

[15] In referring to the surveys for the *Recreation Use, Needs, and Access Study*, Erie uses visitor survey, intercept survey, and use survey interchangeably in the RSP. We use 'visitor survey' throughout this study plan determination to cover all types.

Discussion and Staff Recommendation

In the RSP, Erie states that the study area for the recreation site facility inventory and the recreation use counts includes the two existing project recreation sites within the project boundary, the Prospect Boat Launch and the Trenton Falls Scenic Trail area. Erie did not include the two boating reaches downstream of the project in the facility inventory and recreation use portions of the *Recreation Use, Needs, and Access Study*.

Both AW and Erie have indicated that the public accesses these two boating reaches in the summer months for canoeing, tubing, and whitewater kayaking. While these reaches of West Canada Creek are outside of the project boundary, the peaking operation of the Trenton Development directly affects water levels for recreation downstream to the confluence with the Mohawk River.[16] In order for staff to have a clear understanding of how the project affects downstream recreation [(section 5.9)(b)(5)], it is important to have recreation facility and use information from the access areas along the boating reaches that would be impacted by peaking operation at the project. Therefore, Erie should include the access areas that serve the two downstream boating reaches of West Canada Creek in its facility inventory and recreation use counts. We anticipate that additional surveying of recreation facilities and public use would increase the cost of the study by $5,000.

We note that in section 4.7.7 of the RSP, *Methodology*, Erie states that it would provide notification of the online visitor survey at the downstream public access parking areas, but does not specify how far downstream the notifications would reach. In order to provide clarity for the geographic scope of the visitor survey, Erie should provide notification at public access parking areas downstream of the project from the Trenton tailrace to the confluence of the Mohawk River. The study report should include a map and description of all locations where notifications of the visitor survey were posted.

[16] The Newport Hydroelectric Project, FERC No. 5196, lies within the Dover Road to Middleville reach of West Canada Creek and is operated in a run-of-river mode where inflow equals outflow and the impoundment level is maintained at the top of the flashboards. The Herkimer Hydroelectric Project, FERC No. 9709, is downstream of the Kast Bridge and is also operated in a run-of-river mode. Run-of-river operation continuously pass incoming flows downstream without fluctuating water levels in the same manner that peaking operation would. Thus, West Canada Creek Project operation is likely to affect flows downstream of the Trenton Development to the confluence of the Mohawk River.

Whitewater Boating Flow and Access Study

Applicant's Proposed Study

Erie proposes to conduct a *Whitewater Boating Flow and Access Study* to characterize and assess whitewater boating opportunities within the Prospect Development bypassed reach and downstream of the Trenton Development. The study would characterize: (1) whitewater boating opportunities within a 1-hour drive of the study area; (2) hydrology data and operational constraints at the project; (3) potential access to the Prospect bypassed reach and the adequacy of put-in and take-out locations downstream of the Trenton Development; (4) boating experience and potential demand; (5) potential safety issues; and (6) the effects of whitewater boating releases on other resources. The study would consist of three phases: study planning and a desk-top analysis (Phase 1); a reconnaissance assessment of the Prospect Development bypassed reach (Phase 2); and a controlled flow assessment downstream of the Trenton Development from Morgan dam to the Newport impoundment (Phase 3). In the event the Phase 2 assessment provides sufficient justification, a controlled flow assessment would also be conducted in the Prospect Development bypassed reach. Erie anticipates that the target flows for the controlled flow study downstream of the Trenton Development would be 1,000 cfs and 1,400 cfs, which is within the range of potential station-controlled releases. If justified by the results of the Phase 2 assessment, Erie proposes target flows of 100 and 200 cfs for the controlled flow study in the Prospect Development bypassed reach.

Flow Release Ranges

Comments on the Study

AW comments that predefining the flow ranges for the controlled flow assessments without stakeholder involvement and prior to completing the Phase 1 analysis circumvents widely accepted protocols for conducting a whitewater boating flow study. AW states that identifying the minimum acceptable and optimal boating flows requires a sufficiently broad range of flows, and Erie's proposed range of flows for the Prospect bypassed reach is likely too low and too narrow. Regarding the range of flows proposed by Erie for the controlled flow study downstream of the Trenton Development, AW states that the proposed flows are unlikely to provide sufficient information to identify minimum acceptable and optimal boating flows. AW considers 600 cfs to be the minimum boatable flow downstream of the Trenton Development. Therefore, AW comments that in order to conduct a meaningful study, a whitewater release of 600 cfs also needs to be evaluated by participants in comparison to other higher flows.

FWS requests that all mandatory conditioning agencies be included in the study to observe the reconnaissance and on-water flow assessment. While FWS acknowledges that it will defer evaluation of suitable boating flows to the expert panel, it states that its recommendations will need to incorporate the opportunities for, and effects of, boating releases from the project on fish and wildlife resources.

