IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

WATERKEEPERS CHESAPEAKE, LOWER SUSQUEHANNA RIVERKEEPER, SHORERIVERS, and CHESAPEAKE BAY FOUNDATION, *Petitioners*, v. FEDERAL ENERGY REGULATORY COMMISSION, *Respondent.*	)	No.

PETITION FOR REVIEW

Pursuant to Federal Power Act § 313(b), 16 U.S.C. § 825l(b), Rule 15 of the Federal Rules of Appellate Procedure, and D.C. Circuit Rule 15, Waterkeepers Chesapeake, Lower Susquehanna Riverkeeper, ShoreRivers, and Chesapeake Bay Foundation hereby petition this Court for review of the Federal Energy Regulatory Commission's March 19, 2021, Order issuing a new license to Exelon Power Generation Company, LLC for the Conowingo Hydroelectric Project (Attachment 1). Petitioners respectfully request that the Order be set aside in whole.

DATED: June 17, 2021

Respectfully submitted,

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RULE 26.1 DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1 and D.C. Circuit Rule 26.1, Waterkeepers Chesapeake, Lower Susquehanna Riverkeeper, ShoreRivers, and Chesapeake Bay Foundation (collectively, "Petitioners") make the following disclosures:

Waterkeepers Chesapeake

Non-Governmental Corporate Party to this Action: Waterkeepers Chesapeake.

Parent Corporations: None.

Publicly Held Company that Owns 10% or More of Party's Stock: None.

Party's General Nature and Purpose: Waterkeepers Chesapeake fights for clean water and a healthy environment by supporting Waterkeepers throughout the Chesapeake and coastal regions as they protect their communities, rivers, and streams from pollution.

Lower Susquehanna Riverkeeper

Non-Governmental Corporate Party to this Action: Lower Susquehanna Riverkeeper.

Parent Corporations: None.

Publicly Held Company that Owns 10% or More of Party's Stock: None.

Party's General Nature and Purpose: Lower Susquehanna Riverkeeper Association is dedicated to improving the ecological health of the Lower Susquehanna River Watershed and the Chesapeake Bay.

ShoreRivers

Non-Governmental Corporate Party to this Action: ShoreRivers.

Parent Corporations: None.

Publicly Held Company that Owns 10% or More of Party's Stock: None.

Party's General Nature and Purpose: ShoreRivers protects and restores Eastern Shore waterways through science-based advocacy, restoration, and education.

Chesapeake Bay Foundation

Non-Governmental Corporate Party to this Action: Chesapeake Bay Foundation.

Parent Corporations: None.

Publicly Held Company that Owns 10% or More of Party's Stock: None.

Party's General Nature and Purpose: Founded in 1967, the Chesapeake Bay Foundation (CBF) is the largest independent conservation organization dedicated solely to saving the Bay. Serving as a watchdog, CBF fights for effective, science-based solutions to the pollution degrading the Chesapeake Bay and its rivers and streams.

DATED: June 17, 2021

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing **Petition for Review** and **Rule 26.1 Disclosure Statement** on Respondents by sending a copy via First Class Mail to each of the following addresses on this 17th day of June, 2021.

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
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Washington, DC 20426

Nathaniel J. Davis, Sr., Deputy Secretary
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/s/ James S. Pew
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Attachment 1

174 FERC ¶ 61,217
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Richard Glick, Chairman;
Neil Chatterjee, James P. Danly,
Allison Clements, and Mark C. Christie.

Exelon Generation Company, LLC Project Nos. 405-106
405-121

ORDER ISSUING NEW LICENSE

(Issued March 19, 2021)

INTRODUCTION

1. On August 31, 2012, Exelon Generation Company, LLC (Exelon) filed, pursuant to sections 4(e) and 15 of the Federal Power Act (FPA),[1] an application for a new license to continue operation and maintenance of the Conowingo Hydroelectric Project No. 405 (Conowingo Project or project). The 570.15-megawatt (MW) project[2] is located on the Susquehanna River at river mile (RM) 10 in Lancaster and York Counties, Pennsylvania, and Cecil and Harford Counties, Maryland.[3] The project does not occupy federal land.

2. As discussed below, this order issues a new license for the project.

[1] 16 U.S.C. §§ 797(e) and 808.

[2] On March 2, 2010, Commission staff approved Exelon's revised Exhibit M, increasing the authorized capacity for the license from 514.4 MW to 574.54 MW to reflect the end-of-life replacement of seven turbine-generators units. *Exelon Generating Co., LLC*, 130 FERC ¶ 62,175 (2010). However, that order included an error and misstated the authorized capacity. The authorized capacity specified in this order, 570.15 MW, corrects that error.

[3] The Susquehanna River is a navigable waterway of the United States. *See Metropolitan Edison Co.*, 2 F.P.C. 703 (1940). Therefore, section 23(b) of the FPA, 16 U.S.C. § 817(1), requires the project to be licensed.

BACKGROUND

3. The Federal Power Commission, the Commission's predecessor, issued the original license for the Conowingo Project on February 20, 1926, for a 50 year period terminating February 19, 1976.[4] The Commission issued the current license for the project on August 14, 1980, for a period ending August 31, 2014.[5] Since then, Exelon has operated the project under an annual license pending the disposition of its new license application.

4. On April 29, 2013, the Commission issued a public notice accepting for filing Exelon's relicense application, indicating the application was ready for environmental analysis, and setting June 28, 2013, later extended to January 31, 2014, as the deadline for filing motions to intervene, protests, comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions.[6]

5. The U.S. Department of the Interior (Interior); Susquehanna River Basin Commission (SRBC); Pennsylvania Department of Environmental Protection (Pennsylvania DEP); Pennsylvania Fish and Boat Commission (Pennsylvania FBC); National Marine Fisheries Service (NMFS); and Maryland Department of Natural Resources (Maryland DNR) and Maryland Department of the Environment (MDE) (jointly) filed notices of intervention.[7] Stewards of the Lower Susquehanna, Inc.; PPL Holtwood, LLC; Safe Harbor Water Power Corporation; Clean Chesapeake

[4] *Susquehanna Power Co*., 6th FPC Ann. Rep. 117 (1926).

[5] *Susquehanna Power Co.,* 19 FERC ¶ 61,348 (1982), *order on reh'g*, 13 FERC ¶ 61,132 (1980) (Due to an oversight, the 1980 Order Issuing New Major License for the Conowingo Project was published after the order on rehearing). The Commission approved the transfer of the project license to Exelon on November 24, 2008. *Susquehanna Power Co.*, 125 FERC ¶ 62,181 (2008).

[6] 78 Fed. Reg. 26,339 (May 6, 2013). *See also Exelon Generation Company, LLC,* Notice Granting Extension of Time and Intent to Prepare an Environmental Impact Statement (Aug. 30, 2013); *Exelon Generation Company, LLC,* Notice Granting Extension of Time (Dec. 13, 2013).

[7] Under Rule 214(a) of the Commission's Rules of Practice and Procedure, Interior, SRBC, Pennsylvania DEP, Pennsylvania FBC, NMFS, Maryland DNR, and MDE became parties to the proceeding upon timely filing of their notices of intervention. 18 C.F.R. § 385.214(a) (2020).

Coalition (Coalition);[8] Stewards of the Lower Susquehanna, Inc., Lower Susquehanna Riverkeeper and Waterkeepers Chesapeake (jointly); Calpine Corporation; Chesapeake Conservancy; Chesapeake Bay Foundation; Mason-Dixon Trail System, Inc; Citizens for Pennsylvania's Future; Cecil Land Use Association; Midshore Riverkeeper Conservancy, Inc.; Chester River Association and Sassafras River Association (jointly); Onondaga Nation; New Energy Capital Partners, LLC (New Energy); Olympus Power Company, LLC; The Nature Conservancy; American Rivers; and Susquehanna River Boaters Association filed timely motions to intervene.[9]

6. The U.S. Environmental Protection Agency (EPA); NMFS; Interior; SRBC; Maryland DNR and MDE (jointly); Pennsylvania FBC; Harford County Government; Cecil County Government; City of Havre de Grace, Maryland; Town of Port Deposit, Maryland; Town of Perryville, Maryland; Coalition; American Rivers; The Nature Conservancy; Chesapeake Conservancy; Chesapeake Bay Foundation; Lower Susquehanna Heritage Greenway, Inc.; Stewards of the Lower Susquehanna, Inc.; Lancaster County Conservancy; Midshore Riverkeeper Conservancy; Citizens for Pennsylvania's Future; New Energy; Henry Immanuel; and Vicki Rinkerman filed comments, terms and conditions, recommendations, and/or prescriptions. No intervenor opposes relicensing the project.

7. On July 30, 2014, Commission staff issued a draft multi-project Environmental Impact Statement (EIS) that analyzed the proposed project's impacts and alternatives to it.[10] Comments on the draft EIS related to the Conowingo Project were filed by: Interior; NMFS; EPA; U.S. Fish and Wildlife Service (FWS); Susquehanna River Anadromous Fish Restoration Cooperative;[11] SRBC; Onondaga Nation; the State of Maryland;

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[8] The original Coalition included representatives of seven Maryland counties: Allegany, Caroline, Carroll, Cecil, Dorchester, Frederick, and Kent Counties. The Coalition filed supplements on March 28, August 6, and September 14, 2014, noting the addition of representatives from Wicomico, Harford, and Queen Anne's Counties to its coalition.

[9] Timely, unopposed motions to intervene are granted by operation of Rule 214(c) of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.214(c). Motions to intervene filed after an application has been filed, but before notice has been issued, are considered timely.

[10] The EIS also considered the impacts of the York Haven Project and the Muddy Run Project, located nearby on the lower Susquehanna River, both of which were then in the relicensing process and have since been issued new licenses.

[11] The Susquehanna River Anadromous Fish Restoration Cooperative consists of representatives from FWS, Susquehanna River Basin Commission, Pennsylvania Fish

Pennsylvania FBC; Coalition; Maryland Farm Bureau; Exelon; York Haven Power Company; The Nature Conservancy; American Rivers; Susquehanna River Boaters Association; the Honorable Benjamin L. Cardin; Chesapeake Bay Foundation and Midshore Riverkeeper Conservancy (jointly); Stewards of the Lower Susquehanna, Inc., Lower Susquehanna Riverkeeper, and Waterkeepers Chesapeake (jointly); Broad Creek Civic Association; New Energy; James Byrne; Matt Teffeau; Dr. Amy Roe; Hugh Rogers; and Patrick Kelly.

8. Commission staff issued a final EIS on March 11, 2015. Comments on the final EIS were filed by EPA; NMFS; The Nature Conservancy;[12] Interior; Coalition; SRBC; and York Haven Power Company, LLC.

9. On May 12, 2016, Exelon filed a settlement agreement entered into by itself and Interior that resolves outstanding issues between Exelon and Interior regarding the terms of Interior's FPA section 18 prescription. The Nature Conservancy filed timely comments generally supporting the settlement. Additionally, Stewards of the Susquehanna River, Inc., Lower Susquehanna Riverkeeper, and Waterkeepers Chesapeake jointly filed comments on the agreement. On June 13, 2016, Exelon filed timely reply comments.

10. On October 29, 2019, Exelon filed an additional settlement agreement that resolves outstanding issues between Exelon and MDE associated with MDE's issuance of a water quality certification (MDE Settlement). On October 30, 2019, the Commission issued public notice of the settlement agreement, setting a deadline of November 19, 2019, later extended to January 17, 2020, for comments, and of December 2, 2019, later extended to January 31, 2020, for reply comments.[13] The SRBC, Pennsylvania DEP, Pennsylvania FBC, Interior, and David Home filed comments supporting the MDE Settlement. Individuals, the Coalition, and some non-governmental organizations filed comments opposing it. Exelon and MDE each filed timely reply comments.

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and Boat Commission, Maryland DNR, and New York State Department of Environmental Conservation.

[12] On October 29, 2019, The Nature Conservancy filed additional comments that included as attachments, Maryland's Final 2018 Integrated Report; EPA's April 9, 2019 approval letter of the Integrated Report; and the Final EPA-USGS Technical Report. On November 8, 2019, Exelon filed reply comments to The Nature Conservancy's comments.

[13] 84 Fed. Reg. 59,801 (Nov. 6, 2019); *Exelon Generation Company, LLC,* Notice Extending Comment Period (Nov. 13, 2019).

11. The interventions, comments, and recommendations have been fully considered in determining whether, and under what conditions, to issue this license.

PROJECT DESCRIPTION

A. Project Area

12. The Susquehanna River, the largest tributary to the Chesapeake Bay, is approximately 444 miles long. It begins near Cooperstown, New York, at Otsego Lake, and flows into the Chesapeake Bay at Havre de Grace, Maryland. The Susquehanna River Basin, which drains approximately 27,510 square miles in New York, Pennsylvania, and Maryland, encompasses 43% of the Chesapeake Bay's drainage area, and provides approximately 50% of the total freshwater inflow to the bay. The basin has six subbasins, one of which is the Lower Susquehanna subbasin.[14] There are seven major tributaries[15] and numerous smaller tributaries[16] to the lower Susquehanna River. Five miles below Conowingo Dam, the river becomes tidally influenced before entering Chesapeake Bay.

13. There are five hydroelectric projects on the lower Susquehanna River. The most upstream of these projects is the 19.62-MW York Haven Hydroelectric Project No. 1888, with its dam at RM 55. Proceeding downstream from the York Haven Project are the 417.5-MW Safe Harbor Hydroelectric Project No. 1025, with its dam at RM 33, and the 195.5-MW Holtwood Hydroelectric Project No. 1881, with its dam at RM 25. The 828-MW Muddy Run Pumped Storage Project No. 2355 is positioned between the Holtwood and Conowingo projects, with its powerhouse located at RM 22. The Conowingo Project is the lowermost project with its dam at RM 10.

B. Project Facilities

14. Conowingo Dam impounds the project's approximately 8,500-acre, 14-mile-long reservoir (Conowingo Pond). The dam, a concrete gravity structure with a maximum height of approximately 94 feet and a total length of 4,648 feet, consists of four distinct sections from east to west: (1) a 1,190-foot-long non-overflow gravity section with an

[14] The other subbasins are the Upper Susquehanna, Chemung, West Branch Susquehanna, Middle Susquehanna, and Juniata.

[15] Conestoga River and Conodoguinet, Swatara, Conewago, and Penn's Creeks are above Conowingo Dam; Octoraro and Deer Creeks are below.

[16] The smaller tributaries are Conowingo Creek, Broad Creek, Hanes Branch, Michaels Run, Peters Creek, Barnes Run, Fishing Creek, Wissler's Run, and Muddy Run.

elevation of 115.7 feet[17] (east abutment); (2) an ogee shaped spillway, the major portion of which is 2,250 feet long, and the minor portion of which is 135 feet long; (3) an intake-powerhouse section which is 946 feet long; and (4) a 127-foot-long non-overflow gravity section (west abutment). The tailrace and spillway sections of the dam are separated by a dividing wall extending 300 feet downstream of the powerhouse. The dam and powerhouse support U.S. Highway Route No. 1, which passes over the top of the Conowingo Dam. Flow over the spillway section is controlled by 50 Stoney-type crest gates and two regulating gates.

15. Conowingo Pond has a gross storage capacity of 310,000 acre-feet at the normal full pool elevation of 109.2 feet. From Conowingo Pond, water enters the powerhouse through intakes that are integral to the dam and individually protected by seven trash racks. The project has eleven turbine-generator units and two house (station service) units. Seven turbine-generator units (Units 1 through 7) and the two house units are completely enclosed within the powerhouse, while the other four units (Units 8 through 11) are outside the powerhouse. The hydraulic equipment for Units 1 through 7 consists of Francis-type single runner hydraulic turbines. The hydraulic equipment for Units 8 through 11 consists of four mixed-flow Kaplan-type hydraulic turbines. Unit 1 has a turbine-generator capacity of 45.0 MW; Unit 2 has a capacity of 40.5 MW; Units 3, 4, 6 and 7 each have a capacity of 47.7 MW; Unit 5 has a capacity of 36.0 MW; and Units 8 through 11 each have a capacity of 63.75 MW. The two 1.425-MW house turbine-generator units provide electricity to the powerhouse. Water flowing through the turbines is discharged through draft tubes into the tailrace immediately downstream of the dam.

16. The project has two fish lifts. The West Fish Lift, adjacent to the west abutment, is currently operated for American shad egg production and other research purposes.[18] The East Fish Lift, adjacent to the dividing wall, uses regulating gate bays for attraction

[17] All elevations are referenced to the National Geodetic Vertical Datum of 1929.

[18] Pursuant to the water quality certification for its Muddy Run Project, Exelon operates an eel trapping and holding facility along the shore on the western side of Conowingo Dam, near an existing FWS eel trapping location. *Exelon Generation Co., LLC*, 153 FERC ¶ 62,232 (2015) (Order Issuing New License for the Muddy Run Project); *Exelon Generation Co., LLC*, 159 FERC ¶ 62,146 (2017) (Order Approving Eel Trapping Facility Design). Because a suitable location at the Muddy Run Project could not be found, the measure was implemented at the Conowingo Project. By letter dated April 21, 2017, Exelon incorporated the requirements and design criteria for the eel facility into the final license application for the Conowingo Project. The operation and maintenance of the eel trapping and holding facility is required by Interior's Modified Fishway Prescription, sections 12.4 and 12.6.1.

flow and is used primarily to pass American shad and other migratory fishes during the April-June migration season.

17. The Conowingo Project has an authorized nameplate generating capacity of 570.15 MW and generates an average of 1,934,501 megawatt-hours (MWh) annually. Electricity generated at the project is transmitted by two 220-kilovolt (kV) non-project transmission lines extending from the project substation to East Nottingham, Pennsylvania.

18. The project has 15 recreation sites that provide opportunities for fishing, boating, hiking, swimming, picnicking, bird watching, and sightseeing. Exelon operates seven of these facilities and leases the other eight to local and state entities or commercial operators.

C. Project Boundary

19. The current project boundary encloses approximately 12,000 acres, including Conowingo Pond, the dam, the powerhouse, the tailrace, and the project's 15 recreation sites. The boundary extends along the east and west banks of the Susquehanna River for approximately 14 miles upstream from the Conowingo Dam. The upper eight miles of the reservoir are in Pennsylvania, while the lower six miles, and the dam itself, are located in Maryland. The boundary extends approximately one-half mile downstream along the west bank of the river. There are approximately 43 miles of shoreline (excluding island shoreline) within the project boundary, 40 miles surrounding the reservoir and three miles along the Susquehanna River downstream of Conowingo Dam.

20. Exelon proposes to modify the project boundary by removing lands that it believes are not needed for project purposes. This includes: 0.06 acre of land not owned by Exelon in the upper reaches of Conowingo Pond; 34.4 acres along the Susquehanna River shoreline at the Muddy Run Project (to minimize the overlap of project lands between the two projects); 205.6 acres of upper Broad Creek, a tributary to Conowingo Pond; and 1,760.1 acres of the Susquehanna River downstream of Rowland Island[19] and associated western shoreline that were originally included for construction of the project.[20] The proposed project boundary contains 9,919 acres of land: 8,850 acres of project waters

[19] The project tailrace extends 2,800 feet from the powerhouse to the downstream end of Rowland Island, a small island located immediately downstream of Conowingo Dam.

[20] This area includes the Lower Susquehanna Heritage Greenway, Deer Creek Access, Lapidum Boat Launch, and McLhinney Park, which are non-project recreation sites located on a thin ribbon of land along the west bank of the Susquehanna River downstream of Conowingo Dam.

and 1,069 acres above the normal high-water elevations in Lancaster and York Counties in Pennsylvania, and Harford and Cecil Counties in Maryland.

D. Current Project Operation

21. The Conowingo Project is a peaking facility that uses reservoir storage to generate during periods of high electricity demand. The project is typically operated semi-automatically (i.e., turbines are brought on-line manually to ensure an efficient start-up until the generation setting programmed into the control system is reached). However, at times, the project is operated in either full manual or automatic mode depending on river flow and system load conditions. The current license allows for Conowingo Pond to fluctuate between elevation 101.2 feet and 110.2 feet, except on weekends between Memorial Day and Labor Day, when the elevation must be at or above 107.2 feet for recreation. Conowingo Pond is typically maintained at about elevation 109.2 feet and is typically not drawn below 105.2 feet to accommodate operation of the Muddy Run Project and the Peach Bottom Atomic Power Station.[21]

22. The project is operated to maintain specified minimum flows downstream of the project, ranging between 3,500 cubic feet per second (cfs) (with periods of zero cfs for up to six hours)[22] and 10,000 cfs, or the discharge measured on the Susquehanna River at the United States Geological Survey (USGS) Marietta gage,[23] whichever is less. During high electricity demand periods with low inflow, Exelon uses water from reservoir storage (within its license constraints) to meet this demand. During non-peak periods of electricity demand, a combination of turbine units is used to meet the minimum flow requirements at the project. When inflows are below the minimum hydraulic capacity of the project, any additional water needed to provide minimum flow is taken from storage.

23. During high-flow events, water is typically passed through all the turbine units and the crest gates are opened to pass the remainder of the streamflow.

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[21] The Muddy Run Project, which uses Conowingo Pond as its lower reservoir, cannot fully operate in pumping mode when the reservoir is below elevation 105.2 feet. Peach Bottom Atomic Power Station, which uses the reservoir for its cooling water, requires that the reservoir elevation be at least 104.2 feet.

[22] Although no operational releases are made from the Conowingo Project during these periods, approximately 800 cfs of leakage flows from the dam into the river reach.

[23] The Marietta gage (No. 01576000) is located about 35 miles upstream from the Conowingo Dam above Safe Harbor Dam. It is considered reflective of the lower Susquehanna River's natural flow regime. Final EIS at 41.

E. Proposed Operation and Environmental Measures

24. As set forth in its license application and modified by settlement agreements with Interior and MDE, Exelon proposes, for the first three years of the new license, to operate the project under the current flow regime with adjustments such as eliminating short periods (i.e., six hour intervals) of zero minimum flow released through the project in December through February and increasing the minimum flow in the first half of June. After the third year of the new license, Exelon proposes to modify the operational flow regime by increasing the minimum flow and implementing restrictions on up-ramping, down-ramping, and maximum generation flow with a focus on the spring migratory fish season. The MDE Settlement provisions are referenced and discussed below in the Water Quality Certification section and the settlement agreement with Interior was incorporated into Interior's modified FPA section 18 prescription, also discussed below.

25. Exelon proposes to continue maintaining Conowingo Pond between elevations 101.2 feet and 110.2 feet, with a minimum elevation of 107.2 feet on weekends between Memorial Day and Labor Day, to meet recreational needs.

26. To protect downstream water quality, Exelon proposes to continue dissolved oxygen (DO) enhancement at the project using the existing turbine venting systems on Units 1 through 7 and the aerating runners on Units 2 and 5, and from May 1 through October 1, and to continuously monitor DO levels at an existing water quality monitoring location about 0.6-mile downstream of Conowingo Dam (Station 643).

27. To identify benchmarks and thresholds for action to address sediment issues that may affect project operation, Exelon proposes to implement a Sediment Management Plan filed with its August 31, 2012 application.

28. To monitor sediment transport and depositional patterns within Conowingo Pond, Exelon proposes to conduct a bathymetric survey of the pond at five year intervals.

29. To protect bald eagles and their habitat, Exelon proposes to implement a Bald Eagle Management Plan, filed on August 30, 2012, which provides for the management of bald eagle habitat on land within the project boundary.

30. To enhance recreation opportunities on project lands, Exelon proposes to implement a Recreation Management Plan, filed with its August 31, 2012 license application, that provides for continued management of project recreation facilities and includes provisions for upgrades at 13 recreation sites.

31. To protect historic properties, Exelon proposes to implement a Historic Properties Management Plan (HPMP) filed with the Commission on August 30, 2012.

SUMMARY OF LICENSE REQUIREMENTS

32. This license, which authorizes 570.15 MW of renewable energy generation capacity, requires the proposed measures listed above, the staff-recommended modifications and additional measures described below, and the conditions included in Interior's FPA section 18 prescription (Appendix 1). Combined, these measures will protect and enhance water quality, fish and wildlife resources, terrestrial resources, threatened and endangered species, recreational opportunities, and cultural resources.

33. This license also includes conditions authorizing other uses of Conowingo Pond and ensuring that operation of the Conowingo Project does not interfere with compliance with the Muddy Run Project license.

34. To ensure the required stream flows are being met, this license requires Exelon to develop a streamflow operation plan that describes how the project will comply with the minimum flow, ramping rates, and maximum generation flow requirements of the license.

35. To protect recreation access, this license requires that the Sediment Management Plan proposed by Exelon include a provision to conduct periodic dredging to maintain the navigation channel at the Conowingo Creek, Peters Creek (Peach Bottom Marina), and Broad Creek boat ramps.

36. To minimize impacts to bald eagles and their habitat, this license requires Exelon to implement its proposed Bald Eagle Management Plan, with the addition of a provision to minimize recreation-related disturbance in proximity to roosting or foraging eagles.

37. To minimize impacts to Indiana and northern long-eared bats, this license requires Exelon to avoid tree clearing (i.e., removal of all trees greater than three inches in diameter at breast height) on project lands from June 1 through July 31, unless a tree poses an immediate threat to human life or property.

38. To protect recreational resources, this license requires Exelon to revise its proposed Recreation Management Plan to include provisions for monitoring recreation at the project every 10 years and implementing a debris management program.

39. To protect shoreline resources, this license requires Exelon to revise its proposed Shoreline Management Plan to include a provision for regular plan updates every 10 years.

40. To protect cultural resources, this license requires Exelon to modify its proposed HPMP.[24]

WATER QUALITY CERTIFICATION

41. Under section 401(a)(1) of the Clean Water Act, the Commission may not issue a license authorizing the construction or operation of a hydroelectric project unless the state water quality certifying agency has either issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year.[25] Section 401(d) of the Clean Water Act provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.[26] As discussed below, we find that Maryland has waived certification.

A. Background

42. On January 31, 2014, Exelon filed, and MDE received, a certification request for the Conowingo Project. Thereafter, Exelon withdrew and refiled its certification request on March 3, 2015, April 25, 2016, and May 17, 2017. MDE issued certification for the Conowingo Project on April 27, 2018.[27]

43. The certification included six sections that are general or administrative (sections 1 through 6), 15 specific conditions (section 7, B through P), and two administrative conditions (section 7, A and Q). The certification required Exelon to: (1) implement and comply with all provisions of the MDE-Fish Passage Improvement Plan, the MDE-American Eel Passage Improvement Plan, and the MDE-Invasive Species Plan (Condition 7.B); (2) operate the project in accordance with an adaptive management plan (Condition 7.C); (3) remove floating and water surface trash and debris in the reservoir weekly (Condition 7.F); (4) ensure that project operations and discharges do not cause or contribute to polychlorinated biphenyl levels in fish tissue (Condition 7.H); and (5) comply with the Shoreline Management Plan (Condition 7.I).

44. The certification also required Exelon to develop and implement a plan to annually reduce the amount of nitrogen and phosphorus from upstream sources in the project's

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[24] *See* Commission staff Transmittal of the Executed Programmatic Agreement for the Conowingo Hydroelectric Project No. 405 (Oct. 3, 2017).

[25] 33 U.S.C. § 1341(a)(1).

[26] *Id*. § 1341(d).

[27] Letter from Ben Grumbles, Secretary, MDE (May 8, 2018).

discharges by 6,000,000 pounds and 260,000 pounds, respectively, using payment of an annual in-lieu of fee of $17.00/pound of nitrogen and $270.00/pound of phosphorus, installation of best management practices and/or ecosystem restoration activities, and/or dredging of the reservoir, subject to a credit of any upstream state's actions resulting in some portion of nutrient reduction (Condition 7.D).

45. Additionally, the certification required Exelon to file: (1) a plan to provide for continuous monitoring of DO levels in the tailrace and a fish kill monitoring plan for monitoring and reporting fish kills (Condition 7.E); (2) a Chlorophyll-A Monitoring Plan for the Maryland portion of the reservoir (Condition 7.G);[28] (3) a bog turtle plan (Condition 7.J); (4) a waterfowl nesting protection plan (Condition 7.K); (5) a tailrace gage plan for the re-design, installation, and maintenance of best available real-time flow telemetry (Condition 7.L); (6) a sturgeon protection plan (Condition 7.M); (7) a plan for implementing habitat improvement projects downstream of the dam (Condition 7.N); (8) a fish protection plan (Condition 7.O); and (9) a fish stranding minimization plan (Condition 7.P). Exelon and other parties appealed the water quality certification.[29]

46. On February 28, 2019, Exelon filed a petition for a declaratory order asking the Commission to find that Maryland had waived its right to issue a water quality certification in light of the U.S. Court of Appeals for the District of Columbia decision in *Hoopa Valley Tribe v. FERC*.[30] On March 13, 2019, the Commission issued public notice of the petition, which set a deadline of March 28, 2019, for motions to intervene, protests, and comments.[31] MDE and SRBC filed timely notices of intervention. The

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[28] Chlorophyll-A is a photosynthetic pigment found in algae and other green plants. The concentration of chlorophyll-A is used as a measure of the density of the algal population in a reservoir.

[29] Waterkeepers and Stewards of the Lower Susquehanna, jointly, and Exelon filed appeals with MDE that remain pending. *See* Exelon May 25, 2018 Letter and MDE January 31, 2020 Reply Comments at 4-5. Separately, Exelon filed a complaint for declaratory relief, petition for judicial review, and complaint for mandamus in the Maryland Circuit Court for Baltimore City, which was dismissed. Exelon's subsequent appeal with the Maryland Court of Special Appeals remains pending. *See* MDE January 31, 2020 Reply Comments at 5-7. Exelon also filed a complaint in the U.S. District Court for the District of Columbia, which was dismissed in part. *Exelon Generation Co., LLC. v. Grumbles*, 380 F. Supp. 3d 1, 3 (D.D.C. 2019). The case is pending subject to the Commission's action on the settlement offer in this proceeding. *See* MDE January 31, 2020 Reply Comments at 7-8.

