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OFFICE OF ENERGY PROJECTS

Project No. 3211-009 – New York
Hinckley (Gregory B. Jarvis) Hydroelectric Project
Power Authority of the State of New York

Cindy Brady
Business Development Manager, Licensing
New York Power Authority
123 Main Street
White Plains, NY 10601

**Reference: Study Plan Determination for the Hinckley (Gregory B. Jarvis)
Hydroelectric Project**

Dear Ms. Brady:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for the Hinckley (Gregory B. Jarvis) Hydroelectric Project (Jarvis Project) located on West Canada Creek, a tributary of the Mohawk River, near the Hamlet of Hinckley, 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 December 12, 2017, Power Authority of the State of New York (Power Authority or NYPA) filed its proposed plan for four studies covering water quality and quantity, fishery resources, and recreation resources in support of its intent to relicense the project.

NYPA held its initial Study Plan Meeting on January 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 Council of Trout Unlimited, Blake Bellinger on behalf of the Citizens for Hinckley (Citizens for Hinckley), the New York State Department of Environmental Conservation (New York DEC), and the Mohawk Valley Chapter of Trout Unlimited.

On April 11, 2018, NYPA filed a Revised Study Plan (RSP) that includes minor revisions to two studies included in the PSP. Comments on the RSP were filed by FWS, New York State Council of Trout Unlimited, Citizens for Hinckley, and New York DEC.

General Comments

A number of the comments received do not directly address study plan issues. This includes multiple comments that indicate there is some confusion regarding the project works that are licensed as part of the Jarvis Project, as well as whether NYPA is solely responsible for conducting the necessary studies and whether the New York State Canal Corporation (owner of Hinckley dam and reservoir)¹ should be required to be a co-licensee. To clarify, the Jarvis Project, as licensed, encompasses within its project boundary not only the Jarvis powerhouse, but also Hinckley dam and reservoir. Because the dam and reservoir are part of the project's complete unit of development, it is NYPA's responsibility to conduct the studies necessary to gather information regarding the environmental and cumulative effects of the project. However, at this time, it is premature to make a determination regarding whether the New York State Canal Corporation should be a co-licensee.

In addition to the above comments, comments were filed on NYPA's response to Commission staff's October 27, 2017 additional information request and several issues that stakeholders previously raised during scoping that Commission staff addressed in the Scoping Document 2, issued on December 12, 2017. This determination does not address these 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.

Study Plan Determination

NYPA's RSP is approved, with the staff-recommended modifications and two additional studies discussed in Appendix B. As indicated in Appendix A, of the four studies proposed by NYPA, one is approved with staff-recommended modifications and three are approved as filed by NYPA. In addition, this determination requires two additional studies, a desktop modeling study of peaking fluctuations (study 5), and a reservoir fluctuation field study (study 6). This determination also addresses several studies requested by stakeholders, but not adopted by NYPA and not required by this determination (see Appendix A). In Appendix B, we explain the specific modifications

¹ On January 17, 2017, New York State Canal Corporation became a subsidiary of NYPA.

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, we only reference the specific study criteria that are particularly relevant to the determination. For the reservoir fluctuation field study, we explain the need for the study and address all seven study criteria.

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 NYPA'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 May 11, 2019.

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, NYPA 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,

Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of studies subject to this determination
Appendix B – 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 NYPA**

Study	Recommending Entity	Approved	Approved with Modifications	Not Required
Required Studies				
1 – Hinckley Reservoir Bathymetric Survey	NYPA	X		
2 – Tailwater Water Quality Study	NYPA	X		
3 – Assessment of Fish Entrainment and Turbine Survival	NYPA	X		
4 – Recreation and Public Access Study	NYPA, New York DEC		X	
5 – Desktop Modeling of Peaking Fluctuations	FWS		X	
6 – Reservoir Fluctuation Field Study	Commission Staff	X		
Studies Requested but not Adopted				
Fish Surveys	FWS, New York DEC			X
Macroinvertebrate and Freshwater Mussel Surveys	FWS, New York DEC			X
Fish Protection and Downstream Passage Studies	FWS, New York DEC			X
Base Flow Study	FWS, New York DEC			X
Wetland Delineation and Aquatic Vegetation Study	New York DEC			X
Shoreline Erosion Study	New York DEC, Citizens for Hinckley			X

APPENDIX B

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

The following discusses staff’s recommendations on studies proposed by NYPA, 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. Required Studies

Study 1: Hinckley Reservoir Bathymetric Survey

The New York State Engineer and Surveyor’s office established contours for the Hinckley reservoir in 1912, before the reservoir was constructed, but no bottom contour surveys have been completed. In 1919 and 1921, the New York State Engineer used the 1912 bottom contour information to prepare area-volume curves to help estimate the volume of water stored in the reservoir at a given water elevation. While NYPA states that the elevation-volume relationship has been re-evaluated several times, including in 1934 by the U.S. Geological Survey (USGS) and in 1988 by NYPA, the bottom contours on which the elevation-volume relationships are based have never been surveyed.

Proposed Bathymetric Survey Area

Applicant’s Proposed Study

NYPA proposes a bathymetric survey of Hinckley reservoir to update project information on reservoir area and volume. The purposes of this study include obtaining the current bathymetric or bottom surface contours of the reservoir, and updating the elevation-area-volume curves.

Comments on the Study

New York DEC states that the proposed bathymetric survey area does not include the extreme northeast portion of the Jarvis Project boundary,² which should be included in the bathymetric survey.

