



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mid-Atlantic Fish and Wildlife Conservation Office
177 Admiral Cochrane Drive
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Low Impact Hydropower Institute
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RE: U.S. Fish and Wildlife Service comments on the Low-Impact Hydropower Power Institute Certification Application for the York Haven Hydroelectric Project (FERC No. 1888), dated November 2020.

Dear Low Impact Hydropower Institute:

The U.S. Fish and Wildlife Service (USFWS) is submitting the following background material on migratory fish restoration in the Susquehanna River followed by specific comments relating to Federal Energy Regulatory Commission (FERC) License Requirements for the York Haven Hydroelectric Project (YHHP) to be considered by the Low Impact Hydropower Institute (LIHI) for recertification of the YHHP.

Susquehanna River Migratory Fish Restoration and Current License Requirements for the Lower Susquehanna River Hydroelectric Projects:

The construction of the main stem dams on the Susquehanna River effectively blocked migratory fish access to their historic spawning and rearing habitats in nearly the entire watershed. Although Pennsylvania Fish and Boat Commission (PFBC) was concerned about migratory fish and fish passage dating back to the 1800s, migratory fish restoration started in earnest on the Susquehanna River in the 1960s when the resource agencies began studies to evaluate the feasibility of restoring American shad to the River. American eels were also stocked in the basin by PFBC from the 1930s to 1980. Eel restoration efforts were reinitiated in the mid-2000s when the USFWS began a trapping effort at Conowingo Dam. The basin resource agencies, including the USFWS, PFBC, Maryland Department of Natural Resources (MDNR), New York Department of Environmental Conservation, Susquehanna River Basin Commission and NOAA, currently cooperatively manage the restoration efforts for migratory fish in the Susquehanna River through the Susquehanna River Anadromous Fish Restoration Cooperative (SRAFRC).

Restoration goals for American shad, river herring and American eel are currently described in the SRAFRFC 2010 Migratory Fish Management and Restoration Plan and the 2013 American Eel Restoration Plan.

Four of the five hydroelectric facilities on the lower Susquehanna River have recent Federal Energy Regulatory Commission (FERC) licenses or license amendments, including Holtwood Dam (2009), York Haven Dam (2015), Muddy Run Pumped Storage Facility (2015), and Conowingo Dam (2021). During the settlement negotiations for these projects, the license requirements for all projects in the river were considered in order to implement a holistic approach to migratory fish restoration that supported the goals of the SRAFRFC Restoration Plans.

FERC issued a new license with significant fish passage provisions including upstream passage efficiency and downstream survival requirements for migratory fish at the hydroelectric projects on the lower Susquehanna River. Generally, projects are required to achieve 85% upstream passage efficiency for American shad in their project area. For downstream migrating shad, 80% survival is required for adults and 95% survival is required for juveniles. For downstream migrating eel, 85% survival is required. These passage efficiency requirements help address known fish passage issues at the dams as well as support migratory fish restoration goals. Besides setting fish passage efficiency requirements, projects are also required to implement specific fish passage improvements to help ensure they have a higher likelihood of reaching the efficiency and survival targets in a timely manner.

Over the next three years, modifications will be made at the Conowingo Dam to improve upstream passage for American shad and river herring. The modifications include adding a zone of passage to provide suitable flow conditions for fish to navigate to the fishway through the tailrace, internal modifications to the fishway to improve flow conditions and increase attraction flow, and added capacity for capturing fish. In 2021, Exelon (owner of Conowingo Dam) re-initiated a trap and transport program, and in three years, that program will transport up to 80% of American shad and river herring (up to 100,000 fish per year) captured at Conowingo Dam to help the project achieve its upstream passage efficiency requirements through a trap and transport credit. All American shad and river herring transported from Conowingo will be released upstream of the York Haven Dam. The remaining fish that are not transported (at least 20% of the Conowingo catch) will be passed upstream into Conowingo Pond through the Conowingo East Fish Lift. Adequate upstream passage efficiency at the three upstream dams will be necessary for these fish to reach suitable spawning habitat.