[30] 913 F.3d 1099 (D.C. Cir. 2019) (*Hoopa Valley*).

[31] 84 Fed. Reg. 10,060 (Mar. 19, 2019).

Coalition, Stewards of the Lower Susquehanna, Inc., Chesapeake Bay Foundation, The Nature Conservancy, Calpine Corporation, Public Citizen, Inc., and Merced Irrigation District filed timely, unopposed motions to intervene. On April 16, 2019, Pennsylvania DEP filed a late, unopposed motion to intervene, which is granted.[32] Comments were filed by MDE and SRBC. Reply comments were filed by Exelon, MDE, Pennsylvania DEP, the Coalition, The Nature Conservancy, Stewards of the Lower Susquehanna, Inc., and Chesapeake Bay Foundation, Inc.

B. MDE Settlement Agreement

47. On October 29, 2019, Exelon filed the MDE Settlement, which resolves all issues between Exelon and MDE associated with MDE's issuance of its water quality certification and includes proposed protection, mitigation, and enhancement measures to address ecological, recreation, and water quality resources affected by the Conowingo Project.[33] The relevant sections of the settlement agreement include: (1) a joint explanatory statement discussing the measures agreed to and pointing to support in the record for those measures; (2) the settlement agreement itself, which addresses resolution of contested matters; and (3) Attachment A, which consists of proposed license articles.[34]

48. The settlement included a conditional waiver of MDE's certification as well as a conditional withdrawal of Exelon's petition for declaratory order, both to become effective upon the Commission's approval of the settlement.[35] It also included a request for a 50-year license for the Conowingo Project and the following proposed license

[32] As noted above, Pennsylvania DEP is already a party to the relicensing proceeding.

[33] The settlement discussions occurred as part of mediation required by the Court of Special Appeals. *See* MDE January 31, 2020 Reply Comments at 6-7.

[34] The remaining sections of the settlement address matters outside the Commission's jurisdiction: Attachments B and C, draft notices of withdrawal of Exelon's appeals; Attachment D, a draft property access agreement granting access to MDE and its contractors onto certain Exelon lands; Attachment E, draft acknowledgement of payment form; and Attachment F, a copy of a letter sent to SRBC requesting acceptance of settlement's proposed flow regime in the SRBC proceeding (Docket 2016-031).

[35] MDE Settlement at 4-5, 13.

articles and off-license provisions, the latter of which the parties are not asking be included in the license.[36]

1. Proposed License Articles

49. Section 3.1 of the MDE Settlement states that the parties intend for the proposed articles in Attachment A to be included in the license. The proposed *Operational Flow Regime* article provides for a two-phased operational flow regime.[37] During the first three years of the new license, Exelon will operate the Conowingo Project under its current flow regime with adjustments, such as eliminating short periods (i.e., six hour intervals) of zero minimum flow released through the project in December through February and increasing the minimum flow in the first half of June, as recommended in the final EIS, to provide additional protection for downstream aquatic habitat.[38] After the third year of the new license, Exelon will implement the second phase of the operational flow regime, which will include increased minimum flow requirements and restrictions on up-ramping, down-ramping, and maximum generation flow, all of which are focused on the spring migratory fish season.[39]

50. The proposed *Monitoring Streamflows in the Tailrace* article states that Exelon will study the feasibility of installing real-time flow telemetry at the stream gage in the dam's tailrace and, if feasible, install such real-time telemetry.[40]

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[36] *Id*. at 22-23.

[37] *Id*. at Attachment A, 1-3. The flow regime in most months is lower than the requirements proposed in section 7.C.i and ii of the MDE certification; however, it is generally higher than the current license requirements.

[38] Exelon states that the three-year period will allow it to coordinate with PJM Interconnection to ensure that the protocols currently employed to dispatch power from the Conowingo and Muddy Run projects can be adapted to the second phase flow regime without jeopardizing reliability or causing adverse impacts to the power markets. *Id*. at 10-11.

[39] The MDE Settlement's proposed second phase of minimum flows will range from 4,000 cfs to 18,200 cfs (or inflow, if less) and will include down-ramping rates of up to 12,000 cfs/hour, if the discharge is less than 30,000 cfs, and up-ramping rates ranging from 0 to 40,000 cfs/hour.

[40] *Id*. at Attachment A, 10. This provision is similar to the requirement in section 7.L of the MDE certification. However, the certification would have required a plan to redesign, install, and maintain best available real-time flow telemetry in the tailrace.

51. The proposed *Fish Passage* article states that Exelon will: (1) implement all provisions of Interior's modified FPA section 18 prescription; (2) modify the East Fish Lift to achieve the greatest possible balance of increased attraction flow (up to 900 cfs) and improved internal hydraulic performance; and (3) index fish lift hopper[41] fullness through visual observations.[42]

52. The proposed *Eel Passage* article[43] states that, in addition to implementing the provisions of Interior's modified FPA section 18 prescription, Exelon will undertake a number of other measures, including developing an eel passage and restoration plan that will: (1) provide for modification of the East Fish Lift to accommodate a temporary eel trapping facility in the East Fish Lift stilling basin;[44] (2) contain details regarding the operation and maintenance of all existing and proposed eel fishways at the project, including continued use of the East Fish Lift for eel passage after the American shad and river herring[45] season has ended; and (3) establish attraction flow velocity and volume, slopes of ramps, matting, and methods to reduce predation. Exelon will consult at least annually with MDE to review eel passage efficiency at the East Fish Lift. After Exelon has operated the temporary eel trapping facility for 10 years, and if MDE determines, in consultation with the Eel Passage Advisory Group,[46] that it has been successful, Exelon will design, install, and operate a permanent eel trapping facility at the East Fish Lift. Exelon also agrees to maintain the upstream eel trap-and-transport program required by Interior's modified prescription for an additional five years through 2035.

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[41] A hopper is a bucket that is lifted like an elevator to the top of the dam where the fish are released into a trough leading to the reservoir.

[42] *Id*. at Attachment A, 3-4. This provision is similar to the requirement in section 7.B.i(a) of the MDE certification.

[43] *Id*. at Attachment A, 4-6. This provision is similar to the requirement in section 7.B.i(b) of the MDE certification.

[44] Pursuant to section 12.6.1 of Interior's modified section 18 prescription, Exelon shall submit proposed stocking locations for collected American eels to FWS and resource agencies for review and approval prior to beginning such measures.

[45] River herring is a collective term used to describe two fish species: alewife and blueback herring.

[46] The Eel Passage Advisory Group consists of representatives from Pennsylvania DEP, FWS, Maryland DNR, SRBC, and the Pennsylvania FBC. MDE Settlement at 7 n.22.

53. The proposed *Invasive Species Mitigation* article includes provisions for an invasive species mitigation plan, pursuant to which Exelon will monitor for aquatic invasive species, remove aquatic invasive species collected in the project's fish lifts under certain circumstances, and notify Maryland DNR and FWS when aquatic invasive species are collected in the project's fish lifts or passed into Conowingo Pond at the East Fish Lift.[47]

54. The proposed *Trash and Debris* article states that Exelon will employ clamming, skimming, or other equally effective means of debris removal, removing no less than 40 loads and no more than 450 loads of debris annually.[48] Exelon will remove debris blocking drinking water intakes and recreational facilities within the project boundary as soon as safely possible. In addition, Exelon will sponsor at least two annual community-based cleanup events at or near the project.

55. The proposed *Dissolved Oxygen Monitoring* article states that Exelon will develop and implement a plan to monitor for, and inform MDE about, large-scale fish kills that occur in Conowingo Pond or the tailrace that would indicate that there may be insufficient levels of dissolved oxygen.[49]

56. The proposed *Shoreline Management Plan* article states that Exelon will consult with MDE, as recommended in the final EIS,[50] regarding, and in some cases seek MDE's approval for, changes that could affect shoreline conditions, including non-project use of project lands, modifications to shoreline vegetation, and changes in use of project lands that may affect sensitive aquatic resources.[51]

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[47] *Id*. at Attachment A, 7. This provision is similar to the requirement in section 7.B.i(c) of the MDE certification.

[48] *Id*. at Attachment A, 8. This provision is similar to the requirement in section 7.F of the MDE certification, except for certain timing flexibility and a cap on the yearly amount of trash and debris removed.

[49] *Id*. at Attachment A, 7. This provision is similar to the requirement in section 7.E.iv of the MDE certification; however, it does not include similar provisions to the requirement in 7.E.ii and iii to develop a plan to provide for continuous monitoring of DO levels in the tailrace.

[50] Final EIS at 427.

[51] MDE Settlement at Attachment A, 8-9. This provision is similar to the requirement in section 7.I of the MDE certification.

57. The proposed *Turtle Management Plans* article[52] states that Exelon will develop and implement a bog turtle protection plan that will include restrictions on mowing wetland habitat documented to support bog turtles, control of invasive and woody plants, and limits on public access in wetlands documented to support bog turtles, as recommended in the final EIS.[53] Exelon will also develop and implement a northern map turtle plan, which will include: (1) monitoring the northern map turtle population in the project area; (2) studying the need for, and location of, artificial basking platforms; and (3) implementing nest management and protection measures.

58. The proposed *Waterfowl Nesting Protection Plan* article[54] states that Exelon will develop and implement a waterfowl nesting protection plan.[55]

59. The proposed *Sturgeon Protection* article states that Exelon agrees to provide an annual report to MDE and Maryland DNR regarding sturgeon observed at the project to assist those agencies in assessing the existence of sturgeon populations in the lower Susquehanna River.[56]

2. Off-License Provisions

60. In addition to the proposed license articles, the MDE Settlement includes several measures that are intended to be outside of the license (off-license provisions) and,

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[52] *Id*. at Attachment A, 9-10. This provision is similar to the requirement in section 7.J of the MDE certification.

[53] Final EIS at 413.

[54] MDE Settlement at Attachment A, 10. This provision is similar to the requirement in section 7.K of the MDE certification.

[55] The MDE Settlement notes that MDE believes this plan is particularly important for assessing the impact, if any, of the new flow regime contemplated by the proposed license articles on waterfowl nesting success. *Id*. at 15. The *Waterfowl Nesting Protection Plan* article also addresses the black-crowned night-heron, a wading bird species that has been observed foraging below the dam, roosting on Rowland Island, and has the potential to nest within the project boundary in similar areas as waterfowl species (e.g., ducks and geese). Final EIS at 234-35.

[56] MDE Settlement at Attachment A, 10-11. This provision is similar to the requirement in section 7.M(i) of the MDE certification; however, it does not include provisions similar to the requirements in 7.M.ii through v to retrieve, return, and monitor any sturgeon found stranded.

correspondingly, outside of the Commission's jurisdiction. Specifically, Exelon has agreed to:

- support MDE's efforts to undertake a mussel restoration initiative to re-establish the *eastern elliptio* population in the lower river[57] by providing: (i) land in or near the project boundary for MDE to construct a mussel hatchery;[58] (ii) funding to assist with the cost of constructing the hatchery and developing the restoration program; and (iii) annual funding to support the operation and maintenance costs of the mussel restoration initiative;[59]

- provide MDE with financial support for (1) projects to make the Susquehanna River and the Chesapeake Bay more resilient to severe weather events;[60] (2) other water quality improvement projects, including forest buffers and agricultural projects such as cover crops,[61] and (3) research and projects related to eels and eel passage;[62]

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[57] While the MDE Settlement does not define "lower river," the MDE Certification, in response to which Exelon and MDE were negotiating the settlement, defines it as "the River from the Dam to its confluence with the Bay." MDE Certification at 3.

[58] The settlement notes that Commission approval may be required if the hatchery site is located within the project boundary. MDE Settlement at 6.

[59] *Id*. at 6-7. This provision will contribute to the development of a potential restoration project that was identified in section 7.D.iv of the MDE certification.

[60] *Id*. at 7. This provision will contribute to the development of potential restoration projects that were identified in section 7.D.iv of the MDE certification. MDE intends to use this funding for projects such as submerged aquatic vegetation restoration, oyster restoration, clam restoration, aquaculture, and to stabilize shorelines, as well as to mitigate the impact of high-flow events that may result in scour of sediment impounded behind the Conowingo Dam.

[61] *Id*. at 7. This provision will contribute to the development of potential restoration projects identified in section 7.D.iv of the MDE certification.

[62] *Id*. This provision will contribute to the research goal that was identified in the Eel Passage Improvement Plan associated with section 7.B.i(b) of the MDE certification.

- develop a feasibility study of dredge material disposal options within, or close to, the project boundary;[63]

- provide funding to the USGS or the Maryland Geological Survey to maintain the existing tailrace gage until such time as real-time telemetry is implemented at the tailrace gage;[64]

- implement technology, if it becomes available, to allow for monitoring hopper fullness, subject to certain cost limitations;[65]

- implement a plan for monitoring chlorophyll-A levels in the Maryland portion of Conowingo Pond, subject to certain cost limitations;[66]

- reimburse certain costs incurred by MDE and certain oversight costs MDE and Maryland DNR are expected to incur in the future with respect to the proposed license articles;[67]

- cooperate with activities undertaken by MDE and other resource agencies in connection with mussel restoration, submerged aquatic vegetation restoration, and other resiliency projects,[68] give MDE and other resource agencies access to project

[63] *Id*. at 8. This provision will contribute to the development of potential projects identified in section 7.D.iv of the MDE certification.

[64] *Id*.

[65] *Id*. This provision is similar to the requirement in section 6.3(e) of the Fish Passage Improvement Plan associated with section 7.B.i(a) of the MDE certification.

[66] *Id*. With the exception of the cost limitation, this provision is similar to the requirement in section 7.G.i and ii of the MDE certification. There is no proposal to submit a plan to address chlorophyll-A levels that exceed water quality standards as would have been required under sections 7.G.iii and iv of the MDE certification.

[67] *Id*. at 8, 10. This provision is similar to the requirement in section 7.Q.xviii of the MDE certification.

[68] *Id*. at 9. This provision is similar to the requirement in section 7.Q.vi of the MDE certification.

lands in connection with those activities,[69] and maintain certain records relating to the proposed license articles;[70] and

- maintain a public web site containing plans, data, and reports related to the protection, mitigation, and enhancement measures.[71]

3. Comments on the MDE Settlement

61. SRBC filed comments in support of the MDE Settlement, noting that the proposed changes to the flow regime are an improvement over the requirements contained in the current license.[72] SRBC also notes that the settlement should reduce adverse impacts to downstream aquatic communities and supports the proposed improvements to the East Fish Lift, the proposed measures to monitor aquatic invasive species, the proposed measures to protect native species, MDE and Exelon's efforts to reduce and avoid large-scale fish kills from low DO in Conowingo Pond, and the plan for trash and debris removal in an effort to improve aquatic recreational activities and aesthetics.[73]

62. FWS supports the measures in the MDE Settlement and approves the inclusion of its modified FPA section 18 prescription in the agreement, with a modification, accepted by Exelon and MDE,[74] to the settlement agreement's proposed license article on invasive species mitigation to ensure compliance with the proposed migratory fish passage efficiency targets.[75]

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[69] *Id*.

[70] *Id*. at 11. This provision is similar to the requirement in section 7.Q.v of the MDE certification.

[71] *Id*. This provision is similar to the requirement in section 7.Q.x of the MDE certification.

[72] SRBC January 17, 2020 Comments.

[73] *Id*. at 1-2.

[74] Exelon January 31, 2020 Reply Comments at 75; MDE January 31, 2020 Reply Comments at 15.

[75] FWS January 17, 2020 Comments.

63. Pennsylvania DEP and Pennsylvania FBC support the MDE Settlement's proposed license articles on fish and eel passage and make additional recommendations regarding invasive species, which are discussed below.[76]

64. Waterkeepers Chesapeake and Lower Susquehanna Riverkeepers (jointly, Waterkeepers), The Nature Conservancy, Coalition, Chesapeake Bay Foundation, and a number of individuals filed comments raising concerns about the MDE Settlement. These issues are addressed below.

C. Procedural Matters Regarding Settlement Agreement Process

65. Some commenters claim that the MDE Settlement is flawed because it was developed without the involvement or input of any other interested parties[77] and without public input.[78] MDE disagrees, noting that it reached out to a number of interested parties "for the express purpose of informing them about, and soliciting their input on settlement strategy."[79]

66. When the agreement was filed, the Commission issued notice and invited comments on it and we have considered those comments. Accordingly, we find that interested parties and the public have had sufficient opportunity to provide input on the MDE Settlement.

67. The Nature Conservancy and Chesapeake Bay Foundation argue that the MDE Settlement fails to include an adequate explanatory statement, as required by 18 C.F.R. § 385.602(c)(1) (2020), and fails to meet the Commission's *Policy Statement on Hydropower Licensing Settlements*, which states that explanations enable the Commission to understand the parties' intent and what in the record the settling parties

[76] Pennsylvania DEP January 17, 2020 Comments; Pennsylvania FBC January 17, 2020 Comments.

[77] Waterkeeper January 17, 2020 Comments at 13; Coalition January 17, 2020 Comments at 4, 6-8.

[78] *See, e.g.*, Scott Budden January 13, 2020 Comments and Lucinda Snow January 20, 2020 Comments.

[79] MDE January 31, 2020 Reply Comments at 17. MDE specifically notes that it had numerous communications with representatives of the Coalition, The Nature Conservancy, and Riverkeepers.

believe supports their proposals.[80] The Nature Conservancy also complains that the MDE Settlement does not address the arguments raised by itself and others on Exelon's previously-proposed flow regime, which it claims is substantially similar to the flow regime proposed in the MDE Settlement.[81]

68. The MDE Settlement includes an explanatory statement that comprises statements of intent, as well as numerous citations to the final EIS and study results filed in the record, as support for its provisions,[82] sufficient for us to understand the parties' intent and evaluate the proposal. There is no requirement that a settlement address in its explanatory statement all comments previously raised in a proceeding.

69. The Nature Conservancy and Chesapeake Bay Foundation request a technical conference to resolve what they consider to be disputed or unresolved issues related to measures that will mitigate project impacts.[83] Exelon states that neither The Nature Conservancy nor Chesapeake Bay Foundation offer sufficient justification for a technical conference.[84] MDE states that there is firm support in the record for the measures proposed in the MDE Settlement and that further delay is not necessary or in the public interest.[85] We agree that these matters can be adequately assessed and addressed based on the information in the record in this proceeding. Therefore, we find no need to convene a technical conference.

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[80] The Nature Conservancy January 17, 2020 Comments at 3-5; Chesapeake Bay Foundation January 17, 2020 Comments at 13-14.

[81] The Nature Conservancy January 17, 2020 Comments at 5.

[82] MDE Settlement at 5-24 (Joint Explanatory Statement).

[83] The Nature Conservancy January 17, 2020 Comments at 36; Chesapeake Bay Foundation January 17, 2020 Comments at 20. The Nature Conservancy also requests that the Commission require Exelon and MDE to provide answers to a series of questions posed by The Nature Conservancy. The Nature Conservancy January 17, 2020 Comments at 33-34, 36.

[84] Exelon January 17, 2020 Reply Comments at 79. Exelon also states there is no compelling reason to require it to answer the questions posed by The Nature Conservancy. *Id*.

[85] MDE January 31, 2020 Reply Comments at 16.

D. Enforceability of License Conditions

70. The Nature Conservancy argues that the proposed license articles are not sufficiently enforceable by the Commission.[86] The Commission has modified the proposed license articles, as appropriate, to ensure that the articles included in this license are sufficiently detailed to allow the Commission to ensure compliance with them.

E. Off-License Provisions

71. As noted above, Exelon agrees to undertake a number of activities outside of the license as part of the MDE Settlement. Exelon and MDE provide the summary of those activities to the Commission for information only and have asked that the activities not be included in the license. Commenters express concern with the contents and enforceability of the off-license provisions.[87]

72. Settling parties are free to enter into "off-license" agreements with respect to matters that will not be included in a license.[88] However, the Commission has no jurisdiction over such agreements and their existence carries no weight in the Commission's consideration of a license application under the FPA.[89] Thus, the off-license provisions of the MDE Settlement are outside the Commission's authority to enforce.[90] To the extent that commenters argue that the off-license provisions should be included in the license, we address those issues below.

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[86] The Nature Conservancy January 17, 2020 Comments at 7-8.

[87] *See, e.g.*, Kurt R. Schwarz January 3, 2020 Comments and Katherine Schinasi January 18, 2020 Comments.

[88] *Settlements in Hydropower Licensing Proceedings under Part I of the Federal Power Act*, 116 FERC ¶ 61,270, at P 7 (2006) (Settlement Policy).

[89] *Id*. *See also Eastern Niagara Public Power Alliance and Public Power Coalition v. FERC*, 558 F.3d 564, 567-68 (D.C. Cir. 2009) (off-license agreements not related to project operations irrelevant to FERC's statutorily mandated assessment of relicensing application).

[90] We note that the provisions are enforceable as a contract by the parties to the MDE Settlement.

F. Waiver of Water Quality Certification

73. The MDE Settlement provides that if the Commission accepts the settlement agreement without modification or expansion[91] MDE will waive its right to issue water quality certification. Waterkeepers argues that MDE cannot undo its water quality certification by waiving its right to issue a certification.[92] We disagree. A state may affirmatively waive its authority before the one-year period expires.[93] Further, it is also recognized that a state may do so while its certification is under appeal.[94] We are also unaware of any authority, nor does Waterkeepers cite any, prohibiting a state from waiving certification after granting it. Therefore, we find that the Clean Water Act does not prohibit Maryland from waiving its authority to issue a water quality certification for the project.

74. Chesapeake Bay Foundation contends that Maryland has abdicated its duty to protect water quality harmed by operation of the project by waiving its water quality certification authority.[95] Similarly, Waterkeepers assert that MDE did not comply with

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[91] The MDE Settlement includes a process for the parties to follow in the event the Commission issues a new license that does not approve the proposed articles in full. *See* MDE Settlement at section 3.2(b).

[92] Waterkeepers January 17, 2020 Comments at 14-16.

[93] *See Env't Def. Fund v. Alexander*, 501 F. Supp. 742, 771 (N.D. Miss. 1980), *aff'd in part, rev'd in part on other grounds, sub nom. Env't Def. Fund, Inc. v. Marsh*, 651 F.2d 983 (5th Cir. 1981) (a state may make an affirmative decision to waive certification under section 401(a)(1) of the Clean Water Act). *See also*, EPA, *Basic Information on CWA Section 401 Certification*, https://www.epa.gov/cwa-401/basic-information-cwa-section-401-certification (last visited Jan. 7, 2021) ("A state or authorized tribe may waive the certification voluntarily, or by failing or refusing to act within the established reasonable time period.").

[94] *See, e.g., Alcoa Power Generating Inc. v. FERC*, 643 F.3d 963, 969 (D.C. Cir. 2011) (acknowledging that a state could decide to waive its certification rights rather than revise the certificate to accommodate a ruling on appeal).

[95] Chesapeake Bay Foundation January 17, 2020 Comments at 8-12. It also claims MDE is waiving its future ability to issue or amend the National Pollution Discharge Elimination System (NPDES) permit for the project. MDE, in its reply comments, notes that the project is currently subject to an NPDES permit for certain point-source outfalls and that the MDE Settlement does not affect MDE's authority with respect to that permit. MDE Reply Comments at 16 n.41.

its own regulations in attempting to withdraw its certification.[96] Given that MDE is not subject to the Commission's jurisdiction, the Commission has no authority to consider these matters. As we have explained, whether a state agency has complied with its own regulations rather than federal law is one to be determined in the first instance by the state.[97]

75. Next, Chesapeake Bay Foundation argues that the Clean Water Act requires states to certify that federally licensed projects will not harm downstream water quality before the Commission can issue a license and that all conditions necessary to assure compliance with provisions of the Clean Water Act must become conditions in the license.[98] Waterkeepers avers that any attempt to excuse Exelon from compliance with the water quality certification conditions included in the certification issued by MDE would contravene the Clean Water Act.[99] Waterkeepers also express concern that pursuant to the MDE Settlement, Exelon will implement a plan to monitor chlorophyll-A levels on the Maryland side of the reservoir rather than take measures to meet water quality standards in the event chlorophyll-A levels exceed them, as was required in the MDE certification.[100] Finally, Waterkeepers assert that the MDE Settlement limits Exelon's liability under the Clean Water Act.[101]

76. Chesapeake Bay Foundation and Waterkeepers misconstrue the requirements of the Clean Water Act. Under section 401(a)(1) of the Clean Water Act, the Commission may not issue a license authorizing the operation of the Conowingo Project unless MDE has either issued water quality certification for the project or has waived certification.[102] Here, MDE has indicated that if the Commission approves the settlement agreement it

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[96] Waterkeepers January 17, 2020 Comments at 15.

[97] *See Flambeau Hydro, LLC*, 113 FERC ¶ 61,291, at P 8 (2005).

[98] Chesapeake Bay Foundation January 17, 2020 Comments at 9.

[99] Waterkeepers January 17, 2020 Comments at 16-17. Waterkeepers further argues that the water quality certification is not waived under *Hoopa Valley*, 913 F.3d at 1099. Waterkeepers January 17, 2020 Comments at 17-21. In light of MDE's affirmative waiver of certification and Exelon's stated intent to withdraw its petition for declaratory order on this issue, we consider the issue moot, and we will not address in this order whether we would have found certification waived under *Hoopa Valley*.

[100] Waterkeepers January 17, 2020 Comments at 26.

[101] *Id*. at 27.

[102] 33 U.S.C. § 1341(a)(1).

entered into with Exelon, the state is waiving certification. Section 401(d) of the Clean Water Act provides that any certification issued by the state shall assure compliance with provisions of the Clean Water Act and that, if issued, the certification shall become a condition of any federal license that authorizes construction or operation of the project.[103] Because MDE is waiving water quality certification in this proceeding, there are no certification conditions required to be included in the license. The Commission has explained that if certification is waived, the licensee is not compelled to construct, operate, or maintain a hydroelectric project in a manner consistent with state water quality standards unless the Commission includes such a requirement in the license.[104] The Commission has conducted its own analysis of the water quality impacts of the project as proposed and is requiring those measures we deem necessary to protect aquatic resources. No more is required.

77. Consistent with the settlement, because we are adopting the Proposed Licensed Articles and only making modifications to ensure that the Commission can enforce those articles, we find that MDE has waived its certification for the project and we dismiss Exelon's petition for declaratory order as moot.

COASTAL ZONE MANAGEMENT ACT

78. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within six months of its receipt of the applicant's certification.[105]

79. By letter filed March 5, 2013, Exelon and Maryland mutually agreed to extend the deadline for the CZMA consistency review determination until May 17, 2018.[106] Maryland failed to act by that date; therefore, Maryland's concurrence is conclusively presumed.

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[103] *Id*. § 1341(d).

[104] *See Gustavus Elec. Co.*, 109 FERC ¶ 61,105 (2004), *reh'g denied*, 110 FERC ¶ 61,334 (2005).

[105] 16 U.S.C. § 1456(c)(3)(A).

[106] Brent A. Bolea, Assistant Attorney General March 5, 2013 Letter. State agencies and applicants may mutually agree in writing to stay the six-month consistency review period. 15 C.F.R. § 930.60(b) (2020).

SECTION 18 FISHWAY PRESCRIPTION

80. Section 18 of the FPA provides that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate.[107]

81. On January 31, 2014, Interior filed a preliminary section 18 prescription, which it modified on June 8, 2016. The modified section 18 prescription requires Exelon to: (1) achieve designated upstream and downstream fish passage efficiency criteria for American shad, river herring, and eel;[108] (2) operate the fish passage facilities in accordance with defined seasonal and daily schedules; (3) develop a fishway operation and maintenance plan;[109] (4) conduct trap and transport operations for American shad and river herring; (5) modify the East Fish Lift and West Fish Lift, provide a zone of passage to the fish passage facilities,[110] and expand eel trapping locations on the east and west sides of the project; (6) conduct fish passage effectiveness monitoring; and (7) allow access for fishway inspections.

82. Interior's modified section 18 prescription is attached to this order as Appendix 1 and incorporated into the license by Ordering Paragraph (E).

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[107] 16 U.S.C. § 811.

[108] Waterkeepers express concern that the MDE Settlement proposes no specific numbers for shad and herring passage while the MDE certification would have required passage of at least five million shad and 12 million herring each year. Waterkeepers January 17, 2020 Comments at 26. We note that the modified section 18 prescription, which is a condition of this license, sets a passage capacity goal of five million shad and 12 million herring each year. Interior's Modified Fishway Prescription, Sections 12.1.1.1 and 12.1.1.2.

[109] Exelon filed an Initial Fishway Operation and Maintenance Plan on September 29, 2017, and an updated plan on February 2, 2021. Because this license includes conditions not anticipated by Exelon's plan, Article 413 requires that the plan be revised within 90 days to be consistent with the terms of this license.

[110] FWS uses the phrase "zone of passage" to collectively describe three areas with hydraulic and environmental conditions (e.g., flow velocity) that allow fish to pass over dams and other height barriers: an approach zone, an entry zone, and a passage zone. The first two zones describe areas in front of the fish passage facility entrance and the third zone describes movement within the lift, ladder, or other fish passage facility. *See* Interior's Modified Fishway Prescription Section 8.2.4.