Discussion and Staff Recommendation

In assessing this study issue, Commission staff reviewed figure 2.1.7-1 of the RSP that depicts the proposed track lines for the Hinckley reservoir bathymetric survey, and a timeline feature on Google Earth Map Satellite images for Hinckley reservoir. Based on the Google Satellite images, the reservoir's shoreline changes depending on whether it is a wet or dry season. In the PSP, NYPA states that the bathymetric survey will be performed during a period of high reservoir water levels in order to achieve the most spatial coverage, including areas that may be exposed or too shallow to survey during periods of low water level. In the RSP, in response to comments from Commission staff, NYPA further explained that it would develop new elevation-storage curves using the new bathymetric contour data, based on volumes calculated at 2-foot increments between water surface elevations 1,175 feet and 1,225 feet. Therefore, NYPA will perform the bathymetric survey for the entire surface area of Hinckley reservoir, which should address New York DEC's request.

Therefore, staff recommends approving NYPA's Hinckley Reservoir Bathymetric Survey as filed in the RSP.

Study 2: Tailwater Water Quality

Applicant's Proposed Study

NYPA proposes to monitor temperature, dissolved oxygen (DO), and pH in the project tailrace, with a continuously recording data sonde, from June 2018 through September 2018. The purpose of this study is to assess the potential effects of project

² In its comments on the RSP, New York DEC states that "the Jarvis Area of Potential Effect (APE) effectively includes the entire surface area of the reservoir, (see figure 3.5.1-1)." The figure to which it refers is the proposed APE NYPA submitted to the New York State Historic Preservation Office for its concurrence. This APE, which does not include the reservoir and has not been approved by the Commission, only applies to cultural resources and does not relate to the proposed bathymetric survey area. On May 4, 2018, NYPA filed a letter responding to comments received on the RSP. In that letter, NYPA confirmed that the APE in figure 3.5.1-1 of the RSP depicts the APE for cultural resource purposes only.

operation (e.g., low DO outflows from the powerhouse) on designated trout waters downstream of the project during the summer, when there is minimal spillage over the dam and water temperatures are the warmest.

Comments on the Study

New York DEC requests that NYPA continuously monitor temperature and DO upstream (in the project reservoir) and downstream of Hinckley dam for at least one full year and also conduct monthly sampling of pH, turbidity, and conductivity upstream and downstream of the dam to provide baseline water quality information. FWS also recommends continuous water quality monitoring both upstream and downstream of Hinckley dam, but only from June through September (not year-round). FWS also recommends that NYPA install the downstream sonde directly in the tailrace (closer to the powerhouse outflow) or place two sondes downstream of the dam so that the effect of spillage (e.g., increased re-aeration) can be properly accounted for when interpreting the results from NYPA's proposed water quality study.

Discussion and Staff Recommendation

As discussed in staff's study request issued on October 27, 2017, existing water quality data from the project reservoir are sufficient to describe baseline conditions for temperature, DO, and pH during existing operating conditions. These existing data indicate that stratification is most pronounced during the summer (June – September) and, it is during this time period that the project has the greatest potential to affect downstream water quality by passing low DO water through the project's deep intakes and downstream into designated trout waters. Therefore, year-round water quality monitoring is not necessary because data collected during June – September would be sufficient. Nor is it necessary to conduct additional water quality monitoring in the project reservoir given the adequacy of the existing data from this area.

Regarding FWS's recommendation on the placement of the downstream sonde(s), spillage is expected to be infrequent during the summer and occurs only about 5 percent of the time during June – September.³ Accordingly, NYPA's proposed monitoring location is in the area where the bulk of the outflow from the project occurs during the

³ Based on information in the PAD: during June – September (years 2001-2016), reservoir elevations only exceeded 1,225 feet (Barge Canal Datum) about 5 percent of the time. When reservoir elevations exceed 1,225 feet, the 2012 Operating Diagram requires NYPA to release 1,800 cfs, which is the maximum hydraulic capacity of the project; accordingly, any outflows above 1,800 cfs (e.g., due to rain events) would spill over the dam.

summer and will therefore provide sufficient data for staff's environmental analysis of the potential effects of project operation on downstream water quality.

Although New York DEC recommends 'other' water quality parameters such as turbidity and conductivity be measured on a monthly basis, it provides no justification for the need [section 5.9(b)(4)] of such measurements, nor does it explain how these parameters could be affected by project operation [section 5.9(b)(5)]. Therefore, staff are not recommending monthly measurements of turbidity and conductivity.

For the reasons described above, staff recommends approving NYPA's Tailwater Water Quality Study, as filed in the RSP, without the modifications requested by New York DEC and FWS.

Study 4: Recreation and Public Access

Applicant's Proposed Study

NYPA proposes to conduct a Recreation & Public Access study to evaluate the existing and future recreational use, capacity, condition, and accessibility of public recreation facilities in the project vicinity. NYPA will gather information via a literature review; outreach to local municipalities, agencies, and organizations; an assessment of all public recreation sites within the project boundary;⁴ and field surveys that include visitor surveys and spot counts at project recreation sites, and an inventory of each formal and informal public recreation site and facility in the study area. The visitor surveys and spot counts will be conducted only at project recreation sites, which include a NYPA-owned boat launch, a NYPA-owned scenic overview on the north end of the dam, and an informal fishing access area at the project tailrace. NYPA does not propose to evaluate any private recreation facilities in the study, including commercial campgrounds, because they are not project recreation facilities nor are they under the control of NYPA. The results of the recreation study will be used to evaluate the overall adequacy of project recreation facilities and whether changes or upgrades are needed to meet current or future recreation needs.

Scope of Study

Comments on the Study

Citizens for Hinckley comments that the study needs to be more comprehensive and include all recreation areas on the lake, especially all boat launches and beaches.

⁴ NYPA states that public recreation facilities include well-used sites within the project boundary accessed by the public without trespassing.

New York DEC comments that the study area for the Recreation & Public Access study encompasses the entire surface area of the reservoir and impacts to recreation and public access within the entire study area should be studied, including impacts to properties not owned by NYPA.