Discussion and Staff Recommendation

The study plan does not include stakeholder consultation prior to or during the study, nor did Erie provide an explanation of how three of the four target flow ranges for the controlled flow assessment were determined. Erie states that in Phases 2 and 3, it would solicit the assistance of expert whitewater boaters affiliated with AW and/or local paddling clubs to form a small whitewater boating expert panel (no more than 5 total representatives). The expert panel would evaluate the suitability for whitewater boating opportunities and assess the type of experiences provided by: (1) 100 cfs and 200 cfs in the Prospect bypassed reach (if the Phase 3 evaluation of this reach occurs); and (2) 1,000 cfs and 1,400 cfs downstream of the Trenton Development to the Newport dam impoundment (approximately 12 miles). Erie states that the expert panel would complete post-evaluation forms to document multiple characteristics of the reaches including trip length, river features, and appropriate flow levels.

The Prospect bypassed reach does not have a minimum flow requirement and aside from spill during high-flow events, water in the bypassed reach is typically a result of leakage from Prospect dam. As described in our comments on the PSP, the characteristics of a potentially boatable reach exist in the Prospect Development bypassed reach. However, due to inaccessibility, low water levels, and public safety concerns, acceptable flow levels for whitewater boating are unknown in this reach. A whitewater boating flow study provides the opportunity to evaluate the type of experience that varying river levels can provide in a stretch of river with known whitewater potential.

Defining release levels at Prospect dam prior to stakeholder consultation would exclude input from the whitewater boating expert panel and may not include a wide enough range of flows to adequately evaluate the experience. Due to the lack of information available to describe the experience of whitewater boating in the Prospect bypassed reach [(section 5.9)(b)(4)], we recommend that if Phase 2 justifies the Prospect bypassed reach controlled flow assessment, Erie consult with the whitewater boating expert panel prior to Phase 3 to collaboratively determine the flow levels to be studied. Erie and the expert panel should seek to determine what flow levels would provide a minimally acceptable and optimal whitewater boating experience. We do not anticipate additional costs associated with consultation; however, additional releases and higher flow levels could increase the cost of the study by $15,000.

The Trenton Development has a minimum flow requirement of 160 cfs. While AW's comments on the RSP indicate that 600 cfs is the minimum flow necessary for boating downstream of the Trenton Development, flow levels for boating in West Canada Creek have never been studied. Defining the release levels from the Trenton Development prior to stakeholder consultation would exclude input from the whitewater boating expert panel, which could help identify the minimally acceptable and optimal flow levels. Therefore, during Phase 2, we recommend that Erie collaborate with the expert panel to determine the flow levels that are likely to provide a minimally acceptable and optimal whitewater boating experience downstream of the Trenton Development. We do not anticipate additional costs associated with consultation; however, an additional release could increase the cost of the study by $10,000.

Regarding FWS's request that mandatory conditioning agencies be included to observe the study, we note that while their participation may not be necessary to evaluate potential recreational flow releases, their ability to view the reconnaissance and on-water flow assessments would provide them an opportunity to observe firsthand the effects of boating releases on fish and wildlife resources. The presence of a representative from each mandatory conditioning agency, to the extent they are willing to participate, would bring additional expertise without causing undue burden on Erie. Therefore, we recommend that Erie invite a representative from each mandatory conditioning agency to be present during the reconnaissance assessment and on-water controlled flow assessments.

Geographic Scope

Comments on the Study

AW states that Erie's proposal to conduct the Phase 3 controlled flow assessment downstream of the Trenton Development from Dover Road to the Newport dam impoundment (upper reach) would provide information on the ability of some recreational boaters, including open canoers and tubers, to enjoy the upper reach of the river. However, AW comments that Erie is limiting the geographic scope of this study by not including the reach from Middleville to Kast Bridge (lower reach), a class II-II+ teaching section regularly used by whitewater boaters. AW comments that only studying a portion of the upper reach would not provide information on the whitewater boating potential of the more significant lower reach and would fail to provide sufficient information to analyze the impact of project operation on whitewater boating opportunities.

Discussion and Staff Recommendation

Weather and energy needs dictate the amount of water released from the Trenton Development. As discussed above, the effects of daily peaking operation at the project would extend to the confluence with the Mohawk River, even with the presence of Newport and Herkimer dams. In order to understand the impact that project operation has on downstream boating opportunities [(section 5.9)(b)(5)], we recommend that Erie extend the geographic scope of the Phase 3 portion of this study to include both reaches downstream of the Trenton Development, from Dover Road to the Newport impoundment and Middleville to Kast Bridge (approximately 20 miles total). We anticipate that any costs associated with extending the geographic scope would be included in the costs associated with additional flow releases.