83. The MDE Settlement proposes to add to Interior's modified section 18 prescription by requiring Exelon to: (1) operate all current and proposed eel fishways on the west side of Conowingo Dam until the fall mean daily water temperature below Conowingo Dam is 10-degrees Celsius or less for three consecutive days (generally occurring in mid- to late November), rather than until September 15; (2) operate all current and proposed eel fishways on the east side of Conowingo Dam from 10 days after the date that American shad operations cease at the East Fish Lift until the fall mean daily water temperature below the Conowingo Dam is 10-degrees Celsius or less for three consecutive days, rather than until September 15; (3) operate the upstream eel passage trap and transport program through 2035 rather than 2030; and (4) operate and evaluate a temporary eel facility at the East Fish Lift and monitor upstream passage success for 10 years to determine whether conversion to a permanent facility is warranted.[111] The MDE Settlement also clarifies that Exelon would never be required to operate more than two permanent eel trapping facilities at the same time.

84. As noted above, Interior filed comments in support of the MDE Settlement. Therefore, the settlement measures are included in the license as Article 414.[112]

85. By letters filed January 30, 2014, and January 31, 2014, the Secretaries of Commerce and Interior, respectively, requested that the Commission reserve authority to prescribe fishways. Consistent with Commission policy, Article 402 of this license reserves the Commission's authority to require fishways that may be prescribed by Commerce and/or Interior for the Conowingo Project.

SUSQUEHANNA RIVER BASIN COMMISSION

86. The SRBC was established by the Susquehanna River Basin Compact (Compact), with duties and responsibilities for comprehensive planning, programming, and management of the water and related resources of the Susquehanna River Basin.[113] Commission-issued licenses must meet the comprehensive development and public interest standards of FPA section 10(a)(1). In addition, under the Compact, projects in the Susquehanna River Basin that are licensed by the Commission "shall not substantially

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[111] The MDE Settlement also provides that if the number of eels exceeds the maximum capacity of eels per unit of ramp area, the licensee must redesign and construct the East Fish Lift Eel Temporary Modifications to reduce crowding.

[112] Sections (c), (h), (l), and (m) of the MDE Settlement's proposed *Eel Passage* article are not included in the license articles as they are included in Interior's modified section 18 prescription itself.

[113] The Compact is a federal interstate agreement among New York, Maryland, Pennsylvania, and the United States. Pub. L. No. 91-575, 84 Stat. 1509 (1970).

conflict with any … [SRBC] comprehensive plan."[114] Under a 1976 Memorandum of Understanding, the Commission and the SRBC have committed to cooperate in the processing of license applications, to the extent feasible, and the Commission has agreed to give due regard to any recommendations made by the SRBC.[115]

87. The SRBC intervened in the relicensing proceeding, stating that it generally supports the project.[116] It did not offer any specific license conditions for the Conowingo Project. While SRBC initially asserted that the project conflicts with portions of the SRBC's comprehensive plan,[117] and that the final EIS failed to adequately address certain issues it had raised,[118] SRBC subsequently filed comments in support of the MDE Settlement.[119] Accordingly, we need not address these matters.

88. SRBC's comprehensive plan has as its overarching goal the restoration and protection of healthy ecosystems and the restoration of the Chesapeake Bay as well as the restoration of populations of migratory fish throughout the Susquehanna River system.[120] We have reviewed the license proposal as amended by the Interior and MDE settlements and find that the project, as licensed herein, is consistent with SRBC's plan.

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[114] As set forth in the conditions and reservations under which the United States consented to participate in the Compact, the Commission's responsibilities and jurisdiction under the FPA and other relevant statutes are not altered, provided that "whenever a comprehensive plan, or revision thereof, has been adopted [by the SRBC] … the exercise of any power conferred by law on any … agency … of the United States with regard to water and related land resources in the Susquehanna River Basin shall not substantially conflict with any such portion of such [SRBC] comprehensive plan … ." Compact, Part II, Section 2(r)(2)(ii).

[115] Letter from Sec'y Richard L. Dunham, Fed. Power Comm'n, to Chairman Thomas C. H. Webster, SRBC, approving enclosed Memorandum of Understanding (Nov. 5, 1976) (http://www.ferc.gov/legal/mou.asp).

[116] SRBC June 11, 2013 Motion to Intervene at 1.

[117] SRBC September 29, 2014 Comments on the Draft EIS at 19-20; SRBC April 20, 2015 Comments on the Final EIS at 4-5.

[118] SRBC April 20, 2015 Comments on the Final EIS at 1, 4-5.

[119] SRCB January 17, 2020 Comments.

[120] Susquehanna River Basin Comprehensive Plan at 38-39, 67, and 71-72.

THREATENED AND ENDANGERED SPECIES

89. Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of their designated critical habitat.[121]

90. As discussed in the final EIS, staff identified six federally listed species with the potential to occur in the project area: the endangered shortnose sturgeon and the endangered Atlantic sturgeon are known to occur in the Susquehanna River downstream of Conowingo Pond, the endangered bog turtle has been confirmed near the Conowingo Project, potential habitat for the endangered Indiana and threatened northern long-eared bats exists within the project area, and the threatened swamp pink is known or believed to occur within Cecil County, Maryland.

91. In the final EIS, staff determined that relicensing the Conowingo Project would have no effect on shortnose or Atlantic sturgeon because neither species has been collected in nor passed via the Conowingo fish lifts since the lifts began operation in 1972.[122] Further, no sturgeon have been documented in the project vicinity since 1986.[123] NMFS concurred with staff's no effect determination for shortnose and Atlantic sturgeon by letter filed May 9, 2018.[124]

92. Staff concluded that developing a bog turtle protection plan for the Conowingo Project would help to minimize effects on bog turtles and their habitat related to project maintenance activities or project-related recreation, and determined that relicensing the project with staff-recommended measures is not likely to adversely affect the bog turtle.[125] FWS concurred with staff's determination for the bog turtle by letter filed

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[121] 16 U.S.C. § 1536(a)(2).

[122] Final EIS at 16 and 259.

[123] *Conowingo Hydroelectric Project Draft Biological Assessment* filed March 26, 2018. Staff noted that it had adopted the Biological Assessment without modification in its April 4, 2018 letter to NMFS providing staff's no effect determination and requesting concurrence.

[124] Article 418 requires the licensee to submit an annual report of the number of Atlantic and shortnose sturgeon observed at the project during the preceding calendar year as set forth in the MDE Settlement.

[125] Final EIS at 16-17 and 259-61.

January 7, 2015.[126] Further, the MDE Settlement includes a provision to develop a plan for the protection and enhancement of the bog turtle population associated with project lands. Article 423 requires Exelon to develop and implement a bog turtle protection plan to protect the existing bog turtle population and its habitat at the project.

93. Although the swamp pink is known or believed to occur within Cecil County, which forms the eastern bank of the Conowingo Project, this species has not been documented in the specific project area and was not observed during Exelon's 2010 and 2011 field survey activities.[127] Therefore, staff concluded that relicensing the Conowingo Project would have no effect on this species.

94. Staff also concluded that, although Indiana bat habitat may exist in the project area, continued routine vegetation management practices would be unlikely to affect trees large enough to provide roosting habitat.[128] Accordingly, staff determined that relicensing the project would not be likely to adversely affect the Indiana bat. FWS concurred with staff's determination for Indiana bat by letter filed January 7, 2015.[129]

95. In the final EIS, staff determined that suitable habitat for the northern long-eared bat may exist at the project, and that relicensing the project may affect this species, but that relicensing the Conowingo Project would not likely jeopardize the continued existence of the northern long-eared bat due to the minimal amount of tree clearing (including in areas proposed for recreation improvements) proposed by Exelon.[130] Although no known northern long-eared bat maternity roost trees or hibernacula were identified by resource agencies at the project prior to issuance of the final EIS, staff indicated there would be some tree clearing associated with the proposed recreation improvement areas. As a result, staff recommended that any license issued for the Conowingo Project include a requirement to limit tree clearing at the project to a period when bats are less likely to be present, which would minimize effects to habitat for federally listed bat species.

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[126] Genevieve LaRouche, Field Office Supervisor, FWS, January 6, 2015 Letter at 1-2 (filed on January 7, 2015) (LaRouche Letter).

[127] Final EIS at 16-17, 257-58, and 262.

[128] *Id*. at 17 and 261-62.

[129] LaRouche Letter at 2.

[130] Final EIS at 262-63.

96. In a letter to FWS issued April 4, 2017, staff noted that the final EIS was issued prior to the formal listing of the northern long-eared bat for protection under the ESA[131] and prior to the final 4(d) rule for the northern long-eared bat.[132] In the April 4, 2017 letter, staff determined that the Conowingo Project may affect the northern long-eared bat, but that any resulting incidental take of the northern long-eared bat is not prohibited by the final 4(d) rule; staff requested streamlined consultation under the 4(d) rule and FWS's concurrence with staff's determination by May 5, 2017. FWS did not file a response. According to the streamlined consultation framework, because no response was received from FWS, staff's determination satisfies the Commission's responsibilities under the ESA for the northern long-eared bat. Article 425 requires, for the protection of the federally listed Indiana and northern long-eared bats, that Exelon avoid tree clearing (i.e., removal of all trees greater than 3 inches in diameter at breast height) on project lands from June 1 through July 31, unless a tree poses an immediate threat to human life or property.

97. In a letter to FWS issued July 10, 2017, staff stated that the rufa subspecies of the red knot (*Calidris canutus rufa*) (rufa red knot), a migratory shorebird, was formally listed as threatened under the ESA on December 11, 2014.[133] The rufa red knot was not raised as a species potentially occurring in the vicinity of the Conowingo Project during relicensing consultation, and staff did not address potential effects to this species within the final EIS.[134]

98. In the July 10, 2017 letter, staff noted that red knots have been observed approximately 10 miles downstream, in Havre de Grace, Maryland, and approximately 28 miles upstream, in Conejohela Flats, Pennsylvania, of the Conowingo Project, mostly during the late August to early September period that corresponds with rufa red knot

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[131] The northern long-eared bat was formally listed as threatened under the ESA effective May 4, 2015. 80 Fed. Reg. 17,974-18,033 (Apr. 2, 2015).

[132] 81 Fed. Reg. 1900, 1900-1922 (Jan. 14, 2016). Section 4(d) of the ESA directs FWS to issue regulations deemed "necessary and advisable to provide for the conservation of threatened species." *See* 16 U.S.C. § 1533(d). The ESA section 4(d) rule focuses on minimizing the effects of disturbances on known northern long-eared bat hibernacula and the effects of tree removal on roosting northern long-eared bats, including maternity colonies, located within the zone associated with the spread of white-nose syndrome.

[133] 79 Fed. Reg. 73,706-73,748 (Dec. 11, 2014).

[134] Although the rufa red knot is no longer listed on Interior's official list of threatened and endangered species that could be affected by the Conowingo Project, it was at the time Commission staff engaged in consultation.

southern migration. The areas where rufa red knots have been observed are characterized by exposed mudflats and other shallow littoral zone habitat. While no rufa red knots were recorded during the licensing proceeding, there are areas of exposed, shallow littoral zone habitat at the project,[135] and thus, it is possible that rufa red knots forage at the project during spring or fall migration.

99. Staff stated that potential project effects on the rufa red knot would likely be limited to periodic inundation of foraging habitat downstream of Conowingo Dam due to water level fluctuations from peaking operation. Staff also noted that similar, potentially suitable shallow littoral zone habitat existed in the lower Susquehanna River and northern Chesapeake Bay that may support migrating rufa red knots. Last, staff noted that Exelon is not proposing to modify current project operation in a manner that would measurably affect the rufa red knot or to construct new project facilities within habitat used by the rufa red knot.

100. Based on the above considerations, staff concluded that issuing a new license for the Conowingo Project is not likely to adversely affect the rufa red knot. By e-mail received July 13, 2017, FWS concurred with staff's determination.[136]

101. Therefore, no further action under the ESA is required for any of the above listed species.

NATIONAL HISTORIC PRESERVATION ACT

102. Under section 106 of the National Historic Preservation Act (NHPA)[137] and its implementing regulations,[138] federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (defined as historic properties) and afford the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the undertaking. This generally requires the Commission to consult with the State Historic Preservation Office (SHPO) to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

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[135] *See* Exelon's August 31, 2012 Water Level Management Study.

[136] See July 13, 2017 e-mail correspondence memo between Andy Bernick (Federal Energy Regulatory Commission) and Mr. David Sutherland (FWS).

[137] 54 U.S.C. § 306108.

[138] 36 C.F.R. pt. 800 (2020).

103. To satisfy these responsibilities, the Commission executed a PA with the Pennsylvania SHPO and the Maryland SHPO.[139] The Commission also invited the National Park Service (Park Service), Delaware Nation, Onondaga Nation, and Exelon to concur with the stipulations of the PA. Only Exelon concurred.

104. The PA requires Exelon to modify the HPMP filed on August 30, 2012. Commission staff's analysis in the final EIS indicates that although the August 2012 HPMP includes many standard requirements, some measures contained within the HPMP would benefit from clarification and added detail.[140] In the final EIS, staff recommended implementing Exelon's HPMP with the following modifications: (a) revise the project area of potential effect (APE) to include the narrow strip of land located in the current project boundary that extends downstream from Spencer Island along the west side of the river to the city of Havre de Grace, Maryland, that contains four additional previously recorded archaeological sites (18HA240, 18HA267, 18HA268, 18HA269); (b) conduct an inventory to identify any cultural resources located on lands within the project APE (particularly areas of interest identified in the Phase IA study that were not subject to Phase IB study), and include an evaluation of any identified cultural resources for National Register eligibility, and a discussion of potential effects prior to any sale or transfer of those lands; (c) make a good faith effort to obtain access to private property to conduct appropriate studies should project effects of any kind to cultural resources on private lands be identified over a new license term; (d) describe and monitor all 48 archaeological sites identified to date within the project APE; (e) describe all 27 historic structures identified in the APE or provide an explanation regarding why they need not be considered in the HPMP; (f) include recognition of the Susquehanna and Tidewater Canal and Columbia & Port Deposit Railroad as eligible for listing on the National Register; (g) include a revised list (as necessary) of project activities involving the Conowingo Project system that can be completed without Maryland SHPO review; (h) include a process for how project-related ground-disturbing activities would be assessed to determine whether or not archaeological sites would be affected, particularly in areas that have not been subject to previous archaeological survey; (i) provide confidentiality of cultural resources locational information during implementation of public outreach programs; (j) include a description of project-related activities that would require consultation with the Delaware Nation and the Onondaga Nation in accordance with section 106 of the NHPA and documentation of all consultation with the Delaware Nation and Onondaga Nation; and (k) include the Park Service as a consulting party.

105. The executed PA requires the measures recommended in the final EIS. Execution of the PA demonstrates the Commission's compliance with section 106 of the NHPA.

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[139] *See* October 3, 2017 Commission staff Transmittal of the Executed Programmatic Agreement for the Conowingo Hydroelectric Project No. 405.

[140] Final EIS at 427-28.

Article 429 requires the licensee to implement the PA and file a revised HPMP with the Commission within six months of license issuance.

RECOMMENDATIONS OF FEDERAL AND STATE FISH AND WILDLIFE AGENCIES PURSUANT TO SECTION 10(j) OF THE FPA

106. Section 10(j)(1) of the FPA[141] requires the Commission, when issuing a license, to include conditions based on recommendations submitted by federal and state fish and wildlife agencies, pursuant to the Fish and Wildlife Coordination Act,[142] to "adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)" affected by the project.

107. In response to the April 29, 2013 public notice that the project was ready for environmental analysis, Interior and Pennsylvania FBC collectively filed 21 recommendations under section 10(j).[143] Seven recommendations are outside the scope of section 10(j). Two of those seven recommendations, made by Pennsylvania FBC regarding downstream passage criteria for American shad and eels, are required by Interior's section 18 prescription and discussed in that section. The remaining five recommendations are discussed in the section below.

108. This license includes conditions consistent with 12 of the remaining 14 recommendations that are within the scope of section 10(j): (1) implement the Bald Eagle Management Plan, with provisions to consult the most recent bald eagle management guidelines before ground-disturbing activity, and restrict human activity (via increased signage, patrols of the area, or physical restrictions such as barriers) on the following project land locations where current project-related human activities disturb perching and foraging eagles at eagle concentration areas: both sides of Rowland Island, under the project's transmission line towers in the Susquehanna River, and on the Cecil County side of the river where eagle concentrations are present (Article 421); (2) develop and implement a waterfowl nesting protection plan (Article 422); (3) develop and implement a bog turtle protection plan, with provisions to consult the most recent bog turtle management guidelines before ground-disturbing activities (Article 423); (4) operate the project to achieve upstream and downstream passage criteria for American shad (Interior modified prescription 12.2.1 and 12.2.2); (5) modify the East Fish Lift to increase attraction flows, increase hopper capacity and reduce cycling time, and add a collection gallery (Interior modified prescription 12.6.1); (6) complete the rebuild of the

[141] 16 U.S.C. § 803(j)(1).

[142] 16 U.S.C. §§ 661 *et seq*.

[143] Interior and Pennsylvania FBC filed the recommendations on January 31, 2014, and December 11, 2013, respectively.

West Fish Lift to add attraction flows, with the capability to expand to volitional passage to contribute to the goal of passing five million American shad at the project (Interior modified prescription 12.6.1 and 12.6.2.3); (7) construct an eel passage facility near the West Fish Lift, with the capability to modify the location of the facility and change to volitional passage at a later date (Interior modified prescription 12.6.1); (8) test additional eel capture locations near the East Fish Lift and construct permanent traps as needed (Interior modified prescription 12.6.1); (9) test additional eel capture locations and install additional traps, as needed, on Octoraro Creek at the base of Octoraro reservoir dam (Interior modified prescription 12.6.1); (10) transport at least one million eels annually upstream until volitional passage is operational (Interior modified prescription 12.6.1); (11) test eel passage facilities located on the west side of the river, including inside or adjacent to the West Fish Lift, to improve capture efficiency (Interior modified prescription 12.7.3); and (12) develop and implement a study to evaluate safe and effective downstream passage of eels (Interior modified prescription 12.7.5).

109. If the Commission believes that any section 10(j) recommendation may be inconsistent with the purposes and requirements of Part I of the FPA or other applicable law, section 10(j)(2) requires the Commission and the agencies to attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agencies.[144] If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

110. Commission staff made an initial determination that Interior's recommendation to implement a flow management plan, and Pennsylvania FBC's recommendation to reduce migratory fish stranding, may be inconsistent with the comprehensive planning standard of section 10(a)(1) and the public interest standard of section 4(e) of the FPA. Subsequently, Interior and Pennsylvania FBC each filed a letter in support of the MDE Settlement, the flow management terms of which are included in this license.[145] Therefore, we consider the inconsistencies resolved.

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[144] 16 U.S.C. § 803(j)(2).

[145] Pennsylvania FBC recommended that Exelon (1) extend the retaining wall on the east end of the East Fish Lift or add boulder fill to the area to prevent flooding during high generation flows, or (2) dredge a channel(s) from the area to provide downstream egress for stranded fishes to reduce stranding of American shad and river herring downstream of Conowingo Dam. The MDE Settlement provides that, after the initial three years of the license, Exelon will maintain a minimum flow of 18,200 cfs during the spring migration period and will adhere to a year-round down-ramping rate of up to 12,000 cfs/hour if the discharge is less than 30,000 cfs when reducing flows. These

SECTION 10(a)(1) OF THE FPA

111. Section 10(a)(1) of the FPA requires that any project for which the Commission issues a license be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.[146]

112. The following sections discuss three recommendations filed by Interior and two recommendations from Pennsylvania FBC that were filed under section 10(j), but which are outside the scope of section 10(j); and other measures from the licensee's proposal, including the MDE Settlement, and staff's recommendations. These measures are considered under the broad public interest standard of section 10(a)(1) of the FPA.

A. Shoreline Management

113. To protect shoreline resources, Exelon proposes to implement a Shoreline Management Plan filed with the license application that includes measures and policies related to shoreline vegetation management and erosion control, woody debris management, game species management, sensitive natural resource protection, and recreation use on land within the project boundary. The Shoreline Management Plan, which also includes an Osprey Management Policy, will guide management of the project's shorelines and protect environmental resources, including bald eagle and osprey habitat, and will help to minimize effects from erosion on the reservoir's shoreline. Interior recommends that a Shoreline Management Plan be implemented consistent with FERC's *Guidance for Shoreline Management Planning at Hydropower Projects*. In the final EIS, staff recommended that Exelon's proposed Shoreline Management Plan be revised to include updates every 10 years, in consultation with interested stakeholders and consistent with the latest *Guidance for Shoreline Management Planning at Hydropower Projects,* to ensure the plan remains current with conditions at the project.[147] In the MDE Settlement, Exelon agrees to consult with MDE on, and in some cases seek MDE's approval of, changes that could affect shoreline conditions, including non-project use of project lands, modifications to shoreline vegetation, and changes in use of project lands that may affect sensitive aquatic species. The MDE Settlement, however, does not

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measures should reduce stranding of migratory and resident fishes. Because Pennsylvania FBC filed comments supporting the MDE settlement and did not raise any further concerns regarding stranding, we consider the issue resolved.

[146] 16 U.S.C. § 803(a)(1).

[147] Final EIS at 407.

specify a timeframe for consultation or updating the plan, as recommended by staff in the final EIS. Therefore, Article 428 approves the Shoreline Management Plan, as modified by the MDE Settlement, with the addition of a provision to review and update the plan every 10 years.

B. Access to Project Lands and Facilities

114. Interior recommends that the project be subject to FWS inspection to ensure compliance with the license's protection, mitigation, and enhancement measures. Standard Article 4 allows representatives and "other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties." In light of Standard Article 4, no special article providing FWS access is required.

C. Gizzard Shad Telemetry Studies

115. Pennsylvania FBC recommends that Exelon conduct two studies: (1) a telemetry study to determine the effect of the increasing abundance of gizzard shad in the lower Susquehanna River on the project's fish lift capacity and upstream passage efficiency of American shad and (2) a telemetry study to evaluate gizzard shad recycling[148] at the West Fish Lift.

116. In the final EIS, staff recommended both studies.[149] However, Interior's modified section 18 prescription contains provisions to immediately increase the biomass capacity of the project's fish lifts to seven million pounds annually, which FWS estimates will alleviate overcrowding in the hoppers and accommodate upstream passage of all species at the project for approximately 25 years. Further, the modified prescription incorporates fish passage efficiency targets and measures to assess upstream passage efficiency throughout the term of the license, thereby informing the need for additional capacity as target populations (i.e., American shad and river herring) are restored.

117. Because the modified section 18 prescription's provisions negate the need for additional studies of gizzard shad, this license does not require gizzard shad telemetry studies.

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[148] Gizzard shad are not passed upstream through the project's fish lifts but are instead released back downstream when captured. Recycling refers to repeated attempts by individual specimens to gain upstream passage.

[149] Final EIS at 419.

D. Reservoir Operation

118. Exelon currently operates Conowingo Pond between elevations 101.2 and 110.2 feet, with a minimum elevation of 107.2 feet on weekends between Memorial Day and Labor Day, to provide recreational opportunities. Exelon proposes to continue operating Conowingo Pond using the same operating limits as it currently does. In the final EIS, staff concluded that this mode of reservoir operation adequately protects aquatic resources and recreational use.[150] Therefore, Article 406 requires the continuation of the existing mode of reservoir operation.

E. Flow Management

119. Pursuant to the flow regime originally proposed in Exelon's application, minimum flow releases would range from a low of 3,500 cfs, with allowance for 0 cfs for up to six hours at a time,[151] from December through February, up to a high of 10,000 cfs in April. The flow regime recommendation set forth by The Nature Conservancy (TNC Flow Regime)[152] would vary monthly between 3,500 cfs and 35,000 cfs.[153] The Nature Conservancy stated that it seeks flows that would: (1) provide for diadromous and resident fish spawning, migration, and egg and larval development, and for macroinvertebrates at least 50% of historic maximum persistent habitat, minimize the time that historic maximum persistent habitat is less than 25%, and target 70% of maximum weighted usable area across species and life stages; (2) increase the probability of fish lift entry for American shad, river herring, and eel; (3) eliminate stranding-related mortality of adult and juvenile fishes; (4) provide at least 50% of available mussel habitat with suitable shear stress; (5) increase the stability and suitability of basking and hibernation habitats for map turtles; and (6) increase the suitability for submerged aquatic vegetation and emergent vegetation establishment.[154]

120. In the final EIS, Commission staff assessed the effects of Exelon's original flow proposal, an alternative run-of-river operation option, and the TNC Flow Regime on

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[150] *Id*. at 414.

[151] With the exception of the 800-cfs leakage noted above.

[152] As noted above, Interior originally included implementation of the TNC Flow Regime as one of its 10(j) recommendations, but subsequently filed comments in support of the MDE Settlement.

[153] Final EIS at 146-47. The Nature Conservancy also proposed consideration of a run-of-river regime.

[154] *Id*. at 145-46.

submerged aquatic vegetation, fish habitat, fish migration, fish stranding, freshwater mussels, and other aquatic invertebrates.[155] Staff determined that the TNC Flow Regime would only provide limited benefits to some species, due to the high variability of species-specific flow preferences downstream of the project.[156] Further, under the TNC Flow Regime, although the Conowingo Project would realize a gain in annual generation of 13,116 MWh, with a levelized annual value of $274,473,[157] the Muddy Run Project would lose the equivalent of nine percent of its annual generation or 146,837 MWh, with a levelized annual loss of $752,390.[158] Project operation under the TNC Flow Regime would also eliminate many of the peaking and ancillary service benefits to the PJM region.[159] In contrast, Commission staff's recommended alternative, which modified Exelon's initial proposal by eliminating periods of zero minimum flow and increasing volume during the first two weeks in June, would result in a loss of annual generation of 2,450 MWh and 931 MWh, at the Conowingo and Muddy Run projects, respectively, with levelized annual losses of $51,270 and $6,708.

121. As part of the MDE Settlement agreement, Exelon proposes to implement, after a three-year period, a flow regime that ranges from 4,000 cfs (August through February) to 18,200 cfs (March through May) (or inflow, if less), and includes down-ramping rates of up to 12,000 cfs/hour if the discharge is less than 30,000 cfs and up-ramping rates

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[155] *Id*. at 148-61.

[156] *Id*. at 158.

[157] As stated below, following the issuance of the final EIS, staff updated the economic analysis for relicensing the Conowingo Project, including the levelized annual costs, to account for an updated alternative power cost and federal tax rate.

[158] Similar to the Conowingo Project, staff updated the economic analysis for the Muddy Run Project in the final EIS and determined updated levelized annual costs using the alternative power cost and federal tax rate described below. Because the Muddy Run Project is a pumped storage project that uses Conowingo Pond as its lower reservoir, operation of the Conowingo Project directly affects generation at the Muddy Run Project. Power generation at both projects depends on river flow and is affected by restrictions on the Conowingo Pond level. To satisfy the TNC Flow Regime, more flow would be released downstream of Conowingo Dam; therefore, there would be less water available for pumping to the Muddy Run Project's upper reservoir from Conowingo Pond, resulting in less generation at the Muddy Run Project at an annual cost of $752,390.

[159] PJM is a regional transmission organization that coordinates the movement of wholesale electricity in several states, including Maryland and Pennsylvania.

ranging from 0 to 40,000 cfs/hour.[160] Exelon's proposal provides minimum flows that are 500 to 14,700 cfs greater than staff's recommendation, except from August 1 through September 14 when flows would be 1,000 cfs less. Therefore, Exelon's revised flow regime proposal generally provides for higher flows than Commission staff's recommendation, and more closely mimics the TNC Flow Regime by limiting maximum generation and modifying ramping rates.

122. As noted above, Exelon states that the three-year period will allow it to coordinate with PJM to ensure that the protocols currently employed to dispatch power from the Conowingo and Muddy Run projects can be adapted to the second phase flow regime without jeopardizing reliability or causing adverse impacts to the power markets. Pennsylvania FBC expresses concern that there is no assurance that Exelon and PJM will be able to modify their procedures to allow for Conowingo's second phase flow regime.[161] Exelon states that it has been in consultation with PJM and is confident that it can implement the flow regime proposed in the MDE Settlement.[162] As discussed below, this order requires Exelon to implement the second phase of its proposed flow regime beginning four years after the issuance of this license. If it is unable to reach agreement with PJM, it will need to file an amendment application to seek approval to modify the required second phase of the flow regime.

123. Waterkeepers argues that the MDE Settlement proposal allows Exelon to continue the large flow changes that increase downstream fish mortality through stranding and predation and can delay upstream spawning migrations of American shad and river herring.[163] Similarly, The Nature Conservancy states that the flow regime proposed in the MDE Settlement will not mitigate the impacts of project operation, particularly peaking, on habitat and ecological health in the lower Susquehanna River. It contends

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[160] In addition to stipulating that natural inflow must be measured at the USGS Marietta gage (No. 01576000), the MDE Settlement provides that if a new license for the Holtwood Project includes a provision for reporting hourly-flow releases at the Holtwood Project such that Exelon can readily identify inflow conditions to Conowingo Pond, minimum flows at the Conowingo Dam would be based on the minimum flows proposed in the MDE Settlement, or inflow as measured at the Holtwood Project, whichever is less. Because anticipating conditions of a future license is speculative, we are not including this provision in this license; however, at such time as a new license is issued for the Holtwood Project, Exelon may file an amendment to its license to request any necessary changes.

[161] Pennsylvania FBC January 17, 2020 Comments at 3-4.

[162] Exelon January 31, 2020 Reply Comments at 52-53.