Discussion and Staff Recommendation

Hinckley reservoir is part of the Jarvis Project and in order for staff to have a clear understanding of how the project affects recreation, it is important to have information on all recreation opportunities within the project boundary. As proposed, NYPA would only formally study public recreation sites at the project. However, multiple private recreation facilities also provide access to Hinckley reservoir. Although we cannot require these private entities to cooperate with NYPA, it is important to have information on the types and amount of recreation these sites provide. To the extent feasible, staff recommends that NYPA coordinate with these private entities to gather information on the types of recreation opportunities they offer and any usage data they maintain. If NYPA is unable to access the sites to describe in detail the provided amenities and access options, staff recommends that NYPA summarize, as accurately as possible (e.g., is there a boat ramp, a campground, or other facilities?), what the private recreation sites provide.

Further, NYPA is only proposing to conduct user surveys and spot counts at the three project recreation sites located on the southwestern end of the reservoir. While NYPA proposes to identify, describe, and photo document each formal and informal public recreation site and facility in the study area (within the project boundary), it does not propose to conduct any spot counts or administer user surveys at any of these sites, including at the New York DEC-owned boat ramp on the eastern shoreline of the reservoir.⁵ As a result, users recreating at these sites and on the northeastern portion of the reservoir, away from the NYPA-owned boat launch, will not have their usage counted. In order to provide a complete picture of recreation usage at the project, staff recommends that NYPA conduct visual spot counts of recreation use at these sites when NYPA evaluates the sites during the field surveys, and visit the sites on four randomly selected days throughout the study period. While these public recreation sites, which may not contain any formal recreation facilities, do not need to be studied as thoroughly as the project's more formal recreation areas, visiting them periodically throughout the study period to assess the level of use during the summer will inform a decision on whether additional information is needed.

⁵ NYPA states that, if available, information on facility use and capacity and user survey results will be obtained from New York DEC.

Seasonal Recreation

Comments on the Study

NYPA proposes to conduct the recreation field surveys between May 12, 2018 and October 8, 2018. Citizens for Hinckley requests that NYPA study recreation at the project during all seasons, because it claims there is a “substantial” amount of winter recreation at Hinckley reservoir, especially ice fishing and snowmobiling. Citizens for Hinckley states that by only conducting field surveys in the summer, NYPA will not get an accurate depiction of seasonal recreation at Hinckley reservoir because many people that come to recreate in the area during the winter do not also recreate there during the summer months.

Discussion and Staff Recommendation

While NYPA’s literature review and visitor use survey will gather information on seasonal usage, NYPA does not propose to conduct field surveys in the winter. NYPA states that it closes the project boat launch during the winter and does not encourage winter recreation; therefore, any access to the reservoir or surrounding areas during the winter is not from project facilities. We note, however, that the reservoir is a project facility and recreation use on the reservoir is project-related recreation regardless of the means of access. Further, winter recreation is a popular pastime in central New York and according to the Relative Index of Needs within the New York Statewide Comprehensive Outdoor Recreation Plan, both Herkimer and Oneida counties, where the project is located, have the highest need for miscellaneous local winter activities.⁶ However, Citizens for Hinckley did not provide any information as to why NYPA’s proposal to gather seasonal information through the literature review and the summer visitor use survey was not sufficient [section 5.9(b)(4)], nor did it justify the additional cost of conducting field work in the winter [section 5.9(b)(7)]. Therefore, NYPA’s proposal to gather this information through the literature review and by asking summer visitors about their seasonal usage of the project is an acceptable method for gathering this information. The results of the study as proposed by NYPA would inform a decision on whether field surveys for winter recreation at the project need to be gathered during the second study season. Therefore, at this time, staff does not recommend Citizens for Hinckley’s requested modification to the Recreation & Public Access study to conduct field surveys during the winter.

⁶ New York State Office of Parks, Recreation, and Historic Preservation. Statewide Comprehensive Outdoor Recreation Plan, 2014-2019. Pages 29-32. <https://parks.ny.gov/inside-our-agency/documents/201419StatewideComprehensiveOutdoorRecreationPlan.pdf>.

Reservoir Fluctuations

Comments on the Study

During the study plan development process, numerous stakeholders requested information on the effects of reservoir fluctuations on recreation at the project. In our October 27, 2017 letter requesting additional information and study requests, Commission staff requested a recreation study that included an analysis of how reservoir fluctuations affect recreation. As part of that request, staff stated that NYPA should use the results of the reservoir bathymetry study to quantify the relationship between reservoir surface area and reservoir levels (i.e., reservoir elevation) for the full range of operation (i.e., minimum reservoir level to full pool). Staff further requested that NYPA map this relationship to visually assess the effects of reservoir levels on reservoir surface area and identify specific areas that may become inaccessible for recreation at lower reservoir levels. In the RSP, NYPA states that it does not propose to conduct any analyses regarding the impact of water level fluctuations on recreation, as reservoir operations are independent of hydroelectric operations.

Discussion and Staff Recommendation

Although NYPA states that reservoir operations are independent of hydroelectric operations, the reservoir is part of the licensed unit of development for the Jarvis Project. As part of any licensing proceeding, staff must be able to evaluate the relative costs and benefits of any proposed or required license conditions for the project (e.g., target water elevations during summer) [section 5.9(b)(5)]. In order to do that, staff must have an understanding of how the project affects the existing environment (baseline), including the effect of reservoir fluctuations on recreation. For this reason, staff is recommending a reservoir fluctuation field study that characterizes and describes the various public access resources, including all recreation areas, present within the littoral zone of the project reservoir (Appendix B). This study will enable staff to assess the potential effects of continued project operation and reservoir fluctuations on these resources, and to inform potential license conditions (e.g., assessing the benefits of more stable water levels during summer). So that we can have a complete picture of how reservoir fluctuations affect recreation, staff recommends that NYPA incorporate the results of the reservoir fluctuation field study into the final Recreation & Public Use study report.

For the reasons described above, staff recommends approving NYPA's Recreation & Public Access study, as filed in the RSP, with the modifications discussed above.