Aesthetics Flow Assessment

Applicant's Proposed Study

Erie proposes to conduct an *Aesthetics Flow Assessment* to gather information on the existing aesthetic character and potential aesthetic flow viewing opportunities adjacent to the project bypassed reaches. The study methodology includes a phased approach with a desktop analysis, reconnaissance assessment, and controlled flow assessment. Phase 1 (desktop analysis and reconnaissance assessment) includes the characterization and documentation of key viewing locations and key viewing characteristics (i.e., waterfalls, vegetation, distance, etc.) during both a leaf-on and a leaf-off period. Potential use and access to these key viewing locations would be studied. From the information gathered during Phase 1, a controlled flow evaluation form would be created. In Phase 2 (documentation and assessment of controlled flow releases), Erie would release target flows of 100 cfs and 200 cfs in the Prospect bypassed reach and 250 cfs and 500 cfs in the Trenton bypassed reach. Erie would include a small, approximately 5-person, focus group made up of representatives from interested stakeholder groups to review the flows on site, complete the evaluation form, and participate in a focus group discussion.

Flow release ranges

Comments on the Study

Both FWS and AW comment on the adequacy of the predefined flows. FWS states that the flows should be determined in consultation with a stakeholder focus group and requests that Erie include at least four flows as part of the flow study in the Trenton bypassed reach (a leakage flow, and a low, moderate, and high flow).

AW comments that predefining the flow ranges without an explanation of how the amounts were determined and without stakeholder involvement may defeat the purpose of the controlled flow assessment and may not yield useful information. AW states that identifying the minimum acceptable and optimal aesthetic flows requires a sufficiently broad range of flows to allow evaluators to conduct a meaningful evaluation. AW also recommends that the focus group select the key observation points for the study rather than Erie making a unilateral decision on the locations.

Discussion and Staff Recommendation

The RSP does not describe how the target flow releases for the *Aesthetics Flow Assessment* were established. Erie has not received stakeholder input on the flow levels that would be studied or the locations from which flows would be viewed. A focus group composed of interested stakeholders typically discusses these types of parameters during the beginning phases of a study. Focus group meetings allow for collaboration and agreement on multiple decision points regarding the development of a study. Because there appears to be a limited number of locations to view the falls at each bypassed reach, incorporating stakeholder consultation in the determination of both the flow levels assessed and the locations from which to view the flows should not be unduly burdensome [(section 5.9)(b)(7)]. Therefore, we recommend that Erie use the expertise of the focus group to determine the number of releases, the appropriate aesthetic flow levels for the study, and to help determine if any observation locations, in addition to those identified in the RSP, would be appropriate. We anticipate that any potentially higher release levels, additional flow releases, and/or the addition of observation locations could increase the cost of the study by $5,000.

Focus group participants

Comments on the Study

New York DEC requests that the focus group for the aesthetics flow study include at least two of its representatives to assist in the review of the different aesthetic flows to be assessed. New York DEC recommends that one staff member from the Bureau of Fisheries and one from the Bureau of Ecosystem Health be included in the focus group.

Discussion and Staff Recommendation

Erie states that it would solicit the assistance of a small focus group (approximately 5 individuals) to consist of a representative from each group of interested stakeholders, such as New York DEC, FWS, AW, New York State Fish and Wildlife Management Board, and the Town of Trenton. The focus group would conduct a review of identified flow ranges for key observation locations adjacent to the Prospect and

Trenton bypassed reaches. The addition of a second New York DEC staff member would bring additional expertise to the focus group and would not cause undue burden on the group or on Erie. Therefore, we recommend that Erie consider additional members from identified stakeholder groups in order to create a well-rounded expert panel.

III. Studies Requested but not Adopted by Erie

Baseflow Study

Study Request

FWS requests that Erie conduct an Instream Flow Incremental Methodology (IFIM) study downstream of the Trenton Development to address the impacts of downstream flow fluctuations on the aquatic environment in West Canada Creek. FWS expresses concern with the existing 1980 IFIM study[17] and notes that the study does not address certain species and life stages or effects of peaking flows on habitat. FWS states that the recommended IFIM study should allow for stakeholder engagement, utilization of habitat-flow relationships from the 1980 IFIM study, the addition of more species and life stages, the incorporation of seasonal habitat-flow relationships under peaking conditions, and the incorporation of a temperature-flow model under average and high temperature conditions.

New York DEC recommends an IFIM study to determine the minimum baseflow downstream of the Trenton Development needed to protect aquatic life and describe how different flow regimes impact water temperature and dissolved oxygen. In its comments on the PSP, New York DEC recommends the IFIM study incorporate additional species and life stages, including rainbow trout, brook trout, smallmouth bass, primary forage species, spawning/egg incubation life stages, and evaluate effects of peaking flows.