[163] Waterkeepers January 17, 2020 Comments at 25.

that current operating conditions impair aquatic life and wildlife on the lower river and that the settlement agreement's proposed minimum flows would be very similar to or lower than the minimum flows in the current license.[164] The Nature Conservancy further states that the frequency and magnitude of daily peaking operation will continue to severely limit habitat availability for fish, wildlife, and aquatic vegetation.[165] Last, The Nature Conservancy, while acknowledging that the settlement agreement includes a down-ramping rate of up to 12,000 cfs/hour when flows are less than 30,000 cfs, raises a concern that the MDE Settlement does not include down-ramping rates to mitigate fish stranding from daily peaking flows greater than 30,000 cfs.[166]

124. In its reply comments, Exelon states that the MDE Settlement flow regime adopts elements of the TNC Flow Regime by increasing minimum flows, limiting the rate of down- and up-ramping, and restricting the maximum generation flows.[167] Exelon asserts that the flow regime proposed in the MDE Settlement will provide the same benefit as the TNC Flow Regime by enhancing the growth of submerged aquatic vegetation, reducing fish stranding, increasing aquatic habitat, protecting at-risk species, and facilitating fish passage, while better balancing developmental and non-developmental considerations than the TNC Flow Regime.[168] MDE notes that the flow regime proposal in the settlement agreement exceeds the recommended flow regime in the final EIS and is based on the studies in the record of the proceeding.[169]

125. The MDE Settlement flow proposal would increase habitat availability downstream of the project for one month longer than staff's recommended flow in the final EIS, meeting or exceeding the TNC's recommended 70% of the maximum weighted usable area[170] for key species from April 1 through November 30, excluding June 16

[164] The Nature Conservancy January 17, 2020 Comments at 9-16.

[165] *Id*. at 17-27.

[166] *Id*. at 27.

[167] Exelon January 31, 2020 Reply Comments at 44-45.

[168] *Id*. at 45.

[169] MDE January 31, 2020 Reply Comments at 15.

[170] Weighted usable area is an index of aquatic habitat that is calculated using the Instream Flow Incremental Methodology. It is meant to be used as a comparative statistic (for comparing alternative flow levels) and is not an absolute measure of habitat.

through June 30.[171] Further, limiting the project's maximum generation and modifying ramping rates, which were not part of staff's recommendation, would offer additional protection of aquatic resources, particularly migratory fishes, as reducing flow variability could facilitate upstream passage and reduce fish stranding.

126. Implementing Exelon's proposed flow management regime would increase annual generation at the Conowingo Project by 2,813 MWh (levelized annual value of $58,867) and decrease generation at the Muddy Run Project by about 39,049 MWh (levelized annual loss of $194,566). Although there would be a loss in generation at the Muddy Run Project, it would be significantly less compared to the TNC Flow Regime. While both flow regimes would provide additional benefits for aquatic resources, Exelon's proposed flow regime would do so with less of an impact on generation at the Muddy Run Project. Therefore, Article 407 requires Exelon's minimum flow plan.

127. A minimum stream flow operation plan, including an associated annual report, is referenced in the proposed *Monitoring Stream Flows in the Tailrace* article in the MDE Settlement, but the MDE Settlement does not describe the plan in any detail. An operation plan detailing procedures for sequencing turbine start-up and operation for seasonal and daily operation to maintain the proposed flow regime downstream of the dam, procedures for measuring and reporting minimum stream flows, schedules for routine maintenance, and procedures to use during routine maintenance and in the case of an emergency affecting the release of the minimum flow, would help Exelon and the Commission ensure that the project is operated in accordance with the license. Therefore, Article 408 requires a minimum stream flow operation plan for the project.

F. Tailrace Streamflow Monitoring

128. In the MDE Settlement, Exelon proposes to study the feasibility of redesigning, installing, and maintaining best available real-time flow telemetry at the USGS flow gage in the project tailrace (No. 01578310). If the study concludes that the installation of new technology is feasible, Exelon will develop a tailrace gage plan to install and maintain such a system. The plan would also include a provision to report flow monitoring data annually to MDE. Although currently there is telemetry available at the USGS flow gage in the tailrace, flows at this location are displayed at the USGS website on an hourly basis and there is a delay from actual measurement to when it is displayed on the website. There has been advancement in water science, including sensor and real-time telemetry technologies. USGS is currently conducting a pilot study for deploying a next generation

[171] Beginning in June, the minimum flow requirement decreases incrementally to coincide with the end of spawning and early fry development of key species. The 7,500-cfs minimum flow from June 16 through June 30 is less than the 7,744 cfs necessary to achieve 70% maximum weighted usable area.

monitoring system using state-of-the-art measurements.[172] New technologies could provide more accurate means of monitoring tailrace flows and provide real-time data in less costly and more rapid ways than previously possible. Therefore, Article 409 requires the feasibility study and a tailrace gage plan if real-time flow telemetry is determined to be feasible based on the results of the study.

G. Dissolved Oxygen

129. Exelon proposes to continue DO enhancement in the project discharge through turbine venting and aeration. Exelon also proposes to continuously monitor DO at a location 0.6 mile downstream of the dam (Station 643) from May 1 through October 1. Because the turbine venting and aerating systems have been shown to maintain adequate DO levels downstream of the project, Article 410 requires the continuation of these measures.[173]

130. In the MDE Settlement, Exelon states that large-scale fish kills can be an indicator of DO deficiency, and proposes to develop and implement a fish kill monitoring plan for large-scale fish kills (defined as fish kills exceeding 50 fish) that may occur in Conowingo Pond and/or at the tailrace. The plan would include data collection procedures, analysis methods, and reporting requirements.

131. The proposed monitoring would provide the benefit of quickly identifying if there are low DO conditions that cause the large-scale fish kills. Having Exelon notify Maryland DNR of the fish kills and consult on any project-related mitigative actions that Exelon could implement within the bounds of the license would protect fishery resources at the project. Monitoring for fish kills would largely involve periodic visual inspections of the tailrace and Conowingo Pond near the powerhouse and the receipt of any fish kill reports for the project from the public. These efforts would have minimal cost, as would notifying Maryland DNR of any observed or reported large-scale fish kills at the project. Moreover, the minimal cost and effort of the proposed measure would justify the aforementioned fishery resource protection benefit. Therefore, Article 411 requires a fish kill monitoring plan, including a provision to report large-scale fish kills to the Maryland DNR.

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[172] USGS, *Next Generation Water Observing System*, https://www.usgs.gov/mission-areas/water-resources/science/usgs-next-generation-water-observing-system-ngwos?qt-science_center_objects=0#qt-science_center_objects (last visited January 21, 2021).

[173] Final EIS at 414.

H. Additional Fish Passage Measures

132. In the MDE Settlement, Exelon proposes to visually quantify, over the term of the license, the fullness of every lift of each fish lift hopper during the operation of the East and West fish lifts. The observational protocols and method of indexing would be determined in consultation with MDE.

133. Implementation of Exelon's proposed indexing of fish lift hopper fullness would help inform the fish lift capacity improvements required in section 12.6.3 of Interior's modified section 18 prescription. Therefore, Article 412 requires Exelon to visually index the fullness of every lift of each fish lift hopper.

I. Additional Eel Passage Measures

134. The MDE Settlement includes three measures regarding eel passage that supplement the measures in Interior's modified section 18 prescription. First, the MDE Settlement states that Exelon will develop an eel passage and restoration plan that includes: (1) detailed plans for the proposed modifications to the East Fish Lift to accommodate a temporary eel trapping facility; (2) details regarding the annual operation and maintenance of all current and proposed eel fishways; and (3) proposed attraction flows, eel ramp slopes, and predation reduction methods. As this proposal is similar to the upstream eel passage plan that staff recommended for the Conowingo Project in the final EIS and it will not adversely interfere with the requirements of the Muddy Run Project, Article 415 requires Exelon to develop an eel passage and restoration plan that includes the details described above.

135. Second, the MDE Settlement states that Exelon will continuously monitor water temperature, DO, and water exchange in the eel holding tanks prior to transporting the eels to upstream stocking locations, and that transport will occur within one week of capture or more often as necessary based on the capacity of the holding tanks. Removal from holding and transport to release locations will be completed on the same day and will occur in vehicles equipped with insulated transport containers at densities not exceeding 10 eels per liter. The measures proposed by Exelon would protect eels by helping to minimize mortality during upstream migration. Therefore, Article 416 requires Exelon to implement these measures at the beginning with the first full trap and transport season and continuing until the trap and transport program ends. Additionally, Article 417 requires Exelon to ensure the eels are transported to release points within a week of capture.

136. Third, the MDE Settlement states that Exelon may not make any physical or operational changes to any eel fishway at the project without the agreement of the MDE and FWS, and approval by the Commission. While a licensee may choose to enter into an agreement with an agency to refrain from requesting an amendment from the Commission, the Commission may not foreclose the possibility that it may need to

require the licensee to undertake measures at the project without the approval of other agencies. Therefore, Article 414 includes the requested language, with the addition of "Unless otherwise required by the Commission."

J. Aquatic Invasive Species Management

137. Pursuant to the MDE Settlement, including the modifications proposed and agreed to in Interior's January 17, 2020 letter, Exelon will monitor the operation of the project's fish lifts and collect and remove aquatic invasive species.[174] During operation, Exelon will also view the East Fish Lift hopper dumping into the fish exit trough. Any observed aquatic invasive species will initiate the immediate closure of the gate at the viewing window and begin a draw-down to remove the invasive species. Exelon will notify Maryland DNR and FWS within 24 hours of any observed aquatic invasive species and all aquatic invasive species captured at the project will be killed and frozen for disposal by FWS or Maryland DNR. If the removal of aquatic invasive species materially interferes with the licensee's fish passage obligations, the licensee, upon consultation with FWS, MDE, and Maryland DNR, may suspend efforts to collect and remove aquatic invasive species.

138. While Pennsylvania DEP and Pennsylvania FBC support the MDE Settlement, they recommend modifications to the proposal related to aquatic invasive species.[175] Article 419 includes two of their recommendations, planning for long-term disposal of invasive species specimens and provisions to adapt to changing aquatic invasive species threats, that are included in Interior's January 17, 2020 proposed modification and supported by Exelon and MDE.[176] One recommendation, a request that they be notified of aquatic invasive species captures and/or passages at Conowingo fish lifts, is supported by Exelon as an off-license commitment.[177] Exelon states that it intends to inform and consult with state and federal resource agencies as it implements the terms of the license, but that it believes it is unnecessary to include this "Best Management Practice" in the

[174] The MDE Settlement does not specify what it considers aquatic invasive species. Article 419 requires Exelon to periodically consult with Interior, Maryland DNR, MDE, and Pennsylvania FBC to obtain an updated list of aquatic invasive species.

[175] Pennsylvania DEP January 17, 2020 Comments at 3; Pennsylvania FBC January 17, 2020 Comments at 3-4.

[176] Pennsylvania DEP identifies Blue Catfish, Zebra Mussel, and Snakehead as aquatic invasive species of particular concern. Pennsylvania DEP January 17, 2020 Comments at 3.

[177] Exelon January 31, 2020 Reply Comments at 53.

license.[178] Because it is a reasonable request, Article 419 includes timely notification to Pennsylvania DEP and Pennsylvania FBC of any aquatic invasive species captures and/or passages. The final two recommendations – (1) additional protective measures for pre-passage aquatic invasive species detection and removal and (2) modification of the East Fish Lift to include technologies to facilitate rapid isolation and removal of aquatic invasive species during fish passage operations – are not supported by Exelon and MDE.[179] Exelon and MDE state that the proposed license article, as modified by Interior, allows for effective mitigation of invasive species without physical changes to the project's fish lifts.[180] Given that the proposed increase in volume of the fish lift hoppers will alleviate overcrowding and allow for the effective identification and removal of aquatic invasive species, we agree that additional protective measures are not needed.

139. Exelon's proposed aquatic invasive species management procedures and reporting should help minimize the introduction and spread of aquatic invasive species upstream of the project. Therefore, Article 419 requires Exelon to collect and remove aquatic invasive species at the project's fish lifts during their operation.

K. Upstream Sediment and Nutrients Entering the Lower Susquehanna River and Chesapeake Bay

140. As discussed in the final EIS, Conowingo Pond has reached a state of dynamic equilibrium where, over time, there is no net storage of sediment or filling occurring (i.e., deposition during low-flow periods or scour during floods).[181] As part of the Sediment Management Plan filed with the license application (discussed below), Exelon proposes to dredge certain recreation areas and conduct bathymetric surveys of Conowingo Pond every five years. In addition, pursuant to the off-license provisions of the MDE Settlement, Exelon will provide funding for MDE to use for projects to make the Susquehanna River and the Chesapeake Bay more resilient to severe weather events, including submerged aquatic vegetation restoration, oyster restoration, clam restoration, aquaculture development, and living shoreline creation.

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[178] *Id*.

[179] Pennsylvania DEP suggests modifying the East Fish Lift to incorporate a fish collection system similar to one used at Holyoke Gas and Electric Department's Holyoke Dam Project. Pennsylvania DEP January 17, 2020 Comments at 3.

[180] MDE January 31, 2020 Reply Comments at 15; Exelon January 31, 2020 Reply Comments at 74-75.

[181] Final EIS at 75-81.

141. In comments on the MDE Settlement, the Coalition argues that loss of the long-term sediment trapping capacity is causing impacts to the health of the Chesapeake Bay ecosystem which can only be remediated by restoration efforts that include dredging the reservoir.[182] Waterkeepers and several other commenters argue that the MDE Settlement proposes nothing, and includes insufficient funds, to address the impacts caused by the dam during storm events.[183] Chesapeake Bay Foundation argues that over time, the project itself will release more pollutants into the Chesapeake Bay than the pollutants coming downstream due to scour events caused by heavy storms.[184]

142. The lower Susquehanna River and the Chesapeake Bay are affected by sediment and nutrients (i.e., nitrogen and phosphorus) transported from the upper watershed, including sediment and sediment-bound nutrients scoured from Conowingo Pond during storms.[185] High levels of nitrogen and phosphorus can be detrimental to water quality as they can enhance eutrophication and result in the depletion of DO in the water column.[186] Since 2010, the tidal portion of the Susquehanna River and the Chesapeake Bay have been the subject of a Chesapeake Bay Total Maximum Daily Load (TMDL) established by EPA for sediment, nitrogen, and phosphorus, with accountability measures to restore water quality in the Chesapeake Bay.[187]

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[182] Coalition January 17, 2020 Comments at 12-15.

[183] *See, e.g.*, Waterkeepers January 17, 2020 Comments at 24-25, Christine Proctor December 11, 2019 Comments, and Heather Martley January 16, 2020 Comments.

[184] Chesapeake Bay Foundation January 17, 2020 Comments at 18-20.

[185] Final EIS at 79.

[186] *Id*. at 137. Eutrophication is the process in which an increase in the concentration of phosphorus, nitrogen, and other nutrients causes excessive algal and plant growth, which leads to depletion of dissolved oxygen, reduced transparency, and changes in the biotic community composition.

[187] *Id*. at 79. Section 303(d) of the Clean Water Act, 33 U.S.C. § 1313(d), authorizes EPA to assist states, territories, and authorized tribes in listing impaired waters and developing TMDLs for these waterbodies. A TMDL establishes the maximum amount of a pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality. The Chesapeake Bay TMDL document sets TMDL allocations for the bay watershed, including segments in New York, Pennsylvania, and Maryland.

143. Sediment loading in the Chesapeake Bay is largely a function of flow, but is affected by the trapping ability of the lower Susquehanna River reservoirs.[188] Nearly all the sediment entering Conowingo Pond comes from the upstream watershed rather than project land.[189] However, because Conowingo Pond has reached dynamic equilibrium, it no longer traps any sediment on a long-term basis, and the full sediment load carried by the river is transported into the Chesapeake Bay, as would have occurred prior to construction of the lower Susquehanna River reservoirs.[190] Therefore, when averaged over time, sediment loads delivered into the Chesapeake Bay equal the loads delivered into the lower Susquehanna River.[191]

144. During storm events, sediment in Conowingo Pond can be mobilized past the dam through scour when the flow reaches or exceeds 400,000 cfs, which is considered the threshold for scour.[192] While the sediment has a relatively short-term impact in the upper reaches of the Chesapeake Bay compared to nutrients, the added storage capacity caused by high-flow events creates temporary storage in the reservoir, thereby reducing the release of sediment load into the Chesapeake Bay during smaller flow events.[193] Although sediment transport, including sediment scoured from Conowingo Pond, affects the lower Susquehanna River and the Chesapeake Bay, the nutrients that are carried downstream with the scoured sediment are more harmful to the Chesapeake Bay's aquatic life than the sediment itself.[194]

145. The final EIS cites to the 2014 Draft Lower Susquehanna River Watershed Assessment (LSRWA) conducted by the U.S. Army Corps of Engineers (Corps) and MDE that indicates that operational changes at the Conowingo Project would not address the sediment transport issue, and that dredging Conowingo Pond would be cost prohibitive and ineffective without measures in place to reduce the amount of sediment

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[188] *Id*. at 71. Lake Clarke (Safe Harbor Project) and Lake Aldred (Holtwood Project) have been in long-term equilibrium for over 50 years. Final EIS at 72.

[189] *Id*. at 77.

[190] *Id*. at 78.

[191] *Id*. at 73.

[192] *Id*.

[193] *Id*. at 78.

[194] *Id*. at 79.

entering the reservoir from the upstream watershed.[195] The study concludes that management opportunities in the Chesapeake Bay watershed to reduce nutrient delivery are likely to be more effective than sediment load removal methods.[196]

146. The final LSRWA, published after issuance of the final EIS, reiterates that strategies focused on reducing nutrients, rather than sediment, are likely to be more effective at addressing impacts to Chesapeake Bay water quality and aquatic life than dredging.[197] It notes that although the sediment is subject to some resuspension, the adverse effect of sediment on the Chesapeake Bay ecosystem essentially ceases once the sediment is deposited on the Bay bottom.[198] While dredging can be beneficial, the benefits are short-lived and not worth the expense.[199] Therefore, at this time, because it is a watershed-wide issue, we find no justification for requiring Exelon to implement measures such as dredging to help control sediment and nutrient loading in the Chesapeake Bay, which would occur in the long term whether or not Conowingo Dam was in place.

L. Sediment Management Plan

147. As noted above, Conowingo Pond has reached dynamic equilibrium; however, within the reservoir, not all areas in the pond may be consistently filled and scoured. Through the Sediment Management Plan filed with the license application, Exelon proposes to identify benchmarks or thresholds (e.g., accumulation of sediment to a certain depth) for actions to address site-specific sediment issues that may affect project

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[195] The LSRWA assessed the lower Susquehanna River watershed to identify strategies for reducing sediment and nutrient loading and habitat restoration in the river and in the Chesapeake Bay. The study included a review of existing data and watershed-level modeling to characterize the complex relationship among river flow, sediment loading, and ecological resources. Project partners included the Corps, MDE, Maryland DNR, SRBC, USGS, the Chesapeake Bay Program, Maryland Geological Survey, and The Nature Conservancy. Corps and MDE, *Final Lower Susquehanna River Watershed Assessment* (dated May 2015, released March 10, 2016), https://dnr.maryland.gov/waters/bay/Documents/LSRWA/Reports/LSRWAFinalMain20160307.pdf.

[196] Final EIS at 139. The final LSRWA makes the same findings. LSRWA at ES-4-6 and 163-64.

[197] Final EIS at 81; final LSRWA at 163.

[198] Final LSRWA at 163-64.

[199] Final EIS at 80-81; final LSRWA at 162-63.

operation. The plan also includes a provision for Exelon to conduct a bathymetric survey of Conowingo Pond every five years to monitor sediment transport and depositional patterns. Additionally, the plan includes a provision to evaluate potential management actions (e.g., hydraulic and mechanical dredging, and disposal options) to improve boating access at three recreation areas (Conowingo Creek, Peters Creek, and Broad Creek) where sediment has been accumulating around the boat launches. However, the plan does not indicate how frequently the dredging would be conducted and to what depths the locations need to be dredged. In the final EIS, staff recommended establishing detailed benchmarks and a schedule for dredging at the three access areas as soon as benchmark water depths are reached to protect recreation access.[200]

148. Therefore, Article 420 requires Exelon to include a provision in the Sediment Management Plan for conducting periodic dredging with the frequency and depth needed to maintain boating access at those locations. In order to monitor changes in sediment depositional and scour patterns, and the condition of the project intake area and recreation access over time, Article 420 also requires Exelon to file the results of each bathymetric survey with the Commission, including an analysis of any change in sediment deposition or scour in the pond from the previous survey(s).[201] The survey would also allow for a better understanding of the sediment transport processes in the pond at its current state of dynamic equilibrium.[202] To maintain recreational boating access at the three recreation areas between the five year intervals, Article 420 requires the Sediment Management Plan to include metrics (e.g., anticipated magnitude of sediment loading corresponding to intensity and duration of storm events) that would trigger action after major storm events or high flows with significant sediment loading.

M. Northern Map Turtle Protection

149. In its license application, Exelon proposes to develop and implement a northern map turtle protection plan to minimize project impacts on map turtles through monitoring, habitat management, and nest site protection.

150. In the final EIS, staff recommended Exelon's proposal to develop a northern map turtle protection plan. Exelon's plan would include provisions for: (1) nest management and alternate basking site mitigation and protection measures; (2) annual monitoring of the northern map turtle population at the Conowingo Project for 10 years; (3) annual monitoring of the use and success of both the mitigation and protection measures for 10 years; (4) an assessment of the northern map turtle's response to any changes in

[200] Final EIS at 414-15.

[201] *Id.*

[202] *Id.* at 81.

operating regime as a result of any license issued; and (5) a method to alter or amend protection and mitigation measures, as justified by the results of northern map turtle monitoring activities.

151. The settlement agreement between Exelon and MDE includes a provision for the development of a northern map turtle plan that includes: (1) annual monitoring of the northern map turtle population at the project for 10 years, followed by population monitoring every five years; (2) a study to determine the amount of artificial basking habitat needed over the normal range of generation flows to support current and future populations of northern map turtles within Conowingo Pond and all areas of the Susquehanna River downstream of the Conowingo Dam affected by generation flows; (3) a study to determine the proper locations for deploying artificial basking platforms; (4) nest management and protection measures; (5) annual monitoring of the use and success of both the mitigation and protection measures; (6) an assessment of the northern map turtle's response to changes in operating practices at the project that are required by the new license; and (7) methods of altering or amending protection and mitigation measures as a result of the monitoring, in consultation with MDE.

152. Through monitoring and analysis of northern map turtle populations and their habitat and the addition of stable artificial basking platforms, Exelon's proposed northern map turtle plan, as modified by the MDE Settlement, is likely to result in increased nesting success and other benefits to the species over the term of the license. Therefore, Article 424 requires Exelon to develop and implement a northern map turtle protection plan.

N. Recreation Management

153. The Conowingo Project currently provides 15 public recreation access areas, which include recreation facilities at Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin Boat Launch, Dorsey Park, Line Bridge, Broad Creek Public Landing, Glen Cove Marina, Conowingo Swimming Pool and Visitor's Center, Peach Bottom Marina, Conowingo Creek Boat Launch, Funk's Pond, Conowingo Dam Overlook, Fisherman's Park/Shures Landing, and Octoraro Creek Access. Exelon operates seven of these facilities and leases the other eight to local and state entities or commercial operators.

154. Exelon filed a Recreation Management Plan with its license application that includes an inventory of existing access and facilities; a description of existing and potential recreation use at the project; an assessment of the need for additional public recreational access, opportunities, and facilities; a description of proposed facility and amenity upgrades at 13 of the project recreation sites; proposed recreation enhancement costs; and a description of how public access, safety, and project recreation will be maintained and monitored throughout the term of any new license issued for the project.

155. The facility and amenity upgrades Exelon proposes at the 13 recreation sites include: fencing, a trailhead directional sign, and vegetation removal at Lock 13; new restrooms, dock and barrier-free parking enhancements, and shoreline stabilization at Lock 15; Conowingo Dam canoe portage trail signage, improved drainage, and barrier-free parking at Muddy Creek; improved traffic patterns, parking and picnic area upgrades, boat ramp and dock enhancements, and Conowingo Dam canoe portage trail signage at Cold Cabin Creek boat launch; parking and boat ramp upgrades, and Conowingo Dam canoe portage trail signage at Dorsey Park; boat launch and drainage improvements, ground stabilization, and Conowingo Dam canoe portage trail signage at Conowingo Creek; parking improvements and repair of the marina's bulkhead wall at Glen Cove Marina; a barrier-free parking space at Funk's Pond; barrier-free accessibility improvements at Conowingo swimming pool; re-opening the Conowingo Dam Overlook with a new pavilion, barrier-free parking improvements, a picnic area, and security fencing; access road improvements, new retaining wall, parking improvements, and an upgraded carry-in boat launch with floating dock and breakwater at Fisherman's Park/Shures Landing; bank stabilization at the Line Bridge informal access area; and parking enhancements and Conowingo Dam canoe portage trail signage at Peach Bottom. For recreation monitoring, the Recreation Management Plan includes a provision to use the FERC Form 80 Licensed Hydropower Development Recreation Use Report to assesses and report recreation use and capacity every six years.

156. In the final EIS, staff states that implementing the Recreation Management Plan, including all of Exelon's proposed facility upgrades, would allow Exelon to carry out facility improvements and install new facilities in a coordinated manner, and would ensure that the proposed recreational facility improvements meet the intended purposes while making a range of amenities accessible for persons with disabilities.[203] However, staff recommended modifying the Recreation Management Plan to include monitoring recreation use and demand periodically over the license term, in concert with every other standard FERC Form 80 reporting deadline, and updating the plan, as necessary, based on the monitoring results. Several of the project's recreation sites currently receive a high level of use and conducting periodic recreation use and demand studies will ensure that the licensee has an accurate picture of recreation when determining if and how the project recreation sites need to be updated.[204]

[203] *Id*. at 423-24.

[204] *Id.*

157. On December 28, 2018, however, the Commission issued a final rule, which became effective on March 28, 2019, eliminating use of the Form 80.[205] In order to ensure recreation use at the project continues to be monitored on a regular basis throughout the term of any new license issued for the project, Exelon should delete reference to the Form 80 within the Recreation Management Plan and include a provision for monitoring recreation use and demand on a 10-year cycle.

158. In the final EIS, staff states that Exelon's proposed boat ramp and boat launch enhancements at existing recreation sites would provide significant improvements to the project's recreational resources. However, sedimentation of Peach Bottom Marina, Conowingo Creek, and Broad Creek on Conowingo Pond could compromise access at these locations, which represent half of the boat ramps providing access to Conowingo Pond for motorized boating.[206] Implementing the Sediment Management Plan (required by Article 420) would, at a minimum, require monitoring of the depth of sediment at Peter's Creek (Peach Bottom Marina), Conowingo Creek, and Broad Creek (Harford County boat launch) every five years. In the final EIS, staff recommended that Exelon revise the Recreation Management Plan to reference the Sediment Management Plan (discussed above) to ensure sediment monitoring results are included in discussions related to boater access to the reservoir.[207]

159. Article 426 requires the Recreation Management Plan with the above modifications.

O. Debris Management

160. As discussed in the final EIS, debris enters Conowingo Pond from the watershed above Conowingo Dam and is delivered downstream during storm events.[208] Given the size of the Susquehanna River's watershed, the amount of debris arriving at the project from upstream can be significant. Operation of the Conowingo and Muddy Run projects results in fluctuating pond levels, which can mobilize debris from the shoreline to the pond and vice versa throughout the operation schedule, which is further influenced by river flow and wind direction. The presence of floating debris in the pond poses a risk to

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[205] *Elimination of Form 80 and Revision of Regulations on Recreational Opportunities and Development at Licensed Hydropower Projects*, Order No. 852, 165 FERC ¶ 61,256 (2018).

[206] Final EIS at 423-24.

[207] *Id.*

[208] Debris includes trash, tires, plastic, metal, and organic material such as plants and tree limbs.

boaters and water-skiers. A review of the project record indicates debris management has been an issue at the Conowingo Project throughout its current license and Exelon has employed debris management measures that are consistent with best management practices, as well with practices at other projects on the Susquehanna River.[209]

161. In the final EIS, staff recommended that Exelon organize its proposed debris management measures into a cohesive debris management program.[210] The final EIS states that the program should include debris management goals, a description of debris management methods, specific size criteria for floating debris targeted for removal, timeframes for when debris would be collected and the frequency of skimmer and clamming operations, the use of best management practices for storing debris on Exelon-owned lands, procedures for removal of stored debris, procedures for tracking debris storage and removal, and a provision to coordinate with and sponsor community-based clean-ups. Staff also recommended the inclusion of a public hotline so boaters could communicate directly with Exelon to expedite debris removal, and an annual report summarizing debris removal efforts and public hotline calls. The final EIS states that a cohesive debris management program would formalize goals and methods of debris management to better serve the public.[211]

162. As part of its settlement agreement with MDE, Exelon agrees to remove debris by employing clamming, skimming, or other means, up to the level of debris removal that was undertaken by Exelon in 2018.[212] In the MDE Settlement, Exelon also committed to removing debris blocking drinking water intakes and recreational facilities within the project boundary as soon as safely possible, and sponsoring at least two annual community-based cleanup events at or near the project.

163. In comments on the MDE Settlement, Waterkeepers assert that the settlement agreement allows Exelon to continue doing no more to reduce impacts from trash and debris than it did in 2018, which it claims will be inadequate.[213] However, as MDE notes in its reply comments, 2018 was an historically high rainfall year in which the amount of debris arriving at the project from upstream sources was significantly greater than in prior

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[209] Final EIS at 294-96.

[210] Although the final EIS recommends the debris management program be part of the Recreation Management Plan, this license includes it as a separate requirement.

[211] Final EIS at 426.

[212] In 2018, Exelon removed approximately 450 twenty-yard dumpster loads of debris at the project. MDE Settlement at 12.