Study 5: Desktop Modeling of Peaking Fluctuations

Study Request

In its comments on the RSP, FWS reiterated its request for a reservoir modeling study to quantify the extent to which peaking operations at the project contribute to daily water level fluctuations in the reservoir. FWS notes that, based on the results of this model, it may recommend additional habitat studies to determine the quantity and quality of littoral habitat being affected by fluctuations related to project operation.

Comments on the Study

In response to FWS's initial study request, NYPA provided, in its PSP, the results of a desktop simulation that estimated and compared reservoir water levels under a constant 24-hour release (e.g., 600 cubic feet per second (cfs) each hour) versus a peaking schedule. Under the peaking scenario, the project released 1,800 cfs (the maximum generating capacity) for 4 hours and lower amounts of water during non-peaking hours (e.g., 360 cfs) such that the daily average outflow from the project matched that required by the 2012 Operating Diagram.⁷ Simulations were performed for various combinations of reservoir elevations (1,225, 1,215, 1,205, and 1,195 feet⁸) and Operating Diagram releases (300, 600, 900, 1,200, 1,500, and 1,800 cfs). NYPA's simulation evaluated a single reservoir inflow (400 cfs) and assumed the volume of the reservoir was 25.8 billion gallons based on pre-construction (planned) bottom contours from over 100 years ago that have not been verified. NYPA states that FWS's requested reservoir modeling study is not necessary because its analysis demonstrates that water level fluctuations attributable to peaking are minor (less than 3 inches in magnitude) and do not affect any resources.

Discussion and Staff Recommendation

FWS suggests that the 2012 Operating Diagram could be used as the basis for a reservoir model to simulate reservoir water levels, but provides no further details on how the model should be developed or the input and output variables that should be

⁷ The 2012 Operating Diagram resulted from agreements between the New York State Canal Corporation and two entities (Brookfield Power and the Mohawk Valley Water Authority) regarding how much water should be released from Hinckley Reservoir each day of the year (from 160 cfs to 1,800 cfs, depending on reservoir elevations). See page 19 of the Pre-Application Document (PAD), filed June 30, 2017.

⁸ All elevations reported herein are in Barge Canal Datum, which is 1.04 feet higher than National Geodetic Vertical Datum 1929.

considered in the modeling exercise. To provide a more accurate evaluation of reservoir fluctuations under existing project operation, the results of the desktop analysis need to be updated with the elevation-specific reservoir volumes obtained from study 1 and also include multiple inflow scenarios as recommended by staff below.

Estimating the magnitude of reservoir fluctuations associated with peaking requires accurate estimates of reservoir elevation, area, and volume. However, as described above, the current volume of Hinckley reservoir has yet to be verified. If the volume of the reservoir is considerably different from that assumed 100 years ago (e.g., if the volume is lower due to infilling), then releasing 1,800 cfs during peaking hours may result in a greater drop in water levels than those calculated in NYPA's simulation analyses.

In the RSP, NYPA presents data from a gage in the project reservoir (USGS No. 01343900) during a week in June 2008. NYPA concludes that the project does not contribute to reservoir fluctuations because these data demonstrate there are no measurable changes in water levels during the peaking period. NYPA further concludes that reservoir fluctuations are solely caused by variations in natural inflow and the 2012 Operating Diagram. However, these empirical data provide a very conservative estimate of the magnitude of fluctuations associated with peaking because project releases during the week analyzed ranged from only 600 cfs (non-peaking) to 700 cfs (peaking); whereas the potential range of project releases during peaking are from 160 cfs (minimum flow) to 1,800 cfs (maximum hydraulic capacity of the project).

Water level fluctuations attributable to peaking are also a function of reservoir inflows. For instance, at a given (fixed) Operating Diagram release and reservoir elevation, larger reservoir fluctuations would be expected under higher inflows because there would be a greater buildup of water (or less water released from the reservoir) during non-peaking hours. According to the PAD, monthly median inflows to the reservoir range from 250 cfs to 2,243 cfs, but, as noted, NYPA's simulations assumed a single value for inflow (400 cfs).

Therefore, we recommend that NYPA expand and update its original simulation analysis (presented in the PSP) by accounting for the new reservoir volume estimates obtained in Study 1 – Hinckley Reservoir Bathymetric Survey, and modeling several inflows each month. Specifically, the new calculations should be based on the elevation-specific reservoir volumes from Study 1 and the following reservoir inflows should be evaluated for each month: (1) the 90 percent exceedance inflow, (2) the 50 percent

exceedance or median inflow, and (3) the 10 percent exceedance inflow.⁹ The same reservoir elevations (1,225, 1,215, 1,205, and 1,195 feet) and Operating Diagram releases (300, 600, 900, 1,200, 1,500, and 1,800 cfs) evaluated in the PSP analysis can be used in the new simulations. As an example: for the month of August, water levels would be simulated for a 24-hour constant release and a peaking schedule (4 hours at 1,800 cfs) at an elevation of 1,195 feet for Operating Diagram releases of 300, 600, 900, 1,200, 1,500, and 1,800 cfs under the median (50 percent exceedance) reservoir inflow for August. Then the simulation should be repeated for the other two inflows that month (90 percent and 10 percent exceedance) and elevations (1,205, 1,215, and 1,225 feet).

Lastly, there is conflicting information regarding the frequency of peaking activity at the project. At the environmental site visit on September 26, 2017, NYPA indicated that peaking only occurs 5 to 15 days at most (4 hours each day) from May through October each year. However, in the RSP, NYPA states that in January 2018, peaking had already occurred on four days, all of which were outside the purported peaking period. Therefore, to clarify this issue, a table should be included in the study report that includes, for representative wet, dry, and average years, the number of days each month, for each representative year, that the project peaked and the typical peaking duration. The study report should also note if there is a consistent timeframe each month or season during which daily peaking occurs (e.g., mornings in the winter and afternoon/evenings in summer).

In conclusion, staff recommends the requested reservoir fluctuation modeling study, with the modifications described above, as this desktop study will provide staff with information necessary to conduct our environmental analysis and assess the potential effects of project operation—namely the magnitude and frequency of reservoir fluctuations associated with peaking—on aquatic, recreation, and geologic resources.