The Muddy Run Pumped Storage Facility is believed to be meeting its passage efficiency criteria at this time, so no modifications to operation are currently required at this project. However, the project is required to evaluate passage efficiency for American shad every 10 years and additional studies on eels are required during its license term to ensure adequate fish passage continues to be provided.

There are known upstream passage efficiency issues for American shad at the Holtwood Dam. Results from a telemetry study in 2018 and 2019 identified fish passage issues within the fish

lifts at Holtwood and the project owner worked to further identify and resolve those issues during the 2020 and 2021 seasons to improve fish passage efficiency.

Safe Harbor is generally thought to be effective in passing American shad upstream. Further evaluation of the project's fish passage may be required during the projects' upcoming relicensing in 2030.

York Haven is known to have poor upstream fish passage efficiency for American shad in the existing East Channel Fishway. A radio telemetry study conducted in 2010 found that 96% of American shad that entered the project area were not successful in passing the fishway. That study found that fish approached the project by generally arriving first at the powerhouse, then some portion of fish were later detected at the main dam and/or the East Channel between Three Mile Island and the eastern shoreline of the Susquehanna River. To improve the poor fish passage efficiency, a nature-like fishway (NLF) was negotiated as part of a settlement agreement to be installed during the projects' recent relicensing. The NLF is intended to provide a diverse suite of passage conditions that are conducive to upstream passage of American shad and river herring, but also for resident species at that location.

York Haven's Nature-Like Fishway:

The NLF at York Haven Dam is required to be constructed by November 2021. The design components of the NLF were agreed upon by the York Haven Power Company (Company) and the resource agencies¹ in the Settlement Agreement (Agreement) in 2014. The fishway size and required attraction flow of the fishway were critical components to the design to have an effective fishway on the roughly 1.7 mile long dam. The diversity of fish passage conditions were also essential elements to the design to ensure that a variety of pathways for passage were available in the structure under the wide range of flow conditions that occur on the Susquehanna River. Although the structure is intended to optimize passage for American shad and river herring, it is also expected to be able to pass a diverse suite of resident species in the river that may use small-scale migrations as part of their life history.

In 2016, there was a near-final design for the NLF that was based on the components of the Agreement. In 2017, the Company approached the resource agencies and requested reconsideration of the 2016 design. The Company was interested in making improvements that would maximize performance and minimize environmental impacts of construction. The agencies agreed to the reconsideration under two conditions: 1) that design modifications would need to be demonstrated (through a matrix of design parameters) to be equivalent or better for fish passage than the 2016 design, and 2) that the fishway would be constructed by November 2021. Over the next two years, the agencies had frequent meetings and correspondence with the Company during the design process to arrive at a 60% design for a NLF in March 2020 that was

¹ The resource agencies party to the 2014 Settlement Agreement included U.S. Fish and Wildlife Service, Pennsylvania Fish and Boat Commission, Maryland Department of Natural Resources, and Susquehanna River Basin Commission. The Pennsylvania Department of Environmental Protection was not a signatory to the Settlement Agreement, but the agency included the fish passage provisions (and other items) of the Settlement Agreement into their 401 Water Quality Certification for the project. Reference to resource agencies in this document include all five agencies listed here.

determined to provide equivalent or better fish passage than the 2016 design and construction could still be completed by the 2021 deadline.

In April 2020, the Company initiated a Dispute Resolution Process with the parties of the Agreement indicating that the 2020, as well as the 2016, NLF designs were too expensive for the Company to construct and requested the agencies consider alternative fish passage at the project. The Company estimated the cost of the NLF to be about \$8 million at the time of the Agreement in 2014. In 2020, the Company shared updated cost estimates of the two previously approved NLF designs with the agencies at \$20.6 million (the 2016 design) and \$23.5 million (the 2020 design). The cost increases over the 2014 Agreement estimates reportedly came primarily from the Company's underestimate of the construction and dam safety costs of the 2014 conceptual design. The resource agencies did not substantiate the Company's \$8 million estimate in 2014 nor the recent estimates for the 2016 and 2020 designs in 2020.

Through the Dispute Resolution Process, the agencies agreed to consider alternative fishways if they could provide equivalent fish passage to the structure conceived in the Agreement. Although several alternatives were provided to the agencies for consideration, including a fan-shaped NLF downstream of the dam and an inland bypass, the agencies identified significant concerns with the alternatives provided, as follows.