[213] Waterkeepers January 17, 2020 Comments at 25-26.

years.[214] Further, Exelon responds that, along with the debris management measures recommended by staff in the final EIS, the MDE Settlement includes additional trash-removal commitments, complaint-response requirements, clean-up sponsorships, and water-supply debris removal that would enhance Exelon's efforts to address debris accumulated behind Conowingo Dam.[215]

164. The Nature Conservancy states that the proposed article is not enforceable because it does not include provisions for notifying the Commission of complaints, reporting compliance with requirements, and monitoring whether measures are adequate.[216] The measures recommended by staff in the final EIS include a description of the procedures for targeting, storing, and tracking debris removed from Conowingo Pond, which are measures enforceable by the Commission. In addition, staff's recommended public hotline and annual report would assist in monitoring Exelon's debris removal efforts and ensuring compliance.

165. Implementing a debris management program would improve boating resources and enhance safety and aesthetics at the project. The debris management measures included in the MDE Settlement, along with the measures recommended by staff in the final EIS,[217] would ensure collection efforts are conducted regularly to minimize the amount of floating debris in Conowingo Pond and reduce impacts at the project. Therefore, Article 427 requires development of a debris management program.

P. Reopening Conowingo Catwalk for Fishing

166. The Conowingo Project fisherman's catwalk, which spans 820 feet along the length of the powerhouse, is a steel and reinforced concrete extension walkway attached to the exterior of the Conowingo powerhouse wall. Historically, the catwalk was very popular with anglers because visitors could fish from a platform along the south face of the dam where the turbulent waters caused by releases from the dam made it one of the best fishing areas at the project. After the events of September 11, 2001, the project operators concluded that allowing the general public to access the project works, particularly the catwalk at the powerhouse, placed the project and public at risk. Accordingly, at that time, the licensees ceased allowing the public to access the catwalk. On May 1, 2007, Commission staff issued an order removing the catwalk as a project

[214] MDE January 31, 2020 Reply Comments at 15.

[215] Exelon January 31, 2020 Reply Comments at 76-77.

[216] The Nature Conservancy January 17, 2020 Comments at 7.

[217] Final EIS at 296.

recreation facility.[218] The order acknowledged that the proposal "to discontinue public use of the catwalk for fishing . . . has been the result of years of consideration and assessment by the licensees." The order also authorized alternate recreation facilities at Fisherman's Park on the west side of the river, which now provides anglers a designated location to fish below the dam,[219] and public fishing access along the north and south banks of Octoraro Creek on the east side of the river.[220] Exelon completed construction of the Octoraro Creek facility in May 2008 and competed the Fisherman's Park facility upgrades in 2009.

167. During scoping, commenters indicated that fishing from the bank at Fisherman's Park is difficult because the main channel is far from the structure and lures are pushed downstream and toward the shore.[221] Comments received throughout the relicensing proceeding reiterate that the catwalk provided a unique angling opportunity and many commenters disagree with Exelon keeping the catwalk closed because the catwalk provides a better angling experience than the alternate facilities authorized by the 2007 order.[222] As a result, Exelon evaluated the feasibility of reopening the catwalk,[223] but determined that while reopening the catwalk is physically feasible, it would require security and structural changes. Exelon believes that recreation opportunities at the project are sufficient to meet existing and reasonably projected demand without use of

[218] *Susquehanna Power Co.,* 119 FERC ¶ 62,088 (2007).

[219] Fishing is allowed along the shoreline of Fisherman's Park (about 700 yards). The license application states that shoreline fishing on the west side of the river is not allowed within 100 yards of the base of Conowingo Dam; however, anecdotal evidence suggests fishing occurs up to the security fence, which is about 30 yards from the base of the dam. License Application at E-321.

[220] *Id*.

[221] *See, e.g.*, Ronald Steelman July 6, 2009 Comments and Jere Hess July 13, 2009 Comments.

[222] *See, e.g.*, Maryland DNR July 9, 2012 Comments, Stewards of the Lower Susquehanna River, et al., September 29, 2014 Comments, and SRBC September 29, 2014 Comments.

[223] *See* Updated Study Report 3.32 - Re-Evaluate the Closing of the Catwalk to Recreational Fishing, filed January 31, 2012.

the catwalk and questioned the benefit gained by investing in security measures necessary to reopen the catwalk.[224]

168. As discussed in the final EIS, the proximity of Conowingo Dam to large population centers offers more anglers opportunities to fish this unique and historically popular resource.[225] Providing this opportunity at the Conowingo catwalk, even on a limited basis, would expand the diversity of angler opportunities by providing anglers access to fish in the main channel under a range of conditions. Therefore, because the catwalk provides exceptional angling opportunities different from those currently provided at Fisherman's Park, the final EIS recommended developing a plan to reopen the catwalk on a limited basis with safety measures in place.[226] In the final EIS, staff recommended that the plan to reopen the catwalk be included as part of the revised Recreation Management Plan.

169. On February 27, 2020, Exelon filed an *Updated Study Report 3.32, Re-Evaluate the Opening of the Catwalk to Recreational Fishing* that reiterates Exelon's request that the catwalk not be reopened. In its February 27, 2020 filing, Exelon included a letter from Michelle S. Lloyd, the Deputy Emergency Manager of the Cecil County Department of Emergency Services, requesting that the Commission reject staff's recommendation in the final EIS to provide public access to the catwalk. In addition, on March 5, 2020, Captain Eric Gonzalez of the Harford County Sheriff's Office filed a letter stating his concerns with reopening the catwalk. Captain Gonzalez states that, while there are risks with allowing public access, "these issues could be mitigated by continuing to keep the area closed to the public except for scheduled tours with the proper security in place."

170. On October 6, 2020, Commission staff performed a physical site security inspection and review of Conowingo's existing operational security program. As part of this review, staff also evaluated reopening the catwalk for public access. Based on on-site observations and review of Exelon's security documentation, staff concluded that reopening of the fisherman's catwalk to provide public access, even on a limited basis, would create increased security risks and would require significant security and structural changes to mitigate those risks.

171. While we recognize that reopening the catwalk would provide additional opportunities for recreational fishing and appreciate the effort Commission staff took in

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[224] *See* Final EIS at 291.

[225] *Id.* at 425.

[226] *Id*. Exelon notes that it opposes this recommendation. Exelon January 31, 2020 Reply Comments at n.15

assessing the issue raised by public commenters, we do not conclude that those opportunities outweigh the increased risk. Therefore, we are not adopting staff's recommendation that Exelon revise its Recreation Management Plan to include the reopening of the fisherman's catwalk for recreational fishing.

Q. Project Boundary

172. Project boundaries enclose the project works that are to be licensed and include "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."[227]

173. As noted above, the current project boundary encloses approximately 12,000 acres, including Conowingo Pond, the dam, the powerhouse, and the tailrace. The boundary extends along the east and west banks of the Susquehanna River for approximately 14 miles upstream from the Conowingo Dam. Exelon proposes to modify the project boundary by removing lands that it states are not needed for project purposes. These lands include: 0.06 acre of land adjacent to the upper reaches of Conowingo Pond; 34.4 acres along the Susquehanna River shoreline at the Muddy Run Project (to minimize the overlap of project lands between the two projects); 205.6 acres on upper Broad Creek, a tributary to Conowingo Pond; and 1,760.1 acres of the Susquehanna River and shoreline downstream of Conowingo Dam that were originally included for construction of the project.[228]

174. Interior, on behalf of the Park Service, notes in its comments on the MDE Settlement that the nearby Captain John Smith Chesapeake National Historic Trail[229] has as one of its characteristics "unspoiled landscapes and viewsheds evocative of the 17th century" and requests that permanent protections and a mechanism for ensuring the continuation of public uses be established if any lands that are currently used for recreational purposes, open space, and habitat protection are removed from the project

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[227] 18 C.F.R. § 4.41(h)(2) (2020).

[228] The Lower Susquehanna Heritage Greenway Trail, Deer Creek Access, Lapidum Boat Launch, and McLhinney Park are non-project recreation sites located on a thin ribbon of land along the west bank of the Susquehanna River downstream of Conowingo Dam.

[229] Officially launched in May 2007 as part of the 400th anniversary of the founding of Jamestown, Virginia, the Captain John Smith Chesapeake National Historic Trail is the nation's first historic water trail and extends from the mouth of the Chesapeake Bay and along the Susquehanna River to Cooperstown, New York.

boundary.[230] The Commission does not have jurisdiction over lands removed from the project boundary and therefore any conditions imposed would be unenforceable.[231]

175. Additionally, one parcel of land Exelon is proposing to remove is a relatively thin ribbon of land on the west bank of the Susquehanna River downstream of Conowingo Dam that was included in past licenses in order to include a railroad that was used to shuttle material to the dam during initial construction. While the lands in this area are now used for non-project recreation, these lands serve no direct project purpose. As discussed in the final EIS, removing these lands would remove four non-project recreation sites from the project boundary: the Lower Susquehanna Heritage Greenway Trail, Deer Creek Access, Lapidum Boat Launch, and McLhinney Park.[232] The Lower Susquehanna Heritage Greenway Trail connects Fisherman's Park (a project recreation site) with Susquehanna State Park lands, and Deer Creek Access and Lapidum Boat Launch are located within the Susquehanna State Park. All three facilities are managed by Maryland DNR. McLhinney Park is managed by the City of Harve de Grace.

176. Recreation demand at the Conowingo Project is currently met through Exelon's 15 project recreation sites located around Conowingo Pond and immediately downstream. While the lands proposed for removal provide recreation opportunities, these opportunities are not related to the project. Further, removing these non-project recreation sites from the project boundary would not limit the recreation opportunities available in the area downstream of Conowingo Dam.[233] It is Commission policy to remove lands from the project boundary that are no longer used for project purposes; therefore, Ordering Paragraph (E) approves Exelon's Exhibit G drawings that include the revised project boundary.

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[230] Interior January 17, 2020 Comments at 2.

[231] Exelon notes that it is willing to consider the concerns expressed by the Park Service and is open to further discussions with the Park Service about any lands that may be removed from the boundary. Exelon January 31, 2020 Reply Comments at 77-78.

[232] Final EIS at 301-02.

[233] Exelon also has committed to continuing lease agreements with Maryland DNR for Deer Creek Access, Lapidum Boat Launch, and the Lower Susquehanna Heritage Greenway Trail, and with the City of Havre de Grace for McLhinney Park, which would help ensure those lands are maintained for public recreation purposes even though they are no longer under Commission jurisdiction.

R. Use of Conowingo Pond

177. Exelon owns and coordinates the operation of the Conowingo Project with the Muddy Run Project to maximize power benefits and maintain reservoir elevations in Conowingo Pond. As noted above, Conowingo Pond serves as the lower reservoir for the Muddy Run Project. Where, as is the case here, the Commission issues separate licenses for related projects, the licenses may include conditions regarding coordinated operation of the projects pursuant to FPA section 10(a). Conowingo Pond is authorized as a source of water and as a lower reservoir for the operation of the Muddy Run Project and the Muddy Run license states that the operation of the Muddy Run Project must not adversely affect the Conowingo Project licensee's ability to comply with its license.[234] Article 403 of this license likewise requires that the Conowingo Project be operated so as to not adversely affect the Muddy Run Project licensee's ability to comply with its license.

178. Conowingo Pond also serves as the source of cooling water for the Peach Bottom Atomic Power Station located in York County, Pennsylvania.[235] The current license also permits the York Energy Center in York, Pennsylvania, and the Wildcat Point Generation Facility in the Town of Rising Sun, Maryland, to withdraw water from the pond for cooling purposes.[236] Conowingo Pond is also used as a public water supply source for the City of Baltimore[237] and the Chester Water Authority.[238] Article 404 authorizes the continued non-project use of the reservoir by these entities.

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[234] Order Issuing New License for the Muddy Run Project, 153 FERC ¶ 62,232 (2015).

[235] The use of the project reservoir for water supply for the Peach Bottom Atomic Station has been authorized since 1970. *Susquehanna Power Co.,* 44 F.P.C. 1208 (1970); *Susquehanna Power Co.*, 55 F.P.C. 2607 (1976); and *Susquehanna Power Co.*, 19 FERC ¶ 61,348 (Article 31 of the 1980 Conowingo license).

[236] *Susquehanna Power Co.*, 116 FERC ¶ 62,108 (2006) (Order Modifying and Approving Non-Project Use of Project Lands and Waters); *Exelon Generation Co., LLC*, 152 FERC ¶ 62,066 (2015).

[237] *Susquehanna Power Co.*, 26 FERC ¶ 62,008 (1984) (Order Approving Additional Water Withdrawals).

[238] *Exelon Generation Co.,* LLC, 152 FERC ¶ 62,142 (2015).

S. Shared Facilities

179. Due to requirements in both the water quality certification issued by Pennsylvania DEP for the Muddy Run Project and the FPA Section 18 prescription issued by Interior for this project, the two projects will share responsibility for the eel trapping and holding facilities along the shore on the western side of Conowingo Dam. Although already included in the Muddy Run Project license, we are including the facilities in this license, as well, to ensure that the licensees for both the Muddy Run Project and the Conowingo Project are jointly and severally liable to perform all obligations related to the maintenance and operation of the shared facilities.

180. Because licensees for individual projects can change over time, a Memorandum of Agreement (MOA) is needed between the licensees (currently both Exelon) for the Muddy Run and Conowingo projects to operate and maintain shared project facilities. To ensure that the licensees are jointly and severally liable under each project license, the MOA should be filed for Commission approval.[239] Consequently, Article 405 requires that the licensee develop an MOA for the two projects and file it with the Commission within 90 days from issuance of this license.

T. Dam Safety

181. The Coalition expresses concern for the stability of the Conowingo Dam through any new license term.[240] It posits that the 2017 service spillway failure at the Oroville Hydroelectric Project, FERC No. 2100, underscores the need to dredge the reservoir to minimize environmental damage downstream and to have reopeners and associated triggers in order to adapt to environmental changes and other new technology.[241]

182. Standard Article 4 of this license states that the project shall be subject to the inspection and supervision of the FERC Regional Engineer and that the licensee shall cooperate fully with the Regional Engineer and comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property. Part 12 of the Commission's regulations sets forth the Commission's Dam Safety program requirements.[242] In addition, the

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[239] *See e.g., Orange Cove Irrigation Dist.*, 137 FERC ¶ 62,157 (2011).

[240] Coalition January 17, 2020 Comments at 11-12.

[241] *Id.* at 12. Coalition describes the dredge and reopener requirements as a necessary condition of any water quality certification for the project; however, as noted above, the certification is being waived in this proceeding.

[242] 18 C.F.R. pt. 12 (2020).

Commission recently issued a notice of proposed rulemaking to seek input on updating its dam safety regulations.[243] Throughout the term of the license, the licensee will be required to undertake any safety measures that the Regional Engineer determines are necessary. Therefore, no separate article is necessary.

U. Off-License Provisions

183. The Nature Conservancy and Chesapeake Bay Foundation state that the MDE Settlement proposes only off-license measures rather than license measures to address the project's impacts on water quality in the lower Susquehanna River and Chesapeake Bay.[244] The Nature Conservancy argues that the MDE Settlement relies too heavily on off-license measures to address project-related impacts, including restoration of mussel populations, improved eel passage, improved water quality, study of sediment removal and disposal, and tailrace gaging.[245] Chesapeake Bay Foundation contends that because there is a clear nexus between the project's operation and downstream water quality impacts, the off-license measures should be included in the license.[246] In contrast, Exelon states that the "off-license" commitments do not have the required nexus to project operations or impacts to warrant their inclusion as license articles subject to Commission's jurisdiction.[247]

184. As the Commission noted in its policy statement on settlements, pursuant to Part I of the FPA, the Commission is required to license projects that best result in the comprehensive development of a waterway.[248] In order to determine whether proposed settlement provisions or license conditions meet this standard, it is necessary for the Commission to determine to what extent these proposals relate to project effects or project purposes. Below, we examine each of the proposed off-license measures.

1. Funding for Mussel Restoration in the Lower River

185. As noted, Exelon has agreed to support MDE's efforts to undertake a mussel restoration initiative to re-establish the *eastern elliptio* population in the lower river (below the

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[243] *Safety of Water Power Projects and Project Works*, 172 FERC ¶ 61,061 (2020).

[244] The Nature Conservancy January 17, 2020 Comments at 32; Chesapeake Bay Foundation January 17, 2020 Comments at 16-17.

[245] The Nature Conservancy January 17, 2020 Comments at 6-7.

[246] Chesapeake Bay Foundation January 17, 2020 Comments at 12.

[247] Exelon January 31, 2020 Reply Comments at 20.

[248] Settlement Policy, 116 FERC ¶ 61,270 at P 3.

dam) by providing at least five acres of land to construct a mussel hatchery and funding to assist with the cost of constructing the hatchery, developing the restoration program, and supporting the operation and maintenance costs of the mussel restoration initiative. In the final EIS, Commission staff found that there is limited historical evidence of mussel populations below the Conowingo Dam and that mussel distribution and abundance below Conowingo Dam is limited by the shear stress that occurs during high-flow events.[249] Commission staff concluded that even reducing flow fluctuations by implementing run-of-river or the TNC Flow Regime operations would only provide a limited benefit to mussels, as impacts on mussels due to high shear stress would still occur in the Susquehanna River during natural high-flow events.[250] Commission staff also determined that the addition of coarse sediment in areas below the dam that are not subject to erosive flow would likely increase the quantity of suitable habitat, but would not increase mussel density or species diversity, as increasing the amount of substrate appropriate for mussels would not eliminate the effects of high-flow events.[251] Therefore, Commission staff did not recommend as a license condition the re-introduction of mussels in the lower river. We agree.

2. Funding for Water Quality Improvement Projects

186. Pursuant to the MDE Settlement, Exelon agrees to provide MDE with financial support for water quality improvement projects, including forest buffers and agricultural projects such as cover crops. The final EIS finds that shoreline erosion effects at the Conowingo Project are largely a function of natural high-flow events, wave scour, and mass-wasting processes.[252] Article 428 requires Exelon to implement its Shoreline Management Plan, which includes maintaining the natural vegetation that currently exists along the shoreline within the project boundary, as well as constructing erosion control measures that do not impair the overall function of the vegetated buffer and are performed consistent with best management practices.[253] As Exelon is already committed to protecting the buffer along the shoreline within the project boundary, support for additional projects outside of the project boundary is not necessary to be included in the license.

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[249] Final EIS at 126.

[250] *Id*. at 151-52.

[251] *Id*. at 209.

[252] *Id*. at 74. Mass wasting is a type of erosion caused by gravity.

[253] Shoreline Management Plan at page iii of the Executive Summary and sections 6.1.2, 6.1.3, 6.1.7.

3. Funding for Eel and Eel Passage Research

187. Exelon will provide Maryland DNR with one million dollars to fund research and projects related to eels and eel passage. Ordering paragraph (F) of this license requires Exelon to comply with Interior's modified section 18 prescription which includes provisions for eel passage. As the license already requires eel passage, there appears to be no further project-related need for additional eel protection or enhancement measures. Moreover, funding general eel and eel passage research does not serve a project-related purpose. Therefore, any funding for such a study would not be included in this license and would only be appropriate as an off-license agreement between parties.

4. Funding for Dredge Material Disposal Feasibility Study

188. Exelon will provide MDE with $500,000 to fund a feasibility study of dredge material disposal options within, and in close proximity to, the project. As discussed above, Article 420 of this license requires the filing of a revised Sediment Management Plan that addresses dredging in certain recreation and water intake areas, and the disposal of the sediment collected.[254] Therefore, there would be no project purpose served in a separate general study of dredge material disposal options. As such, any funding for such a study would not be included in this license and would only be appropriate as an off-license agreement between parties.

5. Funding for Tailrace Gage

189. Exelon has agreed, as an off-license measure, to continue providing a certain level of funding to the USGS or the Maryland Geological Survey to maintain the existing tailrace gage until such time as real-time telemetry is implemented at the tailrace gage. We note that Standard Article 8 of this license requires that the licensee maintain gages required by this license through funding or cooperation with USGS; therefore, it is unnecessary to include this specific provision in the license.

ADMINISTRATIVE PROVISIONS

A. Annual Charges

190. The Commission collects annual charges from licensees for administration of the FPA. Article 201 provides for the collection of funds for administration of the FPA.

[254] Discussed above at PP 146-147.

B. Exhibit F and G Drawings

191. The Commission requires licensees to file sets of approved project drawings in electronic file format. Article 202 requires the filing of these drawings.

C. Amortization Reserve

192. The Commission requires that, for new major licenses, non-municipal licensees set up and maintain an amortization reserve account upon license issuance. Article 203 requires the establishment of the account.

D. Headwater Benefits

193. Some projects directly benefit from headwater improvements that were constructed by other licensees, the United States, or permittees. Article 204 requires the licensee to reimburse such entities for these benefits if they were not previously assessed and reimbursed.

E. Use and Occupancy of Project Lands and Waters

194. Requiring a licensee to obtain prior Commission approval for every use or occupancy of project land would be unduly burdensome. Therefore, Article 430 allows the licensee to grant permission, without prior Commission approval, for the use and occupancy of project lands for such minor activities such as landscape planting. Such uses must be consistent with the purposes of protecting and enhancing the scenic, recreational, and environmental values of the project.

F. Review of Final Plans and Specifications

195. Where new construction or modifications to the project are involved, the Commission requires the licensee to file revised exhibits of project features as built. Article 205 provides for the filing of these exhibits.

196. Article 301 requires the licensee to coordinate any modifications that would affect project works or operation resulting from environmental requirements, with the Commission's D2SI – New York Regional Engineer.

G. Commission Approval of Resource Plans, and Filing of Reports and Amendment Applications

197. In Appendix 1, certain conditions of Interior's modified section 18 prescription do not require the licensee to file plans or amendment applications with the Commission for approval or to file copies of required reports with the Commission. Therefore, Article 401 requires the licensee to: (a) file plans with the Commission for approval; (b) file reports with the Commission; and (c) file amendment applications, as appropriate.

STATE AND FEDERAL COMPREHENSIVE PLANS

198. Section 10(a)(2)(A) of the FPA[255] requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.[256] Under section 10(a)(2)(A), federal and state agencies filed 33 comprehensive plans that address various resources in Pennsylvania and Maryland. Of these, staff identified and reviewed 26 comprehensive plans that are relevant to this project.[257] No conflicts were found.

APPLICANT'S PLANS AND CAPABILITIES

199. In accordance with sections 10(a)(2)(C) and 15(a) of the FPA, Commission staff evaluated Exelon's record as a licensee for these areas: (A) conservation efforts; (B) compliance history and ability to comply with the new license; (C) safe management, operation, and maintenance of the project; (D) ability to provide efficient and reliable electric service; (E) need for power; (F) transmission services; (G) cost effectiveness of plans; and (H) actions affecting the public.[258] This order accepts staff's findings in each of the following areas.

A. Conservation Efforts

200. Section 10(a)(2)(C) of the FPA requires the Commission to consider the electricity consumption improvement program of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost-effectively, taking into account the published policies, restrictions, and requirements of state regulatory authorities.[259] The Conowingo Project connects with transmission facilities in the PJM Interconnection, a regional transmission organization that coordinates the movement of wholesale electricity throughout Delaware, Illinois, Indiana,

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[255] 16 U.S.C. § 803(a)(2)(A).

[256] Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19 (2020).

[257] The list of applicable plans can be found in section 5.4 of the final EIS; however, SRBC's "Comprehensive Plan for the Water Resources of the Susquehanna River Basin" has been revised. The new citation is:

Susquehanna River Basin Commission. 2013. Comprehensive plan for the water resources of the Susquehanna River Basin. Harrisburg, Pennsylvania. December 2013, revised June 2018.

[258] 16 U.S.C. §§ 803(a)(2)(C) and 808(a).

[259] 16 U.S.C. § 803(a)(2)(C).

Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. As part of its Customer Energy Efficiency Program, Exelon and its subsidiaries provide customers with the information and resources necessary to conserve electricity and implement initiatives to educate consumers about saving energy. Exelon offers an additional incentive for consumers by highlighting the cost savings of conserving electricity. These programs demonstrate Exelon's efforts to conserve electricity.

B. Compliance History and Ability to Comply with the New License

201. Based on a review of Exelon's compliance with the terms and conditions of the current license, staff found that Exelon's overall record of making timely filings and compliance with its license is satisfactory. Therefore, staff believes, and we agree, that Exelon can satisfy the conditions of a new license.

C. Safe Management, Operation, and Maintenance of the Project

202. Staff reviewed Exelon's management, operation, and maintenance of the Conowingo Project pursuant to the requirements of 18 C.F.R. Part 12 and the Commission's Engineering Guidelines and periodic Independent Consultant's Safety Inspection Reports. We agree with staff's conclusion that the dam and other project works are safe, and that there is no reason to believe that Exelon cannot continue to safely manage, operate, and maintain these facilities under a new license.

D. Ability to Provide Efficient and Reliable Electric Service

203. Staff reviewed Exelon's plans and its ability to operate and maintain the project in a manner most likely to provide efficient and reliable electric service. Staff's review indicates that Exelon regularly inspects the project turbine generator units to ensure that they continue to perform in an optimal manner, schedules maintenance to minimize effects on energy production, and since the project has been in operation, has undertaken initiatives to ensure that the project is able to operate reliably into the future. Staff concludes that Exelon is capable of operating the project to provide efficient and reliable electric service in the future. We concur.

E. Need for Power

204. The Conowingo Project serves a significant role in the PJM regional transmission grid by using its 570.15-MW capacity for peak load demand, regulation control, black start capability, and baseload power. To assess the need for power, staff looked at the need for power in the operating region in which the project is located, which is the PJM region of the North American Electric Reliability Corporation (NERC). NERC annually forecasts electricity supply and demand in the nation and the region for a 10-year period.

NERC's most recent report[260] on annual supply and demand projections for the PJM region indicates that annual peak demand is projected to grow at an annual average compound rate of 0.4% over the 10-year planning period from 2020 through 2029. Independent power producers such as Exelon are projected to supply part of this demand. Power from the Conowingo Project will continue to contribute to the region's diversified generation mix and help meet a need for power in the region.

F. Transmission Services

205. There are no primary transmission lines included as part of the Conowingo Project because it interconnects with the 220-kV electric grid at a substation at the project's powerhouse. Exelon is proposing no changes that would affect its own or other transmission line services in the region.

G. Cost Effectiveness of Plans

206. Exelon plans to make a number of facility and operational modifications to enhance environmental resources affected by the project. Based on Exelon's record as an existing licensee, these plans are likely to be implemented in a cost-effective manner.

H. Actions Affecting the Public

207. Exelon provided extensive opportunity for public involvement in the development of its application for a new license for the Conowingo Project. In addition, during the previous license period, Exelon maintained recreational facilities, boat launches, fishing access, and parking areas, which enhanced public use of project lands. Exelon uses the project to help meet regional power needs and the project provides employment opportunities to the public.

PROJECT ECONOMICS

208. In determining whether to issue a new license for an existing hydroelectric project, the Commission considers a number of public interest factors, including the economic benefits of project power. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp., Publishing Paper Division*,[261] the Commission uses current costs to compare the costs of the project and likely alternative power with no forecasts concerning potential future inflation, escalation, or deflation beyond the license issuance date. The basic purpose of the

[260] North American Electric Reliability Corporation. 2019 Long Term Reliability Assessment. December 2019.

[261] 72 FERC ¶ 61,027 (1995).

Commission's economic analysis is to provide a general estimate of the potential power benefits and the costs of a project, and of reasonable alternatives to project power.[262]

209. In applying this analysis to the Conowingo Project, Commission staff considered three options: the no-action alternative, Exelon's proposal, and the project as licensed herein.[263] Under the no-action alternative, the project would continue to operate as it does now. The project has an installed capacity of 570.15 MW and generates an average of 1,934,501 MWh of electricity annually. The average annual project cost is about $62,183,433 or $32.14/MWh. Multiplying the estimate of average generation by the alternative power cost of $38.50/MWh,[264] yields a total value of the project's power of $74,478,289 in 2020 dollars. To determine whether the proposed project is currently economically beneficial, the project's cost is subtracted from the value of the project's power. Therefore, the project costs $12,294,856, or $6.36/MWh, less to produce power than the likely alternative cost of power.

210. As proposed by Exelon, the levelized annual cost of operating the project is $66,567,810, or $34.36/MWh. The project would generate an estimated average 1,937,314 MWh of energy annually.[265] When the estimate of average generation is multiplied by the alternative power cost of $38.49/MWh, the result is a total value of the project's power of $74,567,216 in 2020 dollars. Therefore, in the first year of operation, the project would cost $7,999,406, or $4.13/MWh, less than the likely alternative cost of power.

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[262] *Id*. at 61,068.

[263] The methodology of our economic analysis is explained in the final EIS. Final EIS at 343 and 346. All costs have been escalated to 2020 dollars. Additionally, the economic analysis presented here is based on an adjustment for depreciation in net investment noted in the license application and a federal tax rate of 21%.

[264] The alternative power cost is based on an average daily energy rate of $26.28/MWh and a capacity rate of $41.06/kilowatt-year. The average daily energy rate is based on an average on-peak energy rate of $30.13/MWh and an average off-peak energy rate of $22.43/MWh. All rates are based on the 2019 PJM State of the Market values.

[265] Estimated average generation under Exelon's proposal includes a gain in generation of 2,813 MWh for the proposed minimum flow in the settlement agreement. Under the proposed minimum flow, a loss of 39,049 MWh in generation and a reduction of 50,742 MWh of pumping energy would be realized at the Muddy Run Project (a levelized annual loss of $194,566 using an on-peak energy rate of $30.13/MWh for generation and an average off-peak energy rate of $22.43/MWh for pumping).

211. As licensed herein with the mandatory conditions and staff-recommended measures, the levelized annual cost of operating the project will be about $66,801,346, or $34.48/MWh. The project will generate an estimated average 1,937,314 MWh of energy annually. When this estimate of average generation is multiplied by the alternative power cost of $38.49/MWh, the result is a total value of the project's power of $74,567,216 in 2020 dollars. Therefore, in the first year of operation, project power will cost $7,765,870, or $4.01/MWh, less than the likely cost of alternative power.

212. In considering public interest factors, the Commission takes into account that hydroelectric projects offer unique operational benefits to the electric utility system, known as ancillary service benefits. These benefits include the ability to help maintain the stability of a power system, such as by quickly adjusting power output to respond to rapid changes in system load, and to respond rapidly to a major utility system or regional blackout by providing a source of power to help restart fossil-fuel based generating stations and put them back on line.

COMPREHENSIVE DEVELOPMENT

213. Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality.[266] Any license issued must be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to license this project, and the terms and conditions included herein, reflect such consideration.

214. The EIS for the project contains background information, analysis of effects, and support for related license articles. The project will be safe if operated and maintained in accordance with the requirements of this license.

215. Based on our independent review and evaluation of the Conowingo Project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the EIS, and the provisions contained within the May 12, 2016 settlement agreement between Exelon and Interior and the October 31, 2019 settlement agreement between Exelon and MDE, we have selected the proposed Conowingo Project, with the mandatory conditions and staff-recommended modifications and measures discussed above, and find that it is best adapted to a comprehensive plan for improving or developing the Susquehanna River.

[266] 16 U.S.C. §§ 797(e) and 803(a)(1).

216. The Commission selected this alternative because: (1) issuance of a new license will serve to maintain a beneficial and dependable source of electric energy; (2) the required environmental measures will protect and enhance fish and wildlife resources, water quality, endangered species, recreational resources, and historic properties; and (3) the 570.15 MW of electric capacity comes from a renewable resource.

LICENSE TERM

217. On October 19, 2017, the Commission established a 40-year default license term policy for original and new licenses.[267] The Policy Statement provides for exceptions to the 40-year default license term under certain circumstances: (1) establishing a shorter or longer license term if necessary to coordinate license terms for projects located on the same river basin; (2) deferring to a shorter or longer license term explicitly agreed to in a generally supported comprehensive settlement agreement; and (3) establishing a longer license term upon a showing by the license applicant that substantial voluntary measures were either previously implemented during the prior license term, or substantial new measures are expected to be implemented under the new license.

218. There are four nearby licensed projects located on the lower Susquehanna River. The license for the Safe Harbor Project No. 1025 will expire on April 22, 2030,[268] and the license for the Holtwood Project No. 1881 will expire on August 31, 2030.[269] The licenses for the York Haven Project No. 1888 and Muddy Run Project No. 2355 will expire on November 30, 2055.[270]

219. In their respective settlement agreements,[271] Exelon, Interior, and MDE agreed to a 50-year license term based on the significant measures that will be required under the license and to coordinate with the expiration dates of 40-year licenses that the parties

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[267] *Policy Statement on Establishing License Terms for Hydroelectric Projects*, 161 FERC ¶ 61,078 (2017) (Policy Statement); 82 Fed. Reg. 49,501 (Oct. 26, 2017).

[268] *Safe Harbor Water Power Corp.*, 18 FERC ¶ 62,535, at 63,916 (1982). (Although the order was issued in 1980, it was not published in the FERC reports until 1982.)

[269] *PPL Holtwood, LLC*, 129 FERC ¶ 62,092, at 64,267 (2009).

[270] *York Haven Power Co., LLC*, 153 FERC ¶ 62,233 (2015); Order Issuing New License for the Muddy Run Project, 153 FERC ¶ 62,232.

[271] Offer of Settlement between Exelon and Interior at 5 (May 12, 2014); MDE Settlement at 22-23; Exelon January 31, 2020 Reply Comments at 72-74.

contend may be issued in approximately 2030 for the Safe Harbor Project and the Holtwood Project.

220. In contrast, the Coalition argues that Exelon should receive either a 10-year license term to coordinate with the Safe Harbor and Holtwood projects or a 35-year license term to coordinate with Muddy Run Project.[272]

221. The first exception to the default 40-year term would be to establish a shorter or longer license term, if necessary, to coordinate license terms for projects located in the same river basin. Aligning the Conowingo license with the 2030 expiration dates of the Safe Harbor and Holtwood projects would result in a less than 30-year license term for the Conowingo Project, which is prohibited by law.[273] Aligning the license with a projected expiration date for as yet unissued licenses is also problematic because it would be too speculative to determine what date would be appropriate for coordination where applications are not yet filed and there can be no reasonable estimate of time as to when (or for what length of license term) any licenses for those projects would be issued. However, we could issue a new license for the Conowingo Project for a term of 35 years to coordinate with the York Haven and Muddy Run licenses, which expire in November 2055.

222. The second exception to the 40-year term would be to defer to a shorter or longer license term explicitly agreed to in a generally supported comprehensive settlement agreement. Here, Exelon has not entered into a generally supported comprehensive settlement agreement. Rather, it has entered into two separate settlement agreements with two agencies, Interior and MDE. Such agreements are not the type which the Commission stated it would defer to in our Policy Statement.

223. The third exception to the 40-year term would be to establish a longer license term upon a showing by the license applicant that substantial voluntary measures were either previously implemented during the prior license term, or substantial new measures are expected to be implemented under the new license.[274] Exelon states that establishing a

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[272] Coalition January 17, 2020 Comments at 9. Coalition also argues that Exelon should be prohibited from requesting a longer term than it requested in its initial relicense application, 46 years. *Id.* at 11. There is no prohibition to subsequently requesting a longer term.

[273] 16 U.S.C. § 808(e). The statute provides that the Commission may issue new licenses for terms of 30 to 50 years.

[274] Our Policy Statement requires the licensee to request a longer license term based on measures that will be required in the new license. We consider the statements in the MDE Settlement and settlement with Interior to be such a request.

license term of 50 years for the Conowingo Project is consistent with the Policy Statement because the protection, mitigation, and enhancement measures in the new license will be significant, both in scope and cost.[275] It states that it will make substantial investments to construct and operate new fish passage facilities for American shad, herring, and American eel; improve recreation facilities; implement measures to improve water quality; and implement measures to protect endangered species.[276] Exelon notes that it also has agreed to increase minimum flows and modify its ramping operations to enhance downstream aquatic habitat.[277] Exelon argues that the costs associated with these measures will need to be recovered over a 50-year license term, and a 50-year license provides the regulatory certainty needed to ensure these investments can be made over the life of the license without jeopardizing the economic viability of the project.[278] We find that, taken together, Exelon's proposed measures are substantial and therefore we are issuing a 50-year license for the Conowingo Project.

The Commission orders:

(A) This license is issued to Exelon Generation Company, LLC (licensee), for a period of 50 years, effective the first day of the month in which this order is issued, to operate and maintain the Conowingo Project. This license is subject to the terms and conditions of the Federal Power Act (FPA), which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the FPA.

(B) The out-of-time motion to intervene filed in Docket No. P-405-121 on April 16, 2019, by the Pennsylvania Department of Environmental Protection, is granted.

(C) The petition for declaratory order filed in Docket No. P-405-121 by Exelon Generation Company, LLC, on February 28, 2019, is dismissed as moot.

[275] MDE Settlement at 23.

[276] *Id.*

[277] *Id.*

[278] *Id.*

(D) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown by Exhibit G filed December 28, 2012.

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Drawing Title
G-1	P-405-1017	Project Boundary	Project Boundary
G-2	P-405-1018	Project Boundary	Project Boundary
G-3	P-405-1019	Project Boundary	Project Boundary
G-4	P-405-1020	Project Boundary	Project Boundary
G-5	P-405-1021	Project Boundary	Project Boundary
G-6	P-405-1022	Project Boundary	Project Boundary
G-7	P-405-1023	Project Boundary	Project Boundary
G-8	P-405-1024	Project Boundary	Project Boundary
G-9	P-405-1025	Project Boundary	Project Boundary
G-10	P-405-1026	Project Boundary	Project Boundary

(2) Project works consisting of: (1) a 4,648-foot-long concrete gravity dam that includes: (a) a 1,190-foot-long, non-overflow gravity section with a crest elevation of 115.70 feet;[279] (b) a 2,250-foot-long ogee-shaped spillway section with a crest elevation of 86.7 feet controlled by 50 crest gates each 38 feet wide and 22.5 feet high; (c) a 135-foot-long ogee-shaped spillway section with a crest elevation of 99.2 feet controlled by two regulating gates each 38 feet wide and 10 feet high; (d) a 946-foot-long intake-powerhouse section; and (e) a 127-foot-long non-overflow gravity section; (2) an 8,500-acre impoundment with a gross storage capacity of 310,000 acre-feet at a full pool elevation of 109.2 feet; (3) an intake section with five steel racks (clear spacing of 5.375 inches) and two wood racks (clear spacing of 4.75 inches); (4) three 90-ton spillway gate cranes; (5) a powerhouse with: (a) four indoor turbine-generating units each composed of a 64,500-horsepower (hp) turbine and a 53,000-kilovolt-ampere (kVA) generator with a power factor 0.9, (b) one indoor unit composed of a 64,500-hp turbine and a 50,000-kVA generator with a power factor 0.9, (c) one indoor unit composed of a 54,000-hp turbine and a 53,000-kVA generator with a power factor 0.9, (d) one indoor unit composed of a 54,000-hp turbine and a 40,000-kVA generator with a power factor 0.9, (e) four outdoor units each composed of a 85,000-hp turbine and a 75,000-kVA generator with a power factor 0.95; and (f) two 1,900-hp house turbines each coupled to a 1,600-kVA generator with a power factor 0.9; (6) two fish lifts; (7) an eel trapping facility and eel holding facility; (8) a 2,800-foot-long, 900- to 1,500-foot-wide tailrace; (9) 13.8-kilovolt (kV) generator leads, and 13.8/220-kV step-up transformers; and (10) appurtenant facilities.

[279] All elevations are referenced to the National Geodetic Vertical Datum of 1929.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F shown below:

Exhibit A: The following sections of Exhibit A filed on August 31, 2012:

Sections 1.0 through 2.4, pages A-2 through A-13, entitled "Project Description," describing the mechanical, electrical, and transmission equipment within the application for license.

Exhibit F: The following Exhibit F drawings filed on August 31, 2012:

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Drawing Title[280]
F-1	P-405-1001	Plan of Development	Plan of Development
F-2	P-405-1002	General Plan and Sections of Dam	Dam Plan and Sections
F-3	P-405-1003	General Plans and Sections of Spillway	Spillway Plan and Sections
F-4	P-405-1004	Plan and Sections – Railroad Dike	Dike Plan and Sections
F-5	P-405-1005	General Plan: Power Station – Sheet 1	Power St. Plan No. 1
F-6	P-405-1006	General Plan: Power Station – Sheet 2	Power St. Plan No. 2
F-7	P-405-1007	General Plan: Power Station – Sheet 3	Power St. Plan No. 3
F-8	P-405-1008	Power Station – Elevation Sh. 1	Power St. Elev. No. 1
F-9	P-405-1009	Power Station – Elevation Sh. 2	Power St. Elev. No. 2
F-10	P-405-1010	Power Station – Elevation Sh. 3	Power St. Elev. No. 3
F-11	P-405-1011	Section: Power Station Unit No. 4	Unit No. 4 – Section
F-12	P-405-1012	Section: Power Station Unit No. 5	Unit No. 5 – Section
F-13	P-405-1013	Section: Power Station Unit No. 8	Unit No. 8 – Section
F-14	P-405-1014	Section: Power Station Unit No. 10	Unit No. 10 – Section
F-15	P-405-1015	Power Station – East End Elevation	Power St. East Elev.
F-16	P-405-1016	East Fish Passage Facility	East Fish Passage

[280] These exact drawing titles must be used in the filename when filing the electronic file format drawings required in license Article 202. Commission staff shortened the drawing titles due to filename character limits. There is no need to modify the titles as they appear on the drawings.

(3) All of the structures, fixtures, equipment, or facilities used to operate or maintain the project, all portable property that may be employed in connection with the project, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(4) Project recreation sites, including: (a) Lock 13, (b) Lock 15, (c) Muddy Creek Boat Launch, (d) Cold Cabin Boat Launch, (e) Dorsey Park, (f) Line Bridge, (g) Broad Creek Public Landing, (h) Glen Cove Marina, (i) Conowingo swimming pool and visitor's center, (j) Peach Bottom Marina, (k) Conowingo Creek Boat Launch, (l) Funks Pond, (m) Conowingo Dam Overlook; (n) Fisherman's Park/Shures Landing, and (o) Octoraro Creek Access.

(E) The Exhibits A, F, and G described above are approved and made part of this license.

(F) This license is subject to the conditions submitted by the Secretary of the U.S. Department of the Interior under section 18 of the FPA, as those conditions are set forth in Appendix 1 to this order.

(G) This license is also subject to the articles set forth in Form L-3 (Oct. 1975), entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States" (*see* 54 F.P.C. 1792 *et seq.*), as reproduced at the end of this order, and the following additional articles:

Article 201. *Administrative Annual Charges*. The licensee must pay the United States annual charges, effective the first day of the month in which the license is issued, and as determined in accordance with provisions of the Commission's regulations in effect from time to time, for the purposes of reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 570.15 megawatts.

Article 202. *Exhibit Drawings*. Within 45 days of the date of issuance of this license, as directed below, the licensee must file the approved exhibit drawings and geographic information system (GIS) data in electronic file format.

a) The licensee must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensee must add the FERC Project-Drawing Number (*i.e.*, P-405-1001 through P-405-1026) in the margin below the title block of the corresponding approved drawing. The licensee must separate the Exhibit F drawings from the other project exhibits, and label and file them as **Critical Energy Infrastructure Information (CEII) material under 18 CFR § 388.113** (the submission should consist of: 1) a public portion consisting of a cover letter, the Exhibit G drawings, and GIS data; and 2) a CEII portion containing only the Exhibit F drawings). Each drawing must be a separate electronic file, and the file name must

include: FERC Project-Drawing Number, FERC Exhibit Number, Filename Title, date of this license, and file extension in the following format [P-405-1001, F-1, Plan of Development, MM-DD-YYYY.TIF].

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (*i.e.*, latitude and longitude coordinates or state plane coordinates), arranged in a triangular format for GIS georeferencing the project boundary drawing to the polygon data. The licensee must identify the spatial reference for the drawing (*i.e.*, map projection, map datum, and units of measurement) on the drawing and label each reference point. In addition, a registered land surveyor must stamp each project boundary drawing. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY:	black & white raster file
FILE TYPE:	Tagged Image File Format, (TIFF) CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION:	300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE:	22” x 34” (minimum), 24” x 36” (maximum)
FILE SIZE:	less than 1 megabyte desired

b) Project boundary GIS data must be in a georeferenced electronic file format (such as ArcGIS shapefiles, GeoMedia files, MapInfo files, or a similar GIS format). The filing must include both polygon data and all reference points shown on the individual project boundary drawings. Each project development must have an electronic boundary polygon data file(s). Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) must include: FERC Project Number, data description, date of this license, and file extension in the following format [P-405, boundary polygon or point data, MM-DD-YYYY.SHP]. The filing must include a separate text file describing the spatial reference for the georeferenced data: map projection used (*i.e.*, UTM, State Plane, Decimal Degrees, *etc.*), the map datum (*i.e.*, North American 27, North American 83, *etc.*), and the units of measurement (*i.e.*, feet, meters, miles, *etc.*). The text file name must include: FERC Project Number, data description, date of this license, and file extension in the following format [P-405, project boundary metadata, MM-DD-YYYY.TXT].

Article 203. *Amortization Reserve*. Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project must be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee must set aside in a project amortization reserve account at the end of each fiscal year one-half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment.

To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee must deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee must set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee must maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves must be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios must be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity must be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 204. *Headwater Benefits*. If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the licensee must reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations.

Article 205. *As-built Exhibits*. Within 90 days of completion of construction of the facilities authorized by this license, the licensee must file for Commission approval, revised exhibits A, F, and G, as applicable, to describe and show those project facilities as built. If the licensee determines the previously approved exhibits reflect the as-built facilities and no revisions are necessary, the licensee must file a letter stating the approved exhibits reflect the as-built project facilities.

Article 301. *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensee must consult with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

Article 401. *Commission Approval, Reporting, and Filing of Amendments*.

(a) Requirement to File Plans for Commission Approval

Various conditions of this license found in U.S. Department of the Interior's (Interior's) section 18 prescription (Appendix 1) require the licensee to prepare plans in consultation with other entities for approval by Interior (U.S. Fish and Wildlife Service [FWS]) and implement specific measures without prior Commission approval. Each such plan must also be submitted to the Commission for approval. These plans are listed below.

Interior Condition[a]	Description	Due Date
12.4	Fishway Operation and Maintenance Plan Updates	January 31, annually[b]
12.7.1	Fishway Effectiveness Monitoring Plan	Within 6 months of license issuance

[a] The conditions shown in this table were filed by Interior on June 8, 2016, and are attached to this order as Appendix 1.

[b] Exelon filed an Initial Fishway Operation and Maintenance Plan on September 29, 2017, and an updated plan on February 2, 2021. The plan is required by Article 413.

The licensee must include with each plan filed with the Commission documentation that the licensee has received approval from FWS, as appropriate.

The Commission reserves the right to make changes to any plan submitted. Upon Commission approval, a plan will become a requirement of the license, and the licensee must implement the plan or changes in project operation or facilities, including any changes required by the Commission.

(b) Requirement to File Reports

Certain conditions found in Interior's section 18 prescription (Appendix 1) require the licensee to file reports with other entities. Because these reports relate to compliance with the requirements of this license, each such report must also be submitted to the Commission. These reports are listed in the following table:

Interior Condition[a]	Description	Due Date
12.7.1	Upstream Fishway Effectiveness Monitoring Report	By December 31, annually[b]
12.7.1	Downstream Fishway Effectiveness Monitoring Report	By August 31, annually[b]
12.7.3	Upstream American Eel Effectiveness Testing Report	By December 31, annually[b]

[a] The conditions shown in this table were filed by Interior on June 8, 2016, and are attached to this order as Appendix 1.

[b] As defined in condition 12.5.4 of Interior's section 18 prescription, fish passage efficiency testing will begin in the fifth year after license issuance.

The licensee must submit to the Commission documentation of any consultation, and copies of any comments and recommendations made by any consulted entity in connection with each report. The Commission reserves the right to require changes to project operation or facilities based on information contained in the report and any other available information.

(c) Requirement to File Amendment Applications

Certain conditions of Interior's section 18 prescription (Appendix 1) contemplate unspecified long-term changes to project operation or facilities based on the results of studies or monitoring. Such changes may not be implemented until the licensee has filed an application to amend the license and the Commission has approved the application. In any amendment request, the licensee must identify related project requirements and request corresponding amendments or extensions of time as needed to maintain consistency among requirements.

Article 402. *Reservation of Authority to Prescribe Fishways*. Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of, such fishways as may be prescribed by the Secretaries of the Interior and/or Commerce pursuant to section 18 of the Federal Power Act.

Article 403. *Use of Conowingo Pond*. Conowingo Pond is authorized to be used as a source of water and as a lower reservoir for the Muddy Run Pumped Storage Project No. 2355 (Muddy Run Project). The operation of the Conowingo Project must be such as to not adversely affect the Muddy Run Project licensee's ability to comply with its license.

Article 404. *Use of Conowingo Pond for Additional Non-Project Uses*. Conowingo Pond is authorized to be used as a source of cooling water for the Peach Bottom Atomic Power Station located in York County, the York Energy Center in York, Pennsylvania, and the Wildcat Point Generation Facility in the Town of Rising Sun, Maryland, as well as for a public water supply source for the City of Baltimore and Chester Water Authority, pursuant to the terms set forth in their non-project use of project lands authorizations.

Article 405. *Memorandum of Agreement*. Within 90 days of license issuance, the licensee must file, for Commission approval, a Memorandum of Agreement (MOA) with the licensee of the Muddy Run Project No. 2355, describing how all project facilities shared between the Conowingo Project No. 405 and the Muddy Run Project No. 2355 must be maintained and operated. The MOA must ensure that the licensees for the Conowingo and Muddy Run projects are jointly and severally responsible for the maintenance and operation of all shared project facilities.

Article 406. *Conowingo Pond Level Management.* Upon license issuance, the licensee must operate the project with a normal range of operation for Conowingo Pond between elevations 101.2 feet National Geodetic Vertical Datum of 1929 (NGVD 29) and 110.2 feet NGVD 29, with a minimum elevation of 107.2 feet NGVD 29 on weekends between Memorial Day and Labor Day, to meet recreational needs.

Conowingo Pond level may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement among the licensee, the Pennsylvania Department of Environmental Protection (Pennsylvania DEP), and the Maryland Department of the Environment (MDE). If pond levels are so modified, the licensee must notify the Commission, in writing, as soon as possible, but no later than 14 days after each such incident. In addition, the licensee must implement the following requirements with regard to planned and unplanned (emergency) changes in water surface elevation requirements of this article.

Planned Deviations:

Impoundment elevations may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods, up to three weeks, after mutual agreement among the licensee, Pennsylvania DEP, and the MDE. The licensee must file a report with the Commission as soon as possible, but no later than 14 calendar days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of consultation with Pennsylvania DEP and MDE. For planned deviations exceeding three weeks, the licensee must file an application for a temporary amendment of lake levels and receive Commission approval prior to implementation.

Unplanned Deviation, more than three hours or resulting in environmental effects:

If the licensee deviates from the impoundment elevation requirements, the licensee must file a report of each incident with the Commission. For any deviation that lasts longer than three hours or results in environmental effects, the licensee must file a report as soon as possible, but no later than 14 calendar days after each such incident. The report must include: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the license's response; (5) any comments or correspondence received from Pennsylvania DEP and MDE, or confirmation that no comments were received from the consulted agencies; (6) documentation of any observed environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

Unplanned Deviations lasting three hours or less with no environmental effects:

For deviations lasting three hours or less that do not result in environment effects, the licensee must file an annual report with the Commission, by March 1 of the year following the reporting year, describing each incident up to one month prior to the reporting date, including: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the license's response; (5) any comments or correspondence received from Pennsylvania DEP and MDE, or confirmation that no comments were received from the listed agencies; and (6) a description of measures implemented to prevent similar deviations in the future

Article 407. *Minimum Flow Requirements.* Upon license issuance, the licensee must operate the project in accordance with the following operational flow regime:

Date	Minimum Flow
September 15 - March 31	3,500 cfs or natural inflow, whichever is less
April 1 - 30	10,000 cfs or natural inflow, whichever is less
May 1 - June 15	7,500 cfs or natural inflow, whichever is less
June 16 - September 14	5,000 cfs or natural inflow, whichever is less

Beginning four years from the date of issuance of this license, the licensee must provide minimum flow and maximum flow releases and ramping rate limitations as described below:

Date	Minimum Flow	Down-ramping Rate	Up-ramping Rate	Maximum Flow
January 1–31	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	None	None

February 1–28	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	None	None
March 1–15	13,100 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	None
March 16–31	18,200 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	None
April 1–30	18,200 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	None
May 1–31	18,200 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	75,000 cfs
June 1–15	10,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	75,000 cfs
June 16–30	7,500 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	75,000 cfs
July 1–31	5,500 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	79,000 cfs
August 1–31	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo	Up to 40,000 cfs/hour	79,000 cfs

		discharge is less than 30,000 cfs		
September 1–30	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	79,000 cfs
October 1–31	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	Up to 40,000 cfs/hour	None
November 1–30	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	None	None
December 1–31	4,000 cfs or natural inflow, whichever is less	Up to 12,000 cfs/hour if Conowingo discharge is less than 30,000 cfs	None	None

a) Natural inflow must be measured at the Marietta U.S. Geological Survey gage (No. 01576000).

b) Maximum flow restrictions must only apply when the natural flow is less than 86,000 cfs.

c) If compliance with the prescribed flows would cause the licensee to violate or breach any law, any applicable license, permit, approval, consent, exemption or authorization from a federal, state, or local governmental authority, including the Nuclear Regulatory Commission license for the Peach Bottom Atomic Power Station, the license for the Muddy Run Pumped Storage Project No. 2355 (Muddy Run Project), any agreement with the City of Baltimore or other governmental entity, or any tariff or other requirement of the PJM Interconnection Regional Transmission Organization or their assigns, the licensee may deviate from the prescribed flows to the least degree necessary in order to avoid such violation or breach.

d) If compliance with the prescribed flows would cause the licensee to violate any agreement in effect as of September 1, 2019, with the Chester Water Authority, Old Dominion Electric Cooperative, or the York Energy

Center, the licensee may deviate from the prescribed flows to the least degree necessary in order to avoid such violation or breach.

e) If compliance with the prescribed flows would cause or exacerbate flooding or a similar public safety hazard, the licensee may deviate from the prescribed flows to the least degree necessary in order to avoid such flooding or public safety hazard.

f) Not including the authorized deviations in sections (c), (d), and (e) of this license article, the licensee shall have the flexibility to deviate from the up-ramping, down-ramping and maximum flow restrictions according to the following limits during each month:

- January, February: 8 total permitted hours of deviation per month;
- March, April, May, and that portion of June during which the East Fish Lift (EFL) is in operation: no deviations allowed;
- June after EFL operation has ceased: 8 total permitted hours of deviation per month of which no more than 50% will be allocated to down-ramping and up-ramping;
- July, August: 26 total permitted hours of deviation per month of which no more than 50% will be allocated to down-ramping and up-ramping;
- September: 32 total permitted hours of deviation per month of which no more than 50% will be allocated to down-ramping and up-ramping;
- October: 14 total permitted hours of deviation per month; and
- November, December: 8 total permitted hours of deviation per month.

When the licensee deviates from the down-ramping or up-ramping restrictions of the operational flow regime, the amount of time applied against the limits set forth above is two hours per event, regardless of the actual amount of time it takes the licensee to complete the down-ramping or up-ramping event. Minimum flow releases may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement among the licensee and the Maryland Department of the Environment. The licensee must maintain complete and accurate records of all deviations that occur pursuant to this section.

Unplanned Deviations

For unplanned deviations, the licensee must file a report with the Commission as soon as possible, but no later than 14 days after the onset of the incident. Each report must describe the incident, including: (1) the cause, (2) the duration and magnitude, (3) any pertinent operational and/or monitoring data, (4) a timeline of the incident and the licensee's response, (5) any environmental effects, (6) documentation that MDE and FWS were notified and any comments received, or, affirmation that no comments were

received, and (7) any measures to be implemented to prevent similar incidents in the future.

Article 408. *Minimum Stream Flow Operation Plan.* Within one year of license issuance, the licensee must file with the Commission for approval, a minimum stream flow operation plan that describes how the licensee will document compliance with the minimum flow releases required by this license, to be initiated beginning 4 years from the date of license issuance. The plan must include the following:

a) a detailed description of how the project will comply with the minimum flow, ramping rate, and maximum flow requirements of the license, as well as Conowingo reservoir level restrictions specified in Article 406, including procedures for sequencing turbine start-up and operation for seasonal and daily operation;
b) a description of the mechanisms and structures (*i.e.*, type and exact locations of all flow and reservoir elevation monitoring equipment and gages) to be used for maintaining compliance with operational requirements, and procedures for maintaining and calibrating monitoring equipment;
c) standard operating procedures to be implemented during routine maintenance, including a schedule of routine maintenance, and procedures to be implemented during conditions outside of normal operation, including during emergency conditions such as unscheduled facility shutdowns and maintenance;
d) a provision to file with the Commission, after consultation with the Maryland Department of the Environment (MDE), a minimum flow and operation compliance report by March 1, annually, detailing implementation of the plan, including any deviations in minimum flows (planned and unplanned deviations, including those authorized pursuant to paragraphs c-f of Article 407), ramping rates, maximum flows, and pond levels that occurred during the previous calendar year; and
e) an implementation schedule.

The plan must be developed after consultation with MDE. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to MDE, and specific descriptions of how MDE's comments are accommodated by the plan. The licensee must provide a minimum of 30 days for MDE to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is

approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 409. *Monitoring Stream Flows in the Tailrace.* Within one year of license issuance, the licensee must conduct a study regarding the feasibility of redesigning, installing, and maintaining best available real-time flow telemetry at the United States Geological Survey flow gage in the project tailrace (No. 01578310).

Within two years of license issuance, the licensee must determine, after consultation with the Maryland Department of the Environment (MDE), whether the study results indicate that installation of new technology is feasible. If the licensee determines installation of new technology is not feasible, the licensee must file a report providing the study results and a record of consultation. If the licensee determines that installation of new technology is feasible, the licensee must develop a tailrace gage plan for installation and maintenance of such a system and file with the Commission within two years of license issuance. The plan must include a provision to report monitoring results annually, by December 31 of each year, to the MDE. The plan must be developed after consultation with MDE. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to MDE, and specific descriptions of how MDE's comments are accommodated by the plan. The licensee must provide a minimum of 30 days for MDE to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 410. *Dissolved Oxygen Enhancements and Monitoring.* Upon license issuance, the licensee must continue dissolved oxygen (DO) enhancement at the project using the existing turbine venting systems on units 1 through 7 and the aerating runners on units 2 and 5. DO levels must be continuously monitored from May 1 through October 1 at the existing Station 643 location, about 0.6 mile downstream of Conowingo Dam. By January 31 of each year, the licensee must file, with the Commission and the Maryland Department of the Environment, a report on the results of the previous year's DO monitoring at the project.

Article 411. *Fish Kill Monitoring Plan.* Within one year of license issuance, the licensee must file with the Commission for approval, a fish kill monitoring plan for any fish kills exceeding 50 fish in Conowingo Pond and/or the project tailrace. The plan must include, at a minimum: (a) data collection procedures, (b) analysis methods, (c) a provision to identify any project-related causes that could have resulted in any such reported fish kills, and (d) a schedule and procedure for reporting.

The plan must be developed after consultation with the Maryland Department of Natural Resources, the U.S. Fish and Wildlife Service, and the Pennsylvania Fish and Boat Commission. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 412. *Fish Lift Monitoring*. During operation of the East and West Fish lifts, the licensee must visually quantify, for each fish lift hopper, the fullness of each lift. The licensee must consult with the Maryland Department of the Environment (MDE) regarding the process for such visual observations and indexing. The licensee must maintain records of the visual inspection and indexing and make those records available for review by the Commission, MDE, and the U.S. Fish and Wildlife Service, when requested.

Article 413. *Fishway Operation and Maintenance Plan.* Within 90 days of license issuance, the licensee must file with the Commission for approval, a revised Fishway Operation and Maintenance Plan, filed February 2, 2021, that is updated to reflect conditions of this license.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 414. *Additions to American Eel Passage Prescription.* Upon license issuance, in addition to complying with U.S. Department of the Interior's section 18 prescription (Appendix 1), the license must:

a) Operate all current and proposed eel fishways on the west side of the Conowingo Dam from May 1 until mean daily water temperature, as determined by hourly readings at Exelon's monitoring station 643 (located 0.6 mile downstream of Conowingo Dam), is 10 degrees Celsius or less for three consecutive days.
b) Operate all current and proposed eel fishways on the east side of Conowingo Dam from 10 days after the date that American shad operations cease at the

East Fish Lift until mean daily water temperature, as determined by hourly readings at Exelon's monitoring station 643 (located 0.6 mile downstream of Conowingo Dam), is 10 degrees Celsius or less for three consecutive days.

c) Maintain the upstream eel passage trap and transport program through 2035.

d) During the 10 years of operating the East Fish Lift with the eel temporary modifications (12.6.1 of the section 18 prescription), if the number of eels exceeds the maximum capacity of eels per unit of ramp area, redesign and construct the East Fish Lift - Eel Temporary Modifications to reduce crowding.

e) If, after 10 years of operating the East Fish Lift with the eel temporary modifications (12.6.1 of the section 18 prescription), the 10-year average annual catch of the East Fish Lift is greater than or equal to 50% of the comparable 10-year average catch of eels at the eel trapping facility at the West Fish Lift, design, install, and operate a permanent eel trapping facility at the location of the East Fish Lift, in accordance with a schedule agreed upon by the Maryland Department of the Environment (MDE) and the U.S. Fish and Wildlife Service (FWS), and approved by the Commission. The 10-year average must be based on comparable dates of operation, as the East Fish Lift eel temporary modifications will operate a shorter period than the eel trapping facility at the West Fish Lift. The licensee must maintain and operate the eel trapping facility at the West Fish Lift for the term of the new license, but is not required to maintain and operate more than two permanent eel traps (e.g., the eel trapping facility at the West Fish Lift and either an eel trapping facility at the location of the East Fish Lift or Octoraro Creek, or comparable facility required under the Muddy Run Project License (FERC No. 2355) at any time, unless otherwise directed by the Commission.

Unless otherwise directed by the Commission, the licensee must not make any modifications, undertake any construction, or make any changes to the operation of any eel fishway without the agreement of the MDE and FWS and approval from the Commission.

The Commission reserves the right to require changes to any proposed modification. Modifications must not begin until the licensee is notified by the Commission that the modifications are approved. Upon Commission approval, the licensee must implement proposed modifications, including any changes required by the Commission.

Article 415. *American Eel Passage and Restoration Plan.* Within six months of license issuance, the licensee must file with the Commission for approval, an eel passage and restoration plan. The plan must include:

a) detailed plans for modifications to the East Fish Lift to specifically accommodate a temporary eel trapping facility at a location within the East Fish Lift stilling basin in the vicinity of the foot of the spillway;
b) details regarding the annual operation and maintenance of all current and proposed eel fishways; and
c) proposed attraction flow velocity and volume, slopes of the ramps, matting, and methods to reduce predation.

Within 30 days of license issuance, the licensee must submit the plan to the Maryland Department of the Environment (MDE), the Pennsylvania Department of Environmental Protection (Pennsylvania DEP), the Pennsylvania Fish and Boat Commission (Pennsylvania Fish and Boat), the Susquehanna River Basin Commission (SRBC), the U.S. Fish and Wildlife Service (FWS), and the Maryland Department of Natural Resources (Maryland DNR), for review. In the event that MDE, in consultation with the Pennsylvania DEP, the Pennsylvania Fish and Boat, SRBC, FWS, or the Maryland DNR, determines that additional information, revisions, modifications, or amendments are necessary to the eel passage and restoration plan, then within 60 days of receipt of written notice, the licensee must submit such information, revisions or amendments to the above-listed agencies.

The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 416. *American Eel Collection and Holding Tank Conditions.* Beginning with the first full trap and transport season following issuance of this license and continuing until the trap and transport program ends, the licensee must ensure the collection tank(s) are designed and operated to hold eels at densities not exceeding 10 elvers per liter unless otherwise agreed to by the licensee, the Maryland Department of the Environment (MDE), and the U.S. Fish and Wildlife Service (FWS). If deemed necessary by MDE, FWS, or the Commission, the licensee must provide aeration to the collection tanks. The licensee must provide daily reports on collection activities to MDE and FWS.

The holding tank(s) must have continuous temperature, dissolved oxygen, and water flow exchange monitoring devices with alarms that sound in a daily staffed location if levels of any parameter are outside of established limits. The licensee must remove, count, and report dead eels to MDE and FWS.

Article 417. *Upstream American Eel Transport Criteria.* Beginning with the first full trap and transport season after issuance of this license and continuing until the trap and transport program ends, the licensee must ensure the upstream transport of juvenile eels occurs as necessary based on the capacity of the holding tank(s) at the licensee's eel fishways, but in no event more than a week after capture. Within one week of capture, eels must be removed from the holding tank(s) and transferred to a transport vehicle equipped with insulated transport container(s) that are covered and aerated. Transport vehicle(s) must be designed and operated to hold eels at densities not exceeding 10 juvenile eels per liter. Eels must be trucked to appropriate release locations on the same day of removal from holding. The licensee must remove, enumerate, and report dead eels to the Maryland Department of the Environment and the U.S. Fish and Wildlife Service.

Article 418. *Sturgeon Reporting.* No later than January 31 of each year, the licensee must file a report with the Commission, the Maryland Department of the Environment, and the Maryland Department of Natural Resources on the number of Atlantic and shortnose sturgeon observed by the licensee and its contractors at the Conowingo Dam during the preceding calendar year.

Article 419. *Aquatic Invasive Species Management.* Beginning 90 days after license issuance, the licensee must undertake the following measures for the management of aquatic invasive species:

a) Consult annually with the Maryland Department of Natural Resources (Maryland DNR), Maryland Department of the Environment (MDE), the Pennsylvania Department of Environmental Protection (Pennsylvania DEP), Pennsylvania Fish and Boat Commission (Pennsylvania FBC), and the U.S. Fish and Wildlife Service (FWS) to identify a list of aquatic invasive species that must be monitored and file that list with the Commission prior to the start of the fish passage season.

b) Notify the Maryland DNR, Pennsylvania DEP, Pennsylvania FBC, and FWS within 24 hours if an aquatic invasive species is captured and removed in the West Fish Lift, captured and removed in the East Fish Lift, or passed from the East Fish Lift into Conowingo Pond. Notification must include: (i) the species name and number of specimens observed or collected; (ii) the disposition of the aquatic invasive species observed or collected; (iii) the approximate size of aquatic invasive species observed or collected; (iv) the date and time of passage; and (v) the estimated flow through the Conowingo Dam at time of passage.

c) During operation of the East Fish Lift, observe the fish lift hopper dumping into the fish exit trough. If an aquatic invasive species is viewed in the fish lift hopper or chute, the licensee must close the gate at the viewing window immediately, and institute a drawdown to remove the aquatic invasive species from the trough before releasing the remaining fish into Conowingo Pond. The licensee must also remove any aquatic invasive species that are observed while conducting fish tagging operations in the East Fish Lift trough.

d) Remove any invasive species that are collected during the operation of the West Fish Lift.

e) For all aquatic invasive species collected at the project, kill or dispatch the aquatic invasive species and, as may be requested, place the specimen in a freezer for disposal by Maryland DNR or FWS. If freezer space at the Conowingo Project for storage of aquatic invasive species becomes limited, the licensee must notify Maryland DNR and MDE. If freezer space for storage of invasive species is not limited, the licensee, as may be requested by Maryland DNR, must send the frozen aquatic invasive species to a facility designated by Maryland DNR at the end of the fish passage season and notify the Maryland DNR and MDE as to the number and type of frozen aquatic invasive species sent to the designated facility.

f) If, during any upstream migratory fish season, the licensee determines that compliance with the measures set forth in paragraph (c) and (d) of this license article will materially interfere with the licensee's fish passage obligations under this license and U.S. Department of the Interior's modified section 18 prescription (Appendix 1), notify FWS, MDE, Maryland DNR, Pennsylvania DEP, and Pennsylvania FBC via email of that determination. The licensee may suspend compliance with the measures set forth in paragraph (c) and (d) of this license article for the remainder of the upstream migratory fish season, unless MDE and FWS notify the licensee within 72 hours of the licensee's initial notification that they do not concur with the licensee's determination.

g) In any year where suspension under paragraph (f) of this license article occurs, convene a meeting no later than July 1 with MDE, Maryland DNR, FWS, Pennsylvania DEP, Pennsylvania FBC, and other state resource agencies as appropriate, to address invasive species issues for the subsequent year. The licensee, after said meeting or no later than August 31, and after consultation with said agencies, must file with the Commission, a report of proposed alternative measures for the management of invasive species, provided that said alternative measures do not significantly exceed the scope of the measures required in paragraphs (a) through (d) of this license article, and request Commission approval when necessary.

Article 420. *Sediment Management Plan.* Within six months of license issuance, the licensee must file with the Commission for approval, a revision to the Sediment

Management Plan filed on August 31, 2012. The revised plan must include the following:

a) A provision to conduct dredging with the frequency and depth needed to maintain the navigation channel at the Conowingo Creek, Peters Creek (Peach Bottom Marina), and Broad Creek boat ramps, where sediment has been accumulating, in order to improve and maintain recreational boating access. The provision should address how the dredged material will be disposed.

b) A provision that beginning in 2022, the licensee must conduct a bathymetric survey of Conowingo Pond at 5-year intervals to monitor sediment transport and depositional patterns within the pond. The licensee must file the results of each bathymetric survey with the Commission by March 31 of the following year. The results of each bathymetric survey must include an analysis of any change in sediment deposition or scour in the pond from the previous survey(s), including the 2011 survey,[281] so that any changes in sediment depositional or scour patterns in the pond over time since the 2011 survey can be monitored.

c) Measures (*e.g.*, metrics for magnitude or frequency of sediment loading following high flows and storm events) that would trigger action to maintain boating access between the 5-year monitoring intervals.

Once approved, the Sediment Management Plan must not be amended without prior Commission approval. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. The Commission reserves the right to require any additional changes to the plan.

Article 421. *Bald Eagle Management Plan.* The Bald Eagle Management Plan, filed on August 29, 2012, is approved with the following modifications:

a) a provision for pedestrian traffic restrictions to be implemented by the licensee (via increased signage, patrols of the area, or physical restrictions such as barriers) on the following project land locations where current project-related human activities disturb perching and foraging eagles at eagle concentration areas: both sides of Rowland Island, under the project's transmission line towers in the Susquehanna River, and on the Cecil County side of the river where eagle concentrations are present;

b) a provision that, before any ground-disturbing work begins on project lands, the licensee must review the U.S. Fish and Wildlife Service's (FWS)

[281] Exelon conducted a bathymetric survey of Conowingo Pond in support of Conowingo Revised Study Plan 3.15: *Sediment Introduction and Transport Study*, and filed it with the Commission on February 23, 2012.

Chesapeake Bay Field Office and Pennsylvania Field Office websites for any updates to the bald eagle management guidelines; and

c) a provision to consult with FWS if there are changes made to the guidelines by FWS during the term of the license, to determine if the Bald Eagle Management Plan needs to be revised, and file any proposed revisions to the Bald Eagle Management Plan with the Commission for approval prior to implementing those changes.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 422. *Waterfowl Nesting Protection Plan.* Within one year of license issuance, the licensee must file with the Commission for approval, a waterfowl nesting protection plan. The plan must include, at a minimum:

a) a provision to verify specific project-related effects on nesting waterfowl, such as project-related water level fluctuations during the nesting season;
b) a provision to verify which species of nesting waterfowl (as well as the black-crowned night-heron, a wading bird species) are affected by the project, if any;
c) a provision to, if new project-related effects are identified, describe appropriate protection or mitigation measures; and
d) a provision for an assessment of the impacts of such protection and mitigation measures on water quality.

The plan must be developed after consultation with the Maryland Department of the Environment, the U.S. Fish and Wildlife Service, and the Pennsylvania Fish and Boat Commission. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 423. *Bog Turtle Protection Plan.* Within one year of license issuance, the licensee must file with the Commission for approval, a bog turtle protection plan for the

protection and enhancement of the bog turtle population. The plan must include, at a minimum:

a) a map of the wetland(s) documented to support bog turtles, and a record of bog turtle sightings in and around the wetland(s) within the project boundary;
b) the restriction of mowing in the wetland(s) documented to support bog turtles;
c) invasive plant and woody plant control, particularly reed canary grass, in the areas around the wetland(s) documented to support bog turtles;
d) limits on public access to the wetland(s) documented to support bog turtles without advertising the reason; and
e) a provision stating that, before any ground-disturbing work begins on project lands, the licensee must review the U.S. Fish and Wildlife Service's (FWS) Chesapeake Bay Field Office and Pennsylvania Field Office websites for any updates to the bog turtle management guidelines; and
f) a provision to consult with FWS if there are any changes made to the guidelines by FWS during the term of the license, to determine if the bog turtle management plan needs to be revised, and file any proposed revisions to the bog turtle management plan with the Commission for approval prior to implementing those changes.

The plan must be developed after consultation with FWS and the Maryland Department of the Environment. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 424. *Northern Map Turtle Protection Plan.* Within one year of license issuance, the licensee must file with the Commission for approval, a northern map turtle protection plan for the protection and enhancement of the map turtle population. The plan must include, at a minimum:

a) annual monitoring of the northern map turtle population at the project for 10 years, followed by population monitoring every 5 years;

b) a study to determine the amount of artificial basking habitat needed over the normal range of generation flows to support current and future populations of northern map turtles within Conowingo Pond and all areas of the Susquehanna River downstream of the Conowingo Dam affected by generation flows;
c) a study to determine the proper locations for deployment of artificial basking platforms;
d) nest management and protection measures;
e) annual monitoring of the use and success of both the mitigation and protection measures;
f) an assessment of the northern map turtle's response to changes in operating practices at the project that are required by the new license; and
g) a provision for recommending to the Commission, any modifications or additions to the protection and mitigation measures as a result of the monitoring, after consultation with the Maryland Department of the Environment (MDE).

The plan must be developed after consultation with MDE. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 425. *Bat Protection Measures*. To protect Indiana and northern long-eared bat habitat, the licensee must avoid cutting trees equal to or greater than 3 inches in diameter at breast height on project lands from June 1 through July 31, unless a tree poses an immediate threat to human life or property. Tree removal is defined herein as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation greater than 3 inches in diameter likely to be used by Indiana and northern long-eared bats.

Article 426. *Recreation Management Plan.* Within six months of license issuance, the licensee must file with the Commission for approval, a revision to the Recreation Management Plan filed on August 31, 2012. The revised plan must include the following:

a) a provision describing how, beginning in 2030, the licensee will monitor recreation use (including methods to be used) every 10 years throughout the license term to determine whether changes to the plan are needed to address recreation demand, and whether boating access and season lengths are sufficient;
b) a cross-reference to the Sediment Management Plan (Article 420 of this license) stating that the results of the bathymetric mapping and dredging at the Conowingo Creek, Peters Creek (Peach Bottom Marina), and Broad Creek boat ramps intended to maintain boater access to Conowingo reservoir at these locations will be reviewed during the 10-year review and update of the Recreation Management Plan; and
c) a cross-reference to the debris management program required by Article 427 of this license.

After each 10-year recreation use monitoring, the licensee must file a proposed update to the Recreation Management Plan by April 30 of the following year for Commission approval. Each proposed update to the plan must be developed after consultation with the U.S. Fish and Wildlife Service, the Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Fish and Boat Commission, the Maryland Department of the Environment, the National Park Service, and the Susquehanna River Boaters Association. The licensee must include with the proposed updated plan a copy of the recreation use monitoring results, an implementation schedule for any modifications, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the updated plans with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information. If, after the recreation use monitoring and consultation with the entities listed above, the licensee determines that no updates to the Recreation Management Plan are warranted, the licensee must file the recreation use monitoring report and a copy of consultation and indicate why no updates are being made the plan.

The licensee must continue to operate and maintain the following existing recreation sites for the term of the license: (a) Lock 13, (b) Lock 15, (c) Muddy Creek Boat Launch, (d) Cold Cabin Boat Launch, (e) Dorsey Park, (f) Line Bridge, (g) Broad Creek Public Landing, (h) Glen Cove Marina, (i) Conowingo swimming pool and visitor's center, (j) Peach Bottom Marina, (k) Conowingo Creek Boat Launch, (l) Funks Pond, (m) Conowingo Dam Overlook; (n) Fisherman's Park/Shures Landing, and (o) Octoraro Creek Access. If the licensee proposes changes to the existing facilities, the licensee must file the changes with the Commission for approval. The changes may not be implemented until they have been approved by the Commission.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 427. *Debris Management Program.* Within six months of license issuance, the licensee must develop a debris management program that contains the following:

a) A description of the program, including: debris management goals, a description of debris management methods, timeframes for when debris will be collected and the frequency of skimmer and clamming operations, specific size criteria for target floating debris, a description of best management practices for the storage of the debris materials at Hopkins Cove and other licensee-owned lands within the project boundary, procedures for removal of stored debris, and procedures for tracking debris storage and removal.

b) A provision for a public hotline for boaters to link directly to the licensee to report areas of hazardous floating debris.

c) A provision to employ clamming, one or more skimmer barges, or any other equally or more effective measure to remove as much floating and water surface trash and debris that accumulates in the reservoir behind the Conowingo Dam as is reasonably practicable, but in any event no fewer than 50 loads nor more than 450 loads of trash and debris per year, where a "load" consists of the maximum volume of trash and debris that can be safely transported in a standard 20-yard dumpster. The licensee must monitor and record the duration of the clamming/trash and debris removal events (number of hours), and the amount of debris and trash removed and subsequently disposed of during each clamming/trash and debris removal event (in cubic yards) and submit the data to the Maryland Department of the Environment (MDE) each year by November 30.

d) A provision requiring the licensee to respond, in a timely fashion, to any complaint from a marina operator, or public boat ramp "monitor," such as the Maryland Department of Natural Resources, relating to accumulated trash and debris at project facilities interfering with recreational uses in Conowingo Pond, by removing, to the extent reasonably practicable and safe, any accumulated trash and debris that is interfering with recreational uses during the recreational season between Memorial Day and Labor Day and properly disposing of removed materials. The licensee must maintain, for review by MDE and Commission staff, records of complaints filed (name, date, time, location, nature of the trash and/or debris issue and amount) and corrective actions taken (date, time, description of action, and, amount of trash and/or debris removed).

e) A provision to sponsor at least two annual community-based cleanups of Conowingo Pond, tributaries upstream of the Conowingo Project that feed Conowingo Pond, and the Susquehanna River and tributaries downstream of the project. Licensee must advertise each event, provide all needed supplies, and be responsible for the disposal of collected materials.

f) A provision specifying that, after any storm event which results in trash and debris blocking water supply intakes in the Susquehanna River downstream of the Conowingo Dam, the licensee must ensure that the trash and debris blocking water supply intakes and recreation facilities within the project boundary is removed as soon as it is safe to enter the water.

g) A provision for an annual report to be filed with the Commission by April 1 throughout the license term, summarizing the previous year's debris removal efforts, hotline action items, and outcomes.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 428. S*horeline Management Plan.* Within six months of license issuance, the licensee must file with the Commission for approval, a revision to the Shoreline Management Plan filed on August 31, 2012. The revised plan must include the following modifications:

a) A provision for reviewing and updating the plan every 10 years, with the first update to be filed with the Commission in 2030.

b) A requirement that, prior to submitting a proposed update to the Shoreline Management Plan to the Commission, the licensee must submit to the Maryland Department of the Environment (MDE) for review and comment all proposed modifications, including an assessment of the impacts of deleted, revised, or new measures on water quality.

c) A requirement that, prior to submitting an application to FERC for a non-project use of project land, the licensee must, in addition to complying with the requirements of Article 430: (i) prepare, or require the third-party requesting the non-project use of project land to prepare, a written assessment of the impacts on water quality of the proposed use; (ii) provide this assessment to MDE for review to determine whether the proposed use is consistent with Maryland water quality standards, including designated and achieved uses; and (iii) consult with MDE regarding the proposed use.

d) With the exception of any activities required pursuant to the license, prior to making any modifications to shoreline vegetation for viewshed maintenance and development and recreation access within the project boundary, a requirement that the licensee must: (i) prepare a written assessment of the

impacts on water quality of the proposed modifications; (ii) provide this assessment to MDE for a determination regarding whether the proposed modifications are consistent with Maryland water quality standards, including designated and achieved uses; and (iii) not undertake any such modifications until MDE notifies the licensee in writing that it has no objections to the proposed modifications.

e) A requirement that the licensee must consult with MDE regarding any proposed modification of an existing use of project lands in cases where such use may affect any sensitive aquatic resource identified by licensee in the "sensitive resources overlays" included in licensee's Shoreline Management Plan.

Each proposed update to the plan must be developed after consultation with the U.S. Fish and Wildlife Service, the National Park Service, the Pennsylvania Department of Conservation and Natural Resources, the Maryland Department of Natural Resources, and MDE. The licensee must include with the updated plans an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must provide a minimum of 30 days for the entities to comment and to make recommendations before filing the updated plans with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 429. *Programmatic Agreement and Historic Properties Management Plan.* Upon license issuance, the licensee must implement the *Programmatic Agreement Between the Federal Energy Regulatory Commission, the Pennsylvania Historic Preservation Officer, and the Maryland Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuing a New License to Exelon Generation Company, LLC, for the Continued Operation of the Conowingo Project in Lancaster and York Counties, Pennsylvania, and Cecil and Harford Counties, Maryland (FERC No. 405-106)*, executed on May 5, 2017, and including but not limited to the Historic Properties Management Plan (HPMP) for the project. Pursuant to the requirements of this Programmatic Agreement, the licensee must file, for Commission approval, a revised HPMP within six months of issuance of this order. The revised HPMP must be based on the HPMP filed with the Commission on August 31, 2012, and include the following:

a) a revised area of potential effects (APE) that includes the narrow strip of land in the current project boundary that extends downstream from Spencer Island along the west side of the river to the city of Havre de Grace, Maryland that contains four additional previously recorded archaeological sites (18HA240, 18HA267, 18HA268, 18HA269);

b) a provision to conduct a cultural resources inventory any lands within the revised APE (particularly areas of interest identified in the Phase IA study that were not subject to Phase IB study), evaluate identified cultural resources for National Register of Historic Places (National Register) eligibility, and address potential effects before sale or transfer of those lands;

c) a provision to make a good faith effort to obtain access to private property to conduct appropriate studies should project effects of any kind to cultural resources on private lands be identified over the new license term;

d) a description and plan to monitor all 48 archaeological sites identified to date within the project APE;

e) a description of all 27 historic structures identified to date within the project APE, including whether they are eligible for the National Register and the measures implemented to protect these sites, or an explanation of why the sites are not considered eligible;

f) a correction to identify the Susquehanna and Tidewater Canal and Columbia & Port Deposit Railroad as eligible for listing in the National Register;

g) a revised list (as necessary) of project activities involving the Conowingo Project system that can be completed without Maryland State Historic Preservation Office (SHPO) review;

h) a process for assessing project-related maintenance and ground-disturbing activities to determine whether or not archaeological sites would be affected, particularly in areas that have not had archaeological surveys;

i) provisions to ensure confidentiality of cultural resources location information during implementation of public outreach programs;

j) a description of project-related activities that will require tribal consultation in accordance with section 106 of the National Historic Preservation Act; and

k) the National Park Service as a consulting party.

The Commission reserves the authority to require changes to the HPMP at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the licensee must obtain approval from the Commission and the Pennsylvania and Maryland SHPOs, before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the project's APE.

Article 430. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use

and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm

drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file with the Commission a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. No report filing is required if no conveyances were made under paragraph (c) during the previous calendar year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project lands or waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

(H) The licensee must serve copies of any Commission filing required by this order on any entity specified in the order to be consulted on matters relating to that filing. Proof of service on these entities must accompany the filing with the Commission.

(I) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 825*l*, and section 385.713 of the Commission's regulations, 18 C.F.R. § 385.713. The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order.

The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

Form L-3
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED MAJOR PROJECT AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Article 4. The project, including its operation and maintenance and any work incidental to additions or alterations authorized by the Commission, whether or not conducted upon lands of the United States, shall be subject to the inspection and supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the

region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto, and shall notify him of the date upon which work with respect to any alteration will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall submit to said representative a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of said alterations or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights or occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a nonpower licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall

make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the

interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail

to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable

modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 22. Whenever the United States shall desire to construct, complete, or improve navigation facilities in connection with the project, the Licensee shall convey to the United States, free of cost, such of its lands and rights-of-way and such rights of

passage through its dams or other structures, and shall permit such control of its pools, as may be required to complete and maintain such navigation facilities.

Article 23. The operation of any navigation facilities which may be constructed as a part of, or in connection with, any dam or diversion structure constituting a part of the project works shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of the Army.

Article 24. The Licensee shall furnish power free of cost to the United States for the operation and maintenance of navigation facilities in the vicinity of the project at the voltage and frequency required by such facilities and at a point adjacent thereto, whether said facilities are constructed by the Licensee or by the United States.

Article 25. The Licensee shall construct, maintain, and operate at its own expense such lights and other signals for the protection of navigation as may be directed by the Secretary of the Department in which the Coast Guard is operating.

Article 26. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 27. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 28. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

APPENDIX 1

U.S. Department of the Interior Modified Fishway Prescription for the Conowingo Hydroelectric Project No. 405 (filed June 8, 2016)

12. Modified Prescription for Fishways

12.1 Design Criteria

12.1.1 Design Populations

12.1.1.1 American Shad

The goal for this fishway prescription is to ultimately be able to pass up to 5 million American shad annually in order to maintain self-sustaining populations of 2 million American shad annually migrating to and reproducing in the Susquehanna River upstream of York Haven Dam and in suitable tributaries.

12.1.1.2 River Herring

The goal for this fishway prescription is to ultimately be able to pass up to 12 million river herring annually in order to maintain self-sustaining populations of 5 million river herring annually migrating to and reproducing in the Susquehanna River upstream of York Haven Dam and in suitable tributaries.

12.1.1.3 American Eel

The Licensee shall construct, operate, and maintain fishway(s) at Conowingo Dam sufficient to pass upstream migrating eels that arrive to the Project into the mainstem of the Susquehanna River upstream of York Haven Dam.

12.1.2 Design Capacity

Capacity is determined by a given weight of fish transferred over a given period of time. Capacity calculations take into consideration all species of fish using a fish passage facility; e.g., fish lift(s), and their corresponding weights, and proportional availability.

12.1.2.1 Initial Capacity

Considering that American shad passage efficiency has been measured to be as low as 25 percent (Exelon 2012d, p. 26), and the Project has passed an average of 1.1 million gizzard shad per season from 2012 - 2014 (SRAFRC 2013a, p. 7; Normandeau Associates 2013, p. 3; Normandeau Associates 2014b, p. 3), the Service estimates that as many as 4.4 million gizzard shad could potentially be in the tailrace annually attempting to move upstream. Based on the estimated biomass of gizzard shad attempting to pass upstream at the current time (4.4 million gizzard shad = 5.3 million pounds of fish) as well as allowing additional capacity for growth of American shad and river herring populations, the Service estimates a fish lift biomass capacity of at least 7 million pounds of fish per season needs to be provided immediately after license issuance. Two 6,500-gallon hoppers sharing the same holding pool, with a cycle time of 15 minutes,

provides capacity to move 7 million pounds of fish in a single season (assuming a peak day run of 5 percent of the seasonal run, a peak hour run of 15 percent of the peak day and hopper minimum water volume of 0.1 cubic feet per pound of fish). Based on projected numbers of a successful American shad restoration using the population model, a fish lift capacity of 7 million pounds of fish should provide safe passage at the Conowingo Project for approximately half of a fifty (50) year license term (assuming that the gizzard shad population does not grow larger than 4.4 million fish). For details on calculating fish lift capacity, refer to Appendix A.

12.1.2.2 Final Potential Capacity

The Service anticipates that restored populations of American shad and river herring may require passage capacity for up to 5 million American shad and 12 million river herring as well as other species at the Project. American shad and river herring would require 26 million pounds of hopper capacity in addition to the potential 5 million pounds that may be required by riverine species. However, the fishway prescription does not require construction of sufficient capacity to pass this number immediately; rather, capacity is added only as populations grow enough to impede efficiency in the event that fishway capacity becomes a bottleneck to future population growth. This fishway prescription incorporates a fish passage efficiency target and measures to assess fish passage efficiency throughout the term of the license in order to test for future conditions that would require corrective actions contained in this prescription. This fishway prescription includes measures providing for an ultimate fishway capacity of up to 18 million pounds per season (four 6,500-gallon hoppers with separate holding pools). The Department recognizes the potential lack of capacity for this current fishway prescription during the later years of American shad and river herring restoration, and may exercise its reservation of authority to address this issue at a later date if fishway capacity appears to be a limiting factor to population restoration, as reflected in declining upstream fish passage efficiency due to lack of fishway capacity.

12.1.3 Design Flows

The Licensee shall design new fishway(s) to ensure operation under river flows in the range of 6,330 cfs to 143,000 cfs. However, the Licensee shall not be required to operate the fishway(s) at flows greater than 113,000 cfs unless data available at the time demonstrates that operation of fishways at flows greater than 113,000 cfs is necessary to achieve the target efficiency. Furthermore, the fishways shall be designed with sufficient freeboard (or other protection) to minimize damage from river flows of up to the 50-year return interval.

12.2 Efficiency Criteria

The Susquehanna River Anadromous Fish Restoration Cooperative (SRAFRC 2010, 2013) and the Service (USFWS 2015b) have established upstream and downstream passage efficiency criteria for the Susquehanna River basin that are the basis for this

Prescription for Fishways. The Service defines upstream fish passage efficiency as the proportion of the fish in the Project tailwaters that successfully move through the fishway and continue upstream migrations, calculated as a percentage. Downstream fish passage efficiency is the proportion of the fish that approach the upstream side of the Project and survive unharmed as they pass the Project and continue downstream migrations. Definitions for fish passage terms used in this document are provided in Section 14. Where no numeric efficiency criteria were set, the Service's goal is to minimize Project impacts to migratory fish populations, with a goal of 100 percent passage and the understanding that no project is likely to fully achieve that goal despite application of the best available technology. Where the Service has information or modeling indicating that restoration may be achieved with less than 100 percent passage, the Service has been able to adopt numeric targets that will achieve restoration, and measures to reach those targets.

12.2.1 Criteria for Upstream American Shad Passage Efficiency[1]

The Licensee shall operate the Project to achieve the upstream passage efficiency criterion of passing 85 percent of all adult American shad that enter the Project tailwaters ("Target Efficiency"). The tailwaters of the project are defined as extending to the downstream tip of Rowland Island.

The Licensee can receive additional credit toward achieving the upstream passage efficiency criterion for adult American shad by trapping at Conowingo and transporting American shad to upstream of York Haven Dam and thus avoiding upstream passage impediments at the intervening hydroelectric projects on the Susquehanna River (see Section 12.7.2.1).

12.2.2 Criteria for Downstream American Shad Passage Efficiency

The Licensee shall operate the Project to achieve the downstream survival efficiency criterion of at least 80 percent of the adult American shad moving downstream past the Project.

The Licensee shall operate the Project to achieve the downstream survival efficiency criterion of at least 95 percent of the juvenile American shad moving downstream past the Project.

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[1] FWS has agreed to meet with the Licensee in 2043 if the upstream hydroelectric projects are not meeting their target passage efficiencies consistently by then, to discuss the passage efficiency criterion for American shad at the Conowingo Project based on then available data. The Service may consider adjusting the passage efficiency criterion at that time.

12.2.3 Criteria for Upstream River Herring Passage Efficiency
In accordance with sections 12.5 and 12.6, the Licensee shall operate the Project to minimize the impact of the Project on upstream migration for adult river herring that approach the Project tailwaters.

Numerical criteria for upstream river herring passage efficiency may be developed in the future when additional information about Susquehanna River herring populations becomes available. Any needed change in fishway requirements resulting from such new targets is not provided for in this Prescription, and would be the subject of independent administrative processes.

12.2.4 Criteria for Downstream River Herring Passage Efficiency
The Licensee shall operate the Project to achieve the downstream survival efficiency criterion of at least 80 percent of the adult river herring moving downstream past the Project.

The Licensee shall operate the Project to achieve the downstream survival efficiency criterion of at least 95 percent of the juvenile river herring moving downstream past the Project.

12.2.5 Criteria for Upstream American Eel Passage Efficiency
The Licensee shall operate the Project to minimize the impact of the Project on upstream migration for juvenile American eel that approach the Project tailwaters.
Numerical criteria for upstream American eel passage efficiency may be developed in the future when additional information about the Susquehanna River American eel population becomes available. Any needed change in fishway requirements resulting from such new targets is not provided for in this Prescription, and would be the subject of independent administrative processes.

12.2.6 Criteria for Downstream American Eel Passage Efficiency
The Licensee shall operate the Project to achieve the downstream survival efficiency criterion of at least 85 percent of the adult (i.e., silver) American eel moving downstream past the Project.

12.3 Seasonal Implementation of Fish Passage
The Licensee shall operate a fishway for upstream passage of anadromous fish daily during the American shad and river herring upstream *Migration Period* (Table 9). The Licensee shall operate the fish lift(s) daily during the upstream *Migration Period*, and begin releasing attraction flows at least one hour prior to the start of daily lift operations. The fish lift(s) will operate at the following times during the *Migration Period*: (1) in March, from 7 a.m. to 7 p.m.; (2) in April, from 6:30 a.m. to 7.30 p.m.; and (3) in May and June from 6:00 a.m. to 8:00 p.m.

The Licensee shall provide attraction flow and operate fish passage facilities for continuous upstream American eel passage (i.e. 24 hours per day) during the entire upstream *Migration Period* (Table 9).

The Licensee shall ensure prior to the start of the *Migration Periods* that all mechanical elements of the fishway(s) are working properly. The Licensee shall repair, maintain, and test fishway(s) as necessary in advance of the migration period, in accordance with the *Fishway Operation and Maintenance Plan* (FOMP) so as to begin operations when required. The Licensee shall maintain and operate fishways to maximize fish passage effectiveness throughout the upstream and downstream *Migration Periods* (Table 9).

Table 9. Upstream and downstream *Migration Periods* for species covered in this Modified Prescription for Fishways.

Species	**Upstream Migration Period[1]**	**Downstream Migration Period[1]**
American shad	Starting when river temperature reaches 50 º F, until river temperatures rise above 72 º F for four consecutive days, but ending no earlier than June 1, and no later than June 15[2]	July 1 through November 15 (juv.) May 1 through July 1, as long as river temperature is above 65 º F[2] (adult)

Species	**Upstream Migration Period[1]**	**Downstream Migration Period[1]**
Alewife and blueback herring	Starting when river temperature reaches 48 º F for three consecutive days and no earlier than March 1, until river temperatures rise above 72 º F for four consecutive days, but ending no earlier than June 1, and no later than June 15[2,3,4]	June 15 through October 14 (juv.) April 15 through July 1 (adult)
American eel	May 1 through September 15[5]	September 15–February 15, whenever river temperature is above 37 ºF for 4 consecutive days[2,6]

[1] Subject to notice and comment, any of these migration periods may be changed during the term of the license by the Department, based on new information, and in consultation with the other fishery agencies and the Licensee. At any time during the new license term, Licensee may submit new information to the Department in support

of a request to change the migration periods. In the event the Department seeks to require downstream passage by means other than through the units, the downstream migration periods automatically will be reviewed jointly by the Department, other fishery agencies, and the Licensee.

[2] Water temperatures shall be monitored once daily at 11 a.m. at Monitoring Station 643 (Shures Landing) or some other location agreed upon by the Licensee and the Service.

[3] This migration period is based on alewife migration timing from other tributaries to the Chesapeake Bay (Sutherland 2000, p. 9; Eyler et al. 2002, p. 59; Slacum et al. 2003, p. 13).

[4] The Service recognizes that, because of factors outside of the Licensee's control, safety considerations may preclude the Licensee's personnel from performing duties necessary to commence fish passage measures at Conowingo by the commencement date. When such conditions arise, the Licensee shall notify the Service and the Service and the Licensee shall consult regarding the anticipated schedule for commencing such measures.

[5] This initial operational period is based on preliminary data on American eel migration at Conowingo Dam (Minkkinen and Park 2014, Figure 4).

[6] This initial operational period is based on preliminary data on American eel migration timing from other tributaries to the Chesapeake Bay (Eyler 2014, pp. 44-46). Results from the "Downstream American Eel Effectiveness Monitoring" (Section 12.7.5) shall be used to further refine this migration period.

12.4 Fishway Operation and Maintenance Plan

The Licensee shall develop and submit a Fishway Operation and Maintenance Plan (FOMP) to the Service, FERC, and resource agencies (states of Maryland and Pennsylvania, Susquehanna River Basin Commission, and National Marine Fisheries Service) for review and approval by the Service. The Licensee shall keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year. If the Service requests a modification of the FOMP, the Licensee shall respond to the requested modification within 30 days of the request by filing a written response with the Service and serving a copy of the response on FERC and the resource agencies.[2] Any modifications to the FOMP by the Licensee shall require approval by the Service and, if necessary, FERC prior to implementation.

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[2] Requested modifications to the FOMP will not include changes to turbine operations. Any modifications to turbine operations shall be implemented only pursuant to Section 12.5.4.

The FOMP shall include:

- Schedules for routine maintenance, pre-season testing, and the procedures for routine fishway operations, including seasonal and daily periods of operation, and associated dam and powerhouse operational measures needed for proper fishway operation;

- Details of how the Project shall be operated during the migration season to provide for adequate fish passage conditions, including:
  - pre-season preparation and testing;
  - sequence of turbine start-up and operation under various flow regimes to enhance fishway operation and effectiveness;
  - debris management at the fishway entrance, guidance channels, and the exit;
  - plant operations to provide near- and far-field attraction flows required for the fishway zone of passage in the tailrace;

- Trap and transport logistics plan and design plans for west and east fish lift modifications needed for trap and transport, including provisions for planning trap and transport logistics so as to avoid, to the extent possible, trapping a population unrepresentative of the migrating population as a whole.

Trap and transport logistics plan for American eel;[3]

- Standard operating procedures for monitoring and enumerating fish passage by species, including the American eel passage facilities;

- Standard operating procedures for collecting biological samples from target species to assess restoration efforts;

- Standard operating procedures for monitoring and reporting operations that affect fish passage;

- Standard operating procedures in case of emergencies and Project outages to first, avoid, and second, minimize, potential negative impacts on fishway operations and the effectiveness of upstream and downstream passage for target species; and

- Plans for post-season maintenance, protection, and winterizing the fish lifts and eel passage facilities.

[3] The Licensee can incorporate by reference American eel plans and logistics developed pursuant to the Eel Passage Advisory Group.

The Licensee shall provide written documentation to the Service, FERC, and resource agencies that all fishway operational personnel have reviewed and understand the FOMP and it shall be signed by the operations manager of the Project. Copies of the approved FOMP and any modifications shall be provided to the Service, FERC, and resource agencies on an annual basis.

By December 31 of each year, the Licensee shall provide an annual report to the Service, FERC, and resource agencies detailing: the implementation of the FOMP, including any deviations from the FOMP and a process to prevent those deviations in the future; any proposed modifications to the FOMP, or in the case of emergencies or project outages, the steps taken by the Licensee to minimize adverse effects on fisheries including any proposed modifications to those steps to further enhance their effectiveness in the future; and operational data for both fishways and the Project to allow the Parties to examine correlations between particular operational patterns and successful or unsuccessful fishway operation, and to confirm, once an operational regime with known effectiveness is settled upon, that the Project continues to operate under that regime. The Service understands that details of operation constitute confidential business information, and agrees to protect them from disclosure as such to the extent it is able to do so by law.

The annual report shall also include:

- Description of routine maintenance as well as repairs made to the fishways or eel passage facilities during the previous fish passage season;
- Average daily flows at the Marietta gauging station;
- Daily water temperature and dissolved oxygen readings[4] in the fish lift and tailwater areas;
- Hourly individual turbine unit operations and discharge, hourly total discharge from the powerhouse, hourly discharge over the spillway, and hourly passage counts of all fish species at each hopper;
- Daily counts of American eel collected at each facility;
- Thirty-minute recordings of total flow discharging from behind the hopper, total flow discharging from the attraction water supply diffuser, water surface elevation immediately upstream from the entrance gates, water surface elevation at the tailwaters, elevation to the crest of the entrance weir gates, and any irregularities such as the identification of a visible boil in the zone over the floor diffusers;
- Number of fish by species trapped and transported, including date, time, and location of release;

[4] The Licensee shall provide dissolved oxygen readings, commencing each year when the Project's NPDES permit requires annual data collection to begin, through the end of the upstream migration period

- Weekly collection of a subsample of biological information from passing adult American shad and river herring consisting of sex ratio, spawning condition, length, weight, and age.

In addition to the annual report, the data for daily flows, water quality, project operations, fishway operations and fish passage as described above shall be recorded in a database during the fish passage season and the Service shall be provided open access to that database. Data shall be entered into the database no later than one week after collection. These data shall be used to assess impacts of river conditions and hydropower operations on successful fish passage through the lifts, with the goal of achieving a better diagnosis of potential fish passage issues at the Project. The operational data will not provide the Service with an independent basis to require modifications and improvements beyond those that may be implemented through the process described below.

By January 31 of each year, the Licensee shall meet with the Service and the Susquehanna River Anadromous Fish Restoration Cooperative (SRAFRC) to discuss the FOMP (and FEMP – See Section 12.7.1). This meeting shall occur no later than January 31 of each year unless the Licensee and the resource agencies agree on a different date. At this annual meeting the Licensee shall discuss with the Service and SRAFRC the fish passage results from the previous year, review regulatory requirements for fish lift and eel passage operations, and discuss any upcoming modification or testing the Licensee shall conduct during the upcoming season.

12.5 Sequencing of Upstream Fish Passage Construction and Implementation

Timely construction, operation, and maintenance of fishways are necessary to ensure their effectiveness and to achieve restoration goals. Therefore, the Licensee shall (1) notify, and (2) obtain approval from the Service and FERC for any extension of time to comply with conditions the Department prescribes.

12.5.1 Trap and Transport of American Shad and River Herring

The Licensee has agreed to and will trap and transport American shad and river herring to areas upstream of York Haven Dam annually. The number of American shad and river herring trapped and transported annually will be up to 80 percent of the number of each species captured in the fish lifts up to a maximum of 100,000 of each species annually. Trap and transport operations shall continue until the Licensee can achieve a measured 85 percent upstream passage efficiency for American shad at the Project without reliance on the trap and truck credit provided for in Section 12.7.2.1.

12.5.2 Initial Construction

Unless otherwise stated, the Licensee shall implement the items defined in Section 12.6.1 "*Initial Construction Items*" within 3 years following license issuance. Construction shall

be conducted in a way as to allow for trap and transport operations as well as volitional passage at the EFL to continue uninterrupted during this time period.

12.5.3 Operation in the First Passage Season after License Issuance

Within 1 year of license issuance, trap and transport operations from the EFL and WFL shall begin. A total of 80 percent of the run, up to 100,000 American shad and 100,000 river herring per year shall be trapped and transported to the mainstem Susquehanna River upstream of York Haven.

12.5.4 Efficiency Testing and Triggering of Subsequent Modifications

In the 5th year after license issuance, the Licensee shall begin the "*Initial Efficiency Test*" of fish passage at the Project. The Licensee shall conduct the *Initial Efficiency Test* as defined in Section 12.7.2 in order to evaluate passage performance relative to upstream efficiency criteria for American shad and river herring as described in Section 12.2. In the 5th year after license issuance, the Licensee shall also assess mortality of American shad during the trap and transport process.

If at the end of the *Initial Efficiency Test*, the combined results of the three-year study (the combination of measured efficiency of the *Initial Efficiency Test* and the *Trap and Transport Credit* resulting in an *Adjusted Efficiency*) meet the *Target Efficiency* of 85 percent for upstream passage of American shad, the Licensee shall operate the Project using the FOMP implemented during the *Initial Efficiency Test*. The Licensee shall then conduct a two-year *"Periodic Efficiency Test"* as defined in Section 12.7.2 in every 5th year thereafter to ensure that the upstream-prescribed efficiency criterion continues to be met through the term of the license.[5]

If at the end of the *Initial Efficiency Test* or after any *Periodic Efficiency Test* thereafter during the license term, or after any subsequent "*Post-Modification Efficiency Test*" as defined in Section 12.7.2, the study results indicate that the Licensee is not meeting the required *Adjusted Efficiency,* the Licensee shall conduct an evaluation of the radio telemetry data and any other data available to the Service and/or the Licensee to determine if the passage inadequacy is related to fishway attraction or fish lift capacity. Concurrent with the submission of the final report from an efficiency study, the Licensee shall propose a course of action most likely to achieve the *Target Efficiency*. Both the Service and the Licensee have agreed on a tiered list of options and the types of either attraction or capacity problems which the tiers may address. If the reason for not achieving the *Target Efficiency* is insufficient fishway attraction, then the Licensee shall

[5] At the Licensee's election, and with Service concurrence, the Periodic Efficiency Test may be extended an additional 1 year. Only after the efficiency tests are completed will the Licensee be required to propose, as may be necessary, a course of action to achieve the Target Efficiency.

follow the actions in Section 12.6.2. If the reason for not achieving the *Target Efficiency* is lack of fish lift capacity, then the Licensee shall follow the actions in Section 12.6.3. In the event that both fishway attraction and fish lift capacity are limiting factors to achieving the *Target Efficiency*, the Licensee shall address items listed under both sections 12.6.2 and 12.6.3, but only to the extent both attraction and capacity measures are necessary to achieve the required *Target Efficiency*. The list of measures in sections 12.6.2 and 12.6.3 is not exclusive and does not preclude either party from identifying and proposing other measures commensurate with the required level of improvement and corresponding tier. The Service shall react to the Licensee's proposal for improving fish passage efficiency within 90 days of receipt. It may:

A. Say nothing, in which case the Licensee shall proceed with its proposed course of action;
B. Agree affirmatively with the Licensee's proposed course of action, in which case the Licensee shall proceed;
C. Propose a different option, not on the tiered list of options, which the Licensee shall proceed with if it agrees;
D. Require, instead, that the Licensee implement an option or options from the appropriate (or lower numbered) tier to address each problem. The Service will choose that option(s) it deems most likely to achieve the *Target Efficiency*. The Service may select an option from a higher-numbered tier only if all options from an appropriate or lower-numbered tier have been implemented. If two or more options appear equally likely to achieve the efficiency criterion, the Service will present the Licensee with the choice, and the Licensee may proceed with whichever it prefers. The Service shall explain, in writing, its reasons for finding that its choice(s) is more likely than the Licensee's to lead to the desired passage efficiency. The Licensee shall then proceed with the selected course of action.

12.5.5 General construction requirements.

All functional (i.e., 30 percent, 60 percent, and 90 percent) and final design plans, operation and maintenance plans, construction schedules, and hydraulic model studies for the new fishways or modifications to existing fishways described herein shall be developed in consultation with the Service and submitted to the Service and FERC for approval. The planning and design process for structures shall generally include CFD modeling prior to construction and post-construction shakedown and testing to confirm modeling.

12.6 Fish Passage Facilities

12.6.1 Initial Construction Items

East Fish Lift Modifications – The Licensee shall modify the EFL facility to provide 900 cfs attraction flow to the EFL. Modifications to the EFL facility will include replacing spillway gates A & B, replacing the crowder system, addressing structural vibration

issues, replacing diffuser gates A and B, replacing the control system, and upgrading the electrical system to allow for a 15 minute lift cycle.

Replace the current 3,300-gallon hopper with two 6,500-gallon hoppers at the EFL
The Licensee shall remove the current hopper and install two 6,500-gallon hoppers within the existing superstructure of the EFL. One hopper will replace the current 3,300-gallon hopper and the second hopper will be located immediately upstream from the current location of the existing EFL hopper (see Figure 10). Access to both hoppers will be provided by the current entrance gates (A, B, and C) and the hoppers will share the same holding pool.

Trap and Transport Facilities at the EFL
The Licensee shall reduce cycle time at each hopper at the EFL to be able to lift fish four times per hour and complete modifications to the EFL structure to allow for trapping and sorting fish at the EFL facility and transporting them to the western side of the dam to a truck for transport upstream. Modifications to the EFL shall include two new sorting tanks; a loading tank; and a hy-rail truck and forklift, or functionally similar equipment, to facilitate movement of American shad from sorting tanks at the EFL to the west shore. These improvements shall be accomplished without losing a season of the passage provided by the EFL.

Trap and Transport Facilities at the WFL
WFL modifications shall be made to facilitate trap and transport including: decreasing lift cycle time by replacing the crowder linkage system and raising the elevation of the sorting tank(s), and providing a mechanism to allow for direct sluicing of fish into tanks mounted on the transport vehicle. These initial improvements shall be accomplished without losing a season of the passage provided by the EFL or trap and transport from the WFL.

Provide a Zone of Passage (ZOP) to the Fish Passage Facilities
The Licensee shall construct and maintain structures, to provide American shad and river herring a ZOP (i.e., route of passage) as described in this section.

In advance of any ZOP development and/or construction, the Service and Licensee will review CFD modeling results from the tailrace. The Licensee shall run the model under a predetermined number of structures arrangements (e.g., different angles, different spacing between the weirs, different weir slopes). In consultation with the Service, the Licensee shall choose to construct the configuration of structures that provides the most conducive hydraulic conditions for fish passage of river herring. The area to be considered for potential ZOP improvements includes approximately 2,500 feet on the west bank and 3,500 feet on the east side of Rowland Island. Based on CFD modeling results that analyze discharge velocities and turbulence, the Licensee shall provide stone weirs,

and/or other suitable alternatives or measures that provide a contiguous zone of passage (ZOP) from the southern tip of Rowland Island to one or both of the lifts. The Licensee shall install up to ten stone weirs, with the option of considering other configurations for structures, so long as the total cost does not exceed the cost estimated for up to ten weirs.[6] Model results will guide the placement and formation of these structures to provide for the hydraulic conditions necessary for the weakest swimmers (river herring) to reach the lifts. Specifically, the ZOP must be designed to maintain instantaneous velocities below 3 feet per second, separated only by brief regions of higher velocity that river herring may traverse in seconds at burst speeds up to 6 feet per second, over the full range of operational flows for the EFL, and in all generation scenarios.

After ZOP construction is completed, the Licensee shall assess the ZOP for upstream migrating river herring under the full range of the current fish passage design flows (i.e., up to 113,000 cfs of river flow).

Eel Passage – Eastern Location – The Licensee shall, consistent with the Eel Passage Plan established by Muddy Run license, evaluate potential trapping locations for American eel on the east side of Conowingo Dam including Octoraro Creek starting in May of the first calendar year after license issuance or immediately if license issuance occurs during the upstream American eel migration period. The plan and schedule for implementation of temporary and permanent eel passage facilities and other design criteria shall follow requirements established by the Muddy Run license and be approved by the Service and FERC following consultation with the Licensee and the respective resource agencies. The Licensee shall operate any temporary or permanent eel passage facility continuously (24 hours per day, 7 days per week) during the American eel Upstream Migration Period and shall submit proposed stocking locations for collected American eels to the Service and resource agencies for review and approval by the Service prior to beginning such measures.

Eel Passage – Western Location
The Licensee shall conduct a trap and transport operation for American eels at the west side of Conowingo Dam beginning immediately after license issuance. The eel passage facility shall be designed to provide volitional passage for American eels no later than

[6] The estimated cost of ten weirs plus a contingency of 30% is no more than $2.3 million in 2016 dollars.

2031, and will be sited taking into consideration the potential for a new West Fish Lift.[7] Design criteria shall follow the components described in the Muddy Run license. The Licensee shall conduct trap and transport of American eels until 2030, and will implement volitional American eel passage starting in the 2031 season. The Licensee shall operate the eel passage facility continuously (24 hours per day, 7 days per week) during the American eel upstream Migration Period. The Licensee shall submit proposed stocking locations for collected American eels to the Service and resource agencies for review and approval by the Service prior to beginning trap and transport of American eels.

12.6.2 Improving Attraction Efficiency

Included is a list of physical and operational modifications to the Project intended to address observed deficiencies in fishway attraction efficiency. The tiered process for improving attraction efficiency is based on passage efficiency during the most recent efficiency test. The items included in the different tiers were developed to be commensurate with the degree of shortfall from the *Target Efficiency*. If, based on the *Adjusted Efficiency* of the current test, all appropriate options from the corresponding tier, including any option proposed by the Licensee and approved by the Service, have been exhausted, the items from the next highest numbered tier may be required, regardless of the current project passage efficiency. More than one item from a tier may be completed at one time depending on the degree of the *Adjusted Efficiency* shortfall.

12.6.2.1 Improving Attraction Efficiency – Tier I (*Adjusted Efficiency 70*%-85%)

In the year following any failure by the Licensee to reach the *Target Efficiency* due to inadequate fishway attraction, the Licensee shall implement one or more of the modifications to Project operations and facilities described in this section.

Correct any Technical Operational Problems and/or Implement Internal Modifications

The Licensee shall correct any technical operational problems that may have been detected during the fish passage season and/or implement internal modifications to the West and/or East fish lift (e.g., energy dissipation, hydraulic attraction).

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[7] Consistent with the Eel Passage Plan established by the Muddy Run license, construction of the volitional passage facility will eliminate the Licensee's obligation to participate in the trap and transport program once the volitional upstream eel passage facility is operational. However, if the upstream eel trap and transport and periodic evaluation program continues beyond 2030, the Licensee will continue to provide access to the Conowingo eel collection facilities for as long as the program continues. The Licensee, however, shall bear no cost responsibility for the trap and transport and periodic evaluation program until 2046, at which time cost responsibility shall be shared among all participants in the program.

Implementation of preferential turbine operating schemes
The Licensee shall develop a turbine operation scheme that can range from simply first on/last off to modification of specific Francis and Kaplan unit operation to ensure that fish are able to successfully locate and access the fish lift entrances.

12.6.2.2 Improving Attraction Efficiency – Tier II (*Adjusted Efficiency* 55%-69%)
Within 2 years following any failure to meet the *Target Efficiency* due to inadequate attraction to the fishway, the Licensee may implement either one of the modifications to the Project facilities described in this section to reach upstream passage efficiency.[8]

Relocate EFL Entrances A & B
If the CFD modeling results indicate modifications to Entrances A & B will improve guidance to and accessibility of the lift entrances, then the Licensee shall extend the entrance channel at entrance A with two 45-degree turns in the fish passage facility channel, so as to discharge into the area behind the catwalk piers and upstream from the Kaplan turbine discharge/boil. The attraction flow should be effective along the catwalk and through the space between the piers (Figure 10, USFWS 2013h). The Licensee shall also modify the existing entrance B so that the centerline of the discharge plume will be at a 45-degree angle to the river flow.

Construct a new Entrance D with a separate crowder and holding pool
The Licensee shall build a new additional entrance, Entrance D, with a separate crowder and holding pool (Figure 10). The hopper will be accessed from the new entrance and through a proposed collection gallery that will span the full length of the Kaplan turbine section of the powerhouse. Entrance D and the collection gallery are intended to provide access to the EFL from the Francis turbine section of the powerhouse. The new collection gallery will be located against and along the powerhouse wall. This improvement will not be required by the Service to be operational before year 15 of the license.

12.6.2.3 Improving Attraction Efficiency -Tier III (*Adjusted Efficiency* less than 55%) Following any failure by the Licensee to reach upstream passage efficiency due to inadequate fishway attraction, the Licensee may implement one or more of the modifications to Project operations and facilities described in this section.

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[8] The Service may require relocation of Entrances A&B and, if the Adjusted Efficiency continues to be between 55%-69%, Entrance D at a later point, but then, per Tier III (and consistent with the "not before" dates), may only require the AWS, not the WFL. Alternatively, the Service may require the relocation of Entrance A&B, and in subsequent cycles proceed to choose the WFL (again, consistent with the "not before" dates) if (a) the Adjusted Efficiency is below 55% and Entrance D has not been constructed or (b) the Adjusted Efficiency is between 55%- 69% and the Service determines that Entrance D is not likely to achieve the efficiency criterion.

Construct an Auxiliary Water Supply at the EFL
The Licensee shall construct a new AWS stilling basin and system so the energy from up to 4,300 cfs can be dissipated and incorporated into effective attraction flows emanating from the multiple fish lift entrances. This improvement will not be required by the Service to be operational before year 25 of the license.

WFL Construction
Licensee shall construct a new WFL (as described below, in parts 1-5) in the west corner of the powerhouse tailrace. The Licensee shall operate the new WFL as a tailwater to headpond fish lift with a collection facility for fish sampling that, at the Licensee's option, could be used as a fish trap and transport facility. This improvement will not be required by the Service for reasons of attraction efficiency to be operational before year 25 of the license, and only if neither Entrance D nor the EFL AWS stilling basin and system have been constructed. If the Service requires construction of the WFL for reasons of attraction efficiency, it has agreed not to subsequently require the EFL AWS stilling basin and system under this Prescription.

WFL Construction – Part 1
The Licensee shall construct a facility that provides the capability of enumerating fish passage by species, allows for the collection of and holding of fish for biological sampling, and that can also be used for trapping and transporting American shad and available river herring per year, with the potential for captured fish to be transported upstream of the York Haven Dam.

WFL Construction – Part 2
The Licensee shall install two 6,500-gallon hoppers, with separate crowders, in the new WFL, capable of operating simultaneously.

WFL Construction – Part 3
The Licensee shall construct the WFL to have the ability to provide up to 5 percent of hydraulic capacity of the Project (or up to 4,300 cfs) for attraction flow to the fishway entrance(s). During the design phase and during preconstruction, the Licensee shall conduct computational fluid dynamics (CFD) modeling and other supporting analysis to develop appropriate fish lift entrance attraction flows, velocities, and hydraulic conditions. The Licensee shall operate the WFL to provide attraction flow of at least 2,600 cfs (3 percent of hydraulic capacity of the Project) during the Upstream Migration Period for American shad and river herring. With the goal of improving fish passage efficiency at the WFL following initial start-up of the new WFL, the Service may require the lift operator to modify operation of the fish lift, the allocation of flows through its Auxiliary Water System (AWS), and/or the total amount of flow being supplied to the WFL (up to a maximum of 4,300 cfs or 5 percent of the Project hydraulic