Discussion and Staff Recommendation

The current minimum flow requirement (160 cfs) for West Canada Creek downstream of the Trenton Development is based on the results of an IFIM study conducted at two reaches downstream of Morgan dam and one reach downstream of Newport dam in August and September of 1980. This study evaluated a total of 41 cross-river transects and quantified habitat-flow relationships for brown trout and smallmouth bass (one reach only) at six flows ranging from 82 cfs to 350 cfs.

[17] Ichthyological Associates, Inc. 1980. Fish Habitat-Flow Relationship at Six Study Releases Below Trenton Hydroelectric Station on West Canada Creek, New York.

The 1980 IFIM study provides information to describe habitat for brown trout and smallmouth bass for project releases up to 350 cfs. Brown trout remains the focal management species in this section of West Canada Creek. Accordingly, the results of the existing IFIM study would be useful to assess the potential effects (gains or losses in habitat) of alternative baseflows that may be proposed during the licensing process [(section 5.9)(b)(5); (section 5.9)(b)(7)].

The 1980 IFIM study does not evaluate effects on all aquatic species, nor does it evaluate the full range of project operation. However, the agencies' comments indicate that the primary resource concern is water quality for trout when flows are low during the summer. New York DEC, provides some evidence that the existing minimum flow during hot summer conditions may not be adequate to protect trout from thermal stress and could lead to fish kills. Peaking flow would affect aquatic habitat for various species and life stages, but flows that exceed project capacity would have a much greater effect on these habitats. Mobile species would seek out suitable habitats at higher flows and there is no information in the record to suggest that higher discharge from the project negatively affects aquatic species. Immobile species (if present) and immobile life stages (egg incubation) may be affected by peaking operations, but high flows greater than the project's capacity would have a far greater effect on these resources. Therefore, an IFIM study that includes additional species and an analysis of peaking flow effects is not necessary to evaluate project effects or inform license conditions [(section 5.9)(b)(5)].

A clear nexus exists between project operation, water quantity, and water temperature, but a new IFIM study is not needed to evaluate this relationship. The *Water Quality Study*, as amended by this determination, would provide information to thoroughly evaluate project effects on water temperature downstream of the Trenton Development and examine potential alternative baseflow conditions. Modeling water temperature under average or high ambient temperature conditions may be useful, but this effort would not be necessary if Erie monitors an adequate range of temperature conditions during the *Water Quality Study* [section 5.9(b)(7)]. In addition, the *Aquatic Mesohabitat Assessment* would map aquatic habitat downstream of the Trenton Development and should provide some additional information to assess project effects on habitat conditions at a variety of flows. This information, in addition to the existing 1980 IFIM study, should be adequate for our analysis of project effects on flow and aquatic habitat [(section 5.9)(b)(5); section 5.9(b)(7)]. As such, we do not recommend Erie conduct an IFIM baseflow study at this time.

Bypass Reach Minimum Flow Study

Study Request

FWS expresses concern about Erie's proposed studies and methods to evaluate habitat in the Prospect bypassed reach because of the lack of stakeholder consultation. FWS recommends that Erie conduct an IFIM study in the Prospect bypassed reach and collect habitat data at a minimum of three locations and five controlled flow releases.

New York DEC recommends a flow demonstration study at both the Prospect and Trenton bypassed reaches to determine the minimum flow necessary to protect aquatic resources.

Discussion and Staff Recommendation

Considering Erie's proposed studies described above, an IFIM study in the Prospect bypassed reach should not be needed to evaluate the effect of different flows on aquatic habitat in this reach. Erie currently proposes to map aquatic mesohabitat, record water levels, evaluate the flow-habitat relationship, monitor water quality, and conduct macroinvertebrate and mussel surveys. As discussed previously, this determination also recommends Erie conduct a backpack electrofishing survey in the Prospect bypassed reach and consult with stakeholders on various issues, including field surveys and water level logger placement in the Prospect bypassed reach. As such, the proposed studies, as modified herein, should provide adequate information to describe existing aquatic resources, evaluate effects of different flows, and determine the need for a minimum flow in the Prospect bypassed reach [(section 5.9)(b)(5); (section 5.9)(b)(7)]. The Trenton bypassed reach has considerably less habitat connectivity than the Prospect bypassed reach, and thus a minimum flow study for aquatic resources is not likely needed to inform license conditions. Erie would conduct habitat mapping in this reach that would likely provide additional information to describe habitat and the potential need for a minimum flow. As such, we do not recommend Erie conduct an IFIM or other minimum flow study in the bypassed reaches at this time.