For the fan-shaped option, there would be flows coming over the main dam, perpendicular to the fishway flow that may create confusing flow patterns within the fishway. This alternative also requires a significant constriction of fishway width where it passes through the dam that significantly reduces the diversity of passage conditions. The ultimate passage efficiency of the fishway would hinge on the conditions of this restriction point in the fishway. Variability of passage conditions is an important component of why the agencies negotiated a NLF at this location. Much of that variability would be lost with the implementation of this alternative.

For the inland bypass option, the Company proposed a relatively short, narrow bypass around the eastern side of the dam. Through agency review, it was determined that for an inland bypass to be considered as a viable alternative, it would have to be longer and straighter, so as not to create confusing flow patterns within the structure. The bypass would need to be much wider to provide sufficient flows through the fishway to attract fish into and through the structure. The agencies would require modifications to the design that would ultimately increase the cost of this option. In a December 2020 meeting where the Company presented this option to the agencies, the Company implied that if significant modifications were made to the proposed inland bypass design, it could ultimately be cost prohibitive to construct. For each design process initiated by the Company, additional time from the resource agencies is required to implement the review process and additional time is lost for the fishery resources that currently experience very poor fish passage efficiency at this site. The agencies cannot support another design and review process that we believe will lead us to another design that will be too expensive for the Company to build.

Because the agencies and Company have not come to an agreement on an alternative design as part of the Dispute Resolution Process, the Pennsylvania Department of Environmental Protection (PADEP) sent a letter to the Company on March 8, 2021 requiring the Company to

pursue either the 2016 design or the 2020 design, and submit a plan and schedule for construction to PADEP by June 1, 2021. Because there has not been an agreed-upon design for the NLF at this point, construction completion by fall 2021 is highly unlikely. The Company needs to select and submit a final design to the agencies for review and approval and establish a timeline for construction of the NLF.

In the Company's application to LIHI for recertification, their description of the progress of the NLF on page 18 is misleading. At the time this application was submitted to LIHI (November 2020), the Company was still proposing alternative fish passage options to the agencies as part of the Dispute Resolution Process. It is unclear to USFWS how construction completion by April 2024 could be established without an agreed-upon design between the Company and the agencies. No such timeline has ever been provided to the resource agencies and no time extension from the required November 2021 construction deadline have been granted for the NLF construction from the agencies.

Resource Need for the Nature-Like Fishway at York Haven:

The timing of construction for the NLF is a critical component in a system-wide effort to restore migratory fish to the Susquehanna River. Although Exelon plans to trap and transport up to 80% of American shad and river herring upstream of the York Haven Dam, there will still be at least 20% of the population that will be travelling upstream through the fish passage facilities in the river. In 2018, MDNR estimated that 50,000 to 100,000 American shad may be in the Conowingo tailrace (<https://www.srbc.net/srafrc/docs/2019/maryland-studies-overview-2019.pdf>). Fish passage improvements at the Conowingo project in the next three years are anticipated to improve passage efficiency to at least 50% (currently estimated at 37%) at the East Fish Lift and operation of the West Fish Lift for trap and transport will further increase catch at the project. Based on recent capture as well as tailrace population estimates at Conowingo Dam, the agencies anticipate 20,000 American shad and river herring annually will be captured at Conowingo in the next few years. If 80% of the catch is transported, 4,000 American shad will still be available to be passed to upstream fish passage facilities. Holtwood is actively working to achieve the required 85% efficiency and Safe Harbor is currently reaching 72% efficiency (from the Holtwood Dam), so it is expected that over 2,000 American shad will be available for passage at York Haven Dam in the near term. That number should rise in future years as shad reproduce upstream of York Haven Dam through improved fish passage, and the trap and transport program and the resulting recruitment will make more fish available to return to the Susquehanna to spawn.