Study 6: Reservoir Fluctuation Field Study

Based on comments received on the RSP, we have identified a gap between the information in the PAD and the information needed to assess project effects. In order to address this gap, we recommend that NYPA conduct a reservoir fluctuation field study. As required in section 5.9 of the Commission's regulations, we address the seven study request criteria for the study request that follows.

⁹ Monthly reservoir inflow data should be obtained from the upstream USGS gage (No. 01343060) at Wilmurt (years 2001-present) and pro-rated for the difference in drainage areas between that gage and the Hinckley Reservoir, as in the PAD.

Criterion (1) – Describe the goals and objectives of each study proposal and the information to be obtained.

Under existing operating conditions, the project reservoir (Hinckley reservoir) experiences large seasonal fluctuations in water levels (10-30 feet) due to the 2012 Operating Diagram. There are currently no required target elevations for reservoir water levels (e.g., based on a traditional rule curve). Instead, water levels are controlled by the 2012 Operating Diagram,¹⁰ which requires releases be made from the reservoir every day of the year regardless of reservoir inflows. These prescribed releases support multiple downstream uses by: (1) providing water to support navigation on the Erie Canal, (2) serving as the primary water supply for the City of Utica, and (3) providing water for hydropower generation at the Jarvis Project and downstream West Canada Creek Project. The releases for navigation and hydropower generation occur directly through the Jarvis powerhouse, whereas public drinking water is withdrawn from the reservoir itself via a depth-selective intake tower. Although the 2012 Operating Diagram calls for lower releases when reservoir levels are lower, releases are made every day, regardless of inflow, which causes significant drawdowns of the reservoir that are most pronounced in late winter-early spring (February through early April) and late summer-early fall (August through October). Because these drawdowns occur during the prime recreation season in upstate New York and coincide with the growing season of fish, wildlife, and plants, the reservoir fluctuations that occur in summer and early fall could potentially effect numerous resources (aquatic, terrestrial, recreation, and geology and soils).

The goal of this study is to characterize and describe the various resources present within the littoral zone of the project reservoir to enable staff to assess the potential effects of continued project operation and reservoir fluctuations on these resources, and to inform potential license conditions (e.g., assessing the benefits of more stable water levels during summer). To achieve this goal, the first objective of this study (phase 1) is to conduct a reconnaissance-level survey along the entire reservoir shoreline to describe shoreline habitat (substrate, cover, etc.) and identify locations where resources would be most susceptible to reservoir fluctuations (public and commercial boat launches and beaches, areas containing suitable substrates for mussels or fish spawning, wetlands, etc.). The second phase of this study would involve returning to representative locations identified in phase 1 (e.g., boat launches, areas with exposed centrarchid nests or wetlands) to more thoroughly evaluate and quantify the existing resources in those areas. Phase 2 should occur when summer reservoir levels are typically the lowest (late September).

¹⁰ See page 19 of the PAD.

Criterion (2) – If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.

Not applicable.

Criterion (3) – If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its licensing decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued must be best adapted to a comprehensive plan for improving or developing the waterway or waterways for all beneficial public uses.

Criterion (4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

Other than a report of a snail kill and exposed centrarchid spawning nests during September 2007,¹¹ when reservoir levels were more than 30 feet below full pond, there is little existing information on the various resources present or their locations (elevations at which they occur) in the littoral zone at the project. As such, existing information on shoreline resources is insufficient for staff to evaluate the potential effects of continued project operation and associated reservoir fluctuations on shoreline resource areas. A reservoir fluctuation field study described herein will provide this necessary information.

Criterion (5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Hinckley reservoir is included in the project boundary for the Jarvis Project. As such, the reservoir is subject to the Commission's licensing authority as a project work necessary to the complete unit of development of the Jarvis Project.¹² To that end, staff must be able to evaluate the relative costs and benefits of any proposed or required license conditions for the project (e.g., target water elevations during summer). A

¹¹https://www.health.ny.gov/environmental/investigations/hinckley_reservoir/docs/2008-04-30_report_to_the_governor.pdf

¹² See NYSEG, 15 FERC ¶ 61,066, at 61,134-35 (1981), *order on reh'g*, 16 FERC ¶ 61,176, at 61,392-94 (1981).

reservoir fluctuation field study will provide staff with the information necessary to conduct these evaluations and develop license conditions that balance developmental and non-developmental values of the project and ensure the best comprehensive public use of the waterway pursuant to sections 10(a) and 4(e) of the Federal Power Act.

Criterion (6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

Given the lack of information on littoral zone resources, the study should occur in two phases. Phase 1 should include a reconnaissance-level survey of the entire shoreline of the reservoir to identify locations that appear most prone to, and potentially affected by, reservoir fluctuations. Specifically, the locations of all public and commercial, recreation areas (boat launches, marinas, beaches, campgrounds, etc.) should be recorded. Areas containing potentially suitable habitats for fish spawning and refugia (e.g., cobble/gravel, SAV, large woody debris) and mussels should also be recorded, as well as areas where there is a high potential for fish stranding (i.e., low slopes with uneven topography). Areas in which there is a high potential for erosion or where active erosion is occurring, and areas with NWI- and New York DEC-mapped wetland habitat in proximity to the shoreline should also be noted. In addition, general habitat types found along the shoreline should be characterized, mapped, and photographed; qualitative habitat classifications typical of impoundment fluctuation studies (e.g., sandy substrate with large woody debris) can be used for these purposes. Phase 1 of the study could be conducted by boat and preferably would occur early enough in the August through October period so that phase 2 can be completed within the same study season. To identify all potentially affected habitats and recreation sites as part of phase 1, NYPA should incorporate the results of the field inventory (task 2) conducted as part of the Recreation & Public Access study, and consult with local resource agencies, including New York DEC.

During phase 2 of the study, the representative sites and locations identified in phase 1 (e.g., shoreline areas with exposed centrarchid nests, informal recreation areas, wetlands, or SAV beds) should be re-visited and those shoreline areas quantitatively sampled (e.g., via transects) to determine the elevation and distribution of potentially affected resources. Aquatic organisms and important habitat features encountered should be photographed and quantified to an extent that allows staff to compare their abundance and distribution along the bank gradient perpendicular to the shoreline—as an example, 70 percent of exposed centrarchid nests occur between elevations of 1,220 and 1,215 feet (or 5-10 feet below full pond). Therefore, phase 2 would ideally occur when water levels are lowest during the late summer-early fall (historically late September).

The study report should provide maps of shoreline habitat types and recreation sites identified in phase 1, overlaid with the locations of all areas and sites further investigated as part of phase 2. In addition, a table should be included that reports the elevations (or range of elevations) at which each feature or group of organisms identified at the various sites in phase 2 occurred.

One study season may be sufficient if both phases of the study can be completed in the August to October timeframe and water levels are sufficiently low and typical of those experienced during normal operating conditions. If 2018 is an anomalously wet year, and reservoir levels remain relatively high, or if results are not deemed adequate for our environmental analysis, a second study season may be necessary.

Criterion (7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

As described above, if normal reservoir levels occur in 2018, then one field season should be sufficient to perform the study, with a month or two of data analysis and report writing. The estimated total cost of this study is approximately \$60,000 to \$80,000, but will depend in large part on the results of phase 1; namely, the type and extent of aquatic habitats and number of recreation facilities identified in phase 1 that will need to be re-visited in phase 2.

II. Studies Requested but not Adopted by NYPA

Fish Surveys

Study Request

New York DEC and FWS request that NYPA conduct fish surveys using a variety of gear (electrofishing, gill nets, seines, etc.) and sample both upstream and downstream of Hinckley dam during at least three seasons (spring, summer, and fall), and all four seasons, if possible. The purpose of these surveys would be to provide information on existing fishery resources in the project area.

Discussion and Staff Recommendation

Information on annual stocking numbers, sizes, and locations are provided in the PAD and can also be found on New York DEC's website.¹³ In addition, several gill net

¹³ <https://www.dec.ny.gov/outdoor/23318.html>

surveys conducted in the project area (mainly the reservoir) across years 1989 to 2004 provide information on other fish species that are present in the project area, as well as their sizes (table 4.4.2-2 in the PAD). These existing data are adequate for staff to characterize the existing fish community and conduct our environmental analysis of project-related effects (e.g., entrainment mortality) on fishery resources in the project area. Therefore, staff does not recommend that NYPA conduct fish surveys upstream or downstream of the project.

Macroinvertebrate and Freshwater Mussels Surveys

Study Request

Due to the lack of survey data from the project area, FWS and New York DEC request that NYPA conduct freshwater mussel and macroinvertebrate surveys upstream and downstream of Hinckley dam to assess the potential effects of project operation—namely upstream water level and downstream flow fluctuations—on any existing invertebrate populations.

Discussion and Staff Recommendation

There is considerably more potential habitat for invertebrates in the project reservoir, which has approximately 17 miles of shoreline and a surface area of 2,850 acres, compared to the limited downstream extent of the project—a short tailrace 150 feet in length that empties directly into an impoundment (Prospect reservoir) used by the West Canada Creek Project (FERC No 2701). Accordingly, while the Jarvis Project has the potential to affect invertebrate populations that are present upstream of Hinckley dam, downstream project effects on physical habitat are likely limited. Furthermore, the presence of mussels in the project reservoir will be assessed during the required reservoir fluctuation field study (Study 6). Therefore, staff does not recommend that NYPA conduct a separate macroinvertebrate and mussel survey that is independent of that recommended study to observe exposed shorelines for the presence of mussels as part of the reservoir fluctuation field study.

Fish Protection and Downstream Passage Studies

Study Request

FWS and New York DEC request that NYPA conduct a literature review to explore downstream passage alternatives to avoid fish entrainment into the project turbines in order to inform the development of effective mitigation measures for impingement and entrainment mortality.

Discussion and Staff Recommendation

A literature review of the feasibility and effectiveness of different downstream fish passage designs and facilities is premature at this time without any knowledge of the degree of expected entrainment mortality at the project and its potential effects on resident fish populations. NYPA's proposed desktop study (Study 3 – *Assessment of Fish Entrainment and Turbine Passage Survival*) will provide estimates of entrainment mortality that will serve as a basis for determining the need for an evaluation of downstream passage options. Therefore, at this time, staff does not recommend that NYPA conduct a fish protection and downstream passage study. The need for downstream passage enhancements should be addressed during the Initial Study Report meeting based upon the results of Study 3.

Minimum Downstream Flow Study

Downstream of the Jarvis Project, there are three mainstem dams on West Canada Creek within 5 miles (figure 2). The West Canada Creek Project includes the Prospect and Trenton Falls developments. Morgan dam (also known as the Nine Mile Creek feeder dam) is used by the New York State Canal Corporation to divert water from the mainstem to Nine Mile Feeder Creek, as needed, to support navigation on the Erie Canal. The licenses for the Jarvis¹⁴ and West Canada Creek¹⁵ Projects each require a minimum flow of 160 cfs measured immediately downstream of Morgan dam (see figure 1). To ensure this section of river 5 miles downstream of the Jarvis Project receives the required minimum flow, both the Jarvis and West Canada Creek Projects must release at least 160 cfs at all times. The section of river to which the minimum flow applies is currently managed as a trophy trout fishery with special regulations that differ from other portions of West Canada Creek.¹⁶

¹⁴ 20 FERC ¶ 62,264 (1982).

¹⁵ 22 FERC ¶ 62,347 (1983).

¹⁶ These regulations include: (1) catch-and-release only, (2) artificial lures only, and (3) a season that is open year-round.

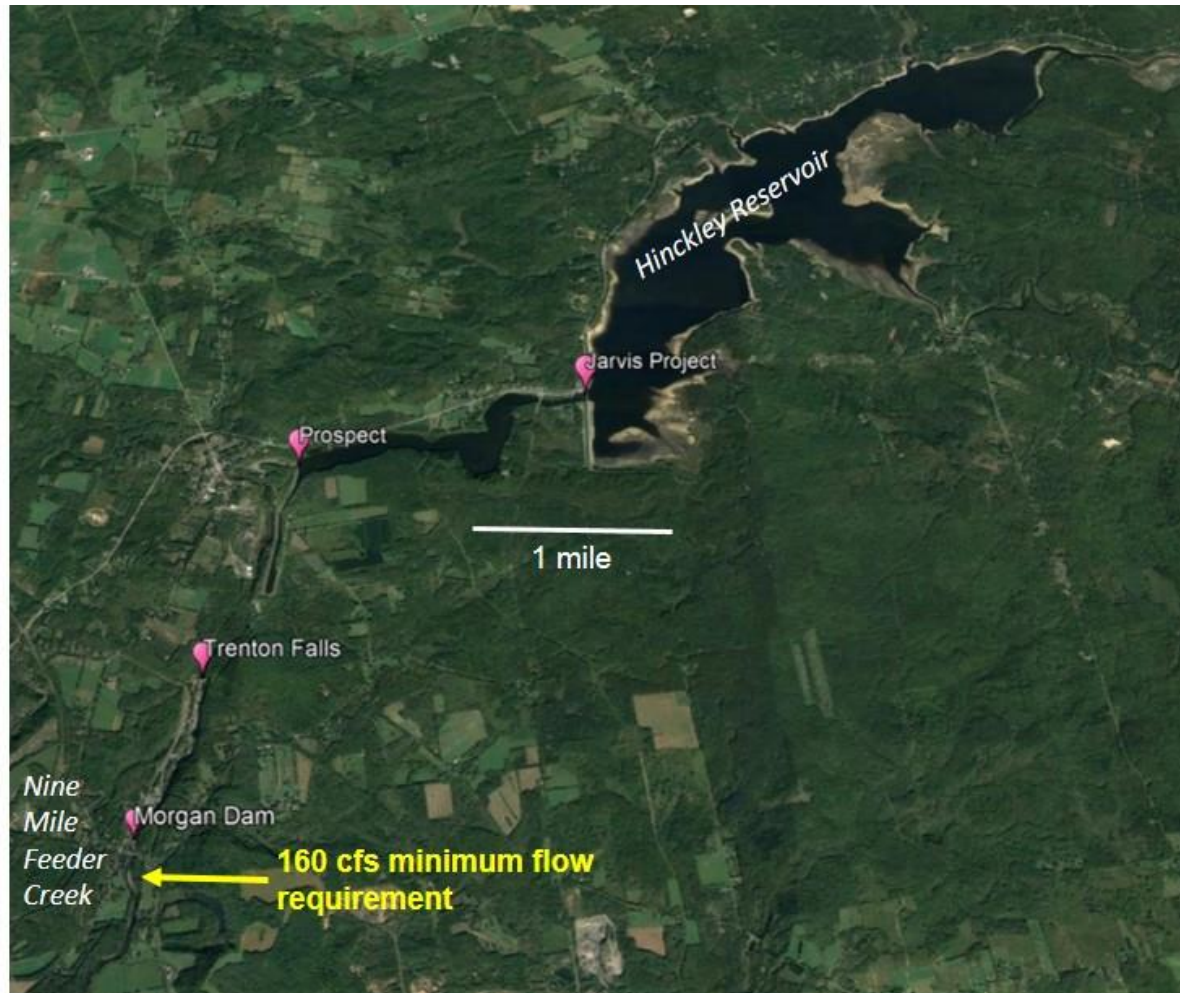


Figure 1: Map of upper West Canada Creek showing the locations of dams near the Jarvis Project, which is the uppermost dam on the river. The West Canada Creek Project comprises the Prospect and Trenton Falls developments.

Study Request

FWS and New York DEC request that NYPA conduct a Delphi flow study in the section of West Canada Creek immediately below Morgan dam, which has the minimum flow requirement of 160 cfs, as described above. The purpose of this study would be to determine whether 160 cfs is an appropriate flow for aquatic resources in this section of West Canada Creek.

Discussion and Staff Recommendation

The minimum flow requirement for West Canada Creek downstream of the Jarvis and West Canada Creek Projects is based on the results of an Instream Flow Incremental

Methodology (IFIM) study¹⁷ conducted just downstream of Morgan dam in August and September of 1980. This study evaluated 11 to 14 cross-river transects in each of two reaches of West Canada Creek and quantified habitat-flow relationships for brown trout at six flows across a range of 82 cfs to 350 cfs. The six flows evaluated (released from the Trenton Falls development) included: 82, 160, 200, 250, 300, and 350 cfs. In its comments on the RSP, New York DEC questions the accuracy of these six flows. However, flow measurements made along each transect verified the actual flows evaluated were similar to the planned flows based on the study design. Specifically, the mean difference between measured (actual) and intended (planned) flows across all transects and reaches ranged from 1 cfs to 21 cfs, with a mean difference of just 12 cfs.

The 1980 IFIM study is more quantitatively robust and provides more predictive power than the Delphi approach recommended by the agencies, which is more qualitative and observational in nature. In addition, the habitat-flow relationships were developed for brown trout, which remains the focal management species in this section of West Canada Creek. Accordingly, the results of the existing IFIM study will be sufficient to assess the potential effects (gains or losses in habitat) of alternative minimum flows that may be proposed during the licensing process. Therefore, staff does not recommend that NYPA conduct the requested flow study.

Wetlands Delineation and Aquatic Vegetation Study

Study Request

New York DEC requests that NYPA conduct a wetland delineation to document all wetlands within the project vicinity and surveys to identify any aquatic vegetation to provide information on the extent and quality of wetlands and aquatic vegetation.

New York DEC requests that NYPA conduct the recommended wetland delineation using techniques commonly accepted by the scientific community, and states that the level of effort and associated cost of wetland delineation and aquatic vegetation mapping would be relatively low and can probably be collected during field work for other studies. New York DEC also acknowledges that much of the readily available information on wetlands is presented in the PAD.

¹⁷ Ichthyological Associates, Inc. 1980. Available at: http://www.jarvis.nypa.gov/Lists/JARVIS%20Relicensing%20Documents/Attachments/48/West_Canada.pdf

Discussion and Staff Recommendation

NYPA estimates that approximately 280 acres of National Wetlands Inventory (NWI)-mapped wetlands and 59.2 acres of New York DEC-mapped wetlands are located within 1,000 feet of the project boundary.¹⁸ The PAD states that, although no formal surveys of littoral zone vegetation have been completed for the Jarvis Project, submerged aquatic vegetation (SAV) growth within Hinckley reservoir is limited by the constant shifting of the reservoir's sand and gravel substrate by wave action.¹⁹

Wetland Delineation

Although we acknowledge that NWI and New York DEC wetland maps are based on aerial imagery and do not reflect the precise boundaries of wetlands present within the project boundary, the level of detail provided by standard wetland delineation methodology exceeds the needs for our environmental analysis [section 5.9(b)(4)]. Also, a wetland delineation following standard methods(i.e., the U.S. Army Corps of Engineers' Wetland Delineation Manual) of at least 280 acres of wetlands along 17 miles of shoreline around Hinckley reservoir would be cost- and effort-intensive and may not provide greatly different data from existing NWI and New York DEC datasets [section 5.9(b)(7)]. Therefore, staff does not recommend that NYPA conduct a wetland delineation. However, we need information on the potential effects that water level fluctuations have on wetlands within the project boundary. Therefore, we recommend that NYPA document and assess potential impacts to palustrine wetlands along the Hinckley reservoir shoreline as part of the reservoir fluctuation field study described in Appendix B.

Aquatic Vegetation Study

Regarding aquatic vegetation, although NYPA suggests that conditions within Hinckley reservoir are unsuitable for SAV development, it is unclear whether any SAV beds are present within the project boundary. As SAV may provide important habitat for game fish species occurring within the project area (including smallmouth bass, yellow perch, and sunfish), we need information on the presence and extent of SAV within areas of Hinckley reservoir that are subject to water level fluctuations due to either project peaking operation or operation in accordance with the 2012 Operating Diagram. Therefore, as part of the reservoir fluctuation field study described in Appendix B, we

¹⁸ See section 4.6.1 (page 115) of the PAD, and Figures 2.8-1A, -1B, and -1C in the PSP.

¹⁹ See Section 4.6.3 (page 116) of the PAD.

recommend that NYPA document SAV along the Hinckley reservoir shoreline and assess potential effects to SAV resulting from water level fluctuations.

Shoreline Erosion Study

Study Request

In its comments on the PSP, New York DEC stated that a shoreline erosion study is necessary to determine if there is a causal link between Jarvis Project operation and the potential shoreline erosion in Hinckley reservoir and West Canada Creek. In comments on the RSP, Citizens for Hinckley requests a study on the impacts of water level fluctuations on shoreline erosion.

Discussion and staff recommendation

In the PAD and a subsequent response to our October 27, 2017 request for additional information, NYPA maintains that there is minimal to no shoreline erosion within the reservoir and downstream portion of the project boundary. NYPA acknowledged that a small area of erosion downstream of the project boundary was the result of high flows that passed over the project dam spillway during the April 28, 2011 flood of record. In addition, NYPA provided information on soil types within the project boundary, indicating the presence of loamy sand and other soil map units with slight to moderate erosion hazard ratings.²⁰

In contrast, comments filed by several stakeholders during scoping (Stephen Wheeler, Heidi Benson, Jim Darcy, David Corr on behalf of Trout Unlimited, and Trout Power) indicate that shoreline erosion is apparent within Hinckley reservoir, although no supporting documentation of shoreline erosion was filed. In filings on the PSP and RSP, Citizens for Hinckley states that any sandy shorelines and banks along a body of water are subject to erosion, and this is occurring at Hinckley reservoir. Citizens for Hinckley provides property boundary maps, and a portion of a property survey that purportedly shows a land survey marker within the water of Hinckley reservoir, suggesting that the reservoir shoreline has eroded inland past the boundary of New York State land and private property.

NYPA acknowledges that minimal erosion may occur within the project boundary, and it is likely that some level of shoreline erosion is occurring within Hinckley reservoir. Water level fluctuations within the reservoir, , have the potential to exacerbate shoreline

²⁰ <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx> (Soil Data Explorer, Erosion Hazard [Off-Road, Off-Trail] Report Tool).

erosion. However, natural processes such as wave action, wind, or high-flow events, also are likely to contribute to shoreline erosion.

The shoreline erosion study requests filed by New York DEC and Citizens for Hinckley do not address the study request criteria requirements of section 5.9(b), so it is unclear what the goals, methodology, or level of effort or cost would be for the study. Many of the comments regarding shoreline erosion in Hinckley reservoir show concern over shoreline erosion causing sedimentation within the reservoir, resulting in impacts to recreational navigation and reservoir volume. NYPA's proposed bathymetric survey (Study 1) should provide the means to calculate the present reservoir volume. Therefore, at this time, staff does not recommend that NYPA conduct a shoreline erosion study within the project boundary, as requested by New York DEC and Citizens for Hinckley.

However, as we need information on shoreline erosion within Hinckley reservoir that is potentially caused by water level fluctuations, we recommend that NYPA document and assess incidences of shoreline erosion within Hinckley reservoir as part of the reservoir fluctuation field study described in Appendix C.