Many decades of poor fish passage efficiency at the Susquehanna River hydroelectric projects have contributed to a significant population decline for American shad in the Susquehanna since 2000. Although the number of shad anticipated to reach the York Haven project in the immediate future is likely to be less than what had occurred in the early to mid-2000s, having efficient fish passage for migratory fish at this location is still a critical component of the overall migratory fish restoration plan for the Susquehanna River. The design and the timing of construction for the NLF is aligned with current fish passage improvements at downstream projects and other efforts to improve restoration of American shad and river herring in the Susquehanna River.

American Eels at York Haven:

Nearly 1.5 million young American eel collected from Conowingo Dam and Octoraro Creek have been stocked at various locations in the Susquehanna River Basin since 2008. That work is currently being supported by Exelon Corporation through FERC license requirements for Conowingo Dam and Muddy Run Pumped Storage Facility. Eels from the stocking program are maturing and migrating back downstream to the Sargasso Sea where they will spawn. The majority of the American eel that have been stocked in the Susquehanna have been in locations upstream of York Haven Dam, so that downstream migrants have to pass York Haven as well as three other main stem hydroelectric dams and a pumped storage project before they can escape the river to the Chesapeake Bay. Mortality of downstream migrating eels is known to occur at hydroelectric facilities where eels suffer injury and mortality when passing downstream through a project's turbines. Eels are thought to migrate downstream primarily in the fall. At York Haven Dam, typical fall flows are near station generation capacity, meaning that most of the flow passing the York Haven project is passing through the project turbines. The small size and high revolutions per minute (RPM) of York Haven's turbines make them particularly injurious to eels. As more of the stocked eels begin to mature and migrate downstream, the impact of the York Haven project on downstream eel migration success is becoming more apparent.

The first eel turbine mortality reported at the York Haven project was in 2016. In 2019 and 2020, hundreds of dead eels were reported from the project's tailrace and areas downstream of the powerhouse. There is a mechanism in the current license requirements to address mortality and downstream eel migration. The project is required to achieve 85% survival of downstream migrants which is to be evaluated by telemetry and turbine studies in the next few years. It is critical that the Company complete these studies on time as required in the license and that, if any corrective action is needed to improve eel survival at the project, those actions also be done in a timely manner to protect out-migrating eels so they can successfully reach spawning grounds. York Haven is the first hydroelectric dam eels will reach on their downstream migration in the Susquehanna River, and it is important that safe passage for eels be provided at this location as soon as possible to provide benefits to the coast-wide American eel population that is currently in a depleted status.

York Haven's Fish Passage Requirements:

The USFWS looks forward to implementation of the fish passage requirements and studies agreed to in the Agreement and required by the FERC license for the York Haven Hydroelectric Project in the coming years to improve both upstream and downstream passage for American shad, river herring and American eel. As described earlier in these comments, timely implementation of these improvements is critical to the overall restoration of migratory fish in the Susquehanna River.

Fish Passage Improvements and Studies to be Completed from 2021-2026:

Improvements or Studies	Due Date or Planned Implementation
Nature-Like Fishway Construction Completion	November 30, 2021
Downstream Sluice/Plunge Pool Modifications	November 30, 2021
Juvenile Shad Headrace Turbine Avoidance Study	Planned for 2023 ¹
Basin-wide Downstream Eel Migration Study Participation	Starting 2021
Site-specific Downstream Eel Route of Passage Study	Planned for 2022 ¹
Downstream Eel Turbine Survival Study	TBD ²
Upstream Shad Passage Effectiveness Study	2 nd year after NLF Construction ³

¹ The timing of the juvenile shad and downstream eel studies was switched. The studies cannot be done concurrently and the agency preference would be to have the eel study done before the juvenile shad study.

² An implementation date for this study has not yet been determined but will likely be required in 2023 or 2024.

³ This study will occur during the second passage season after NLF construction. Since NLF construction is required to be completed in November 2021, the upstream study should be conducted starting on April 1, 2023. It appears unlikely that the NLF will be constructed by the deadline, so this study implementation may be delayed.

We look forward to our continued work with the Company to ensure that fish passage requirements are implemented in a timely manner at the York Haven Hydroelectric Project. Thank you for the opportunity to provide comments to their LIHI recertification. Feel free to reach out to me if you have any questions or need additional information.

Sincerely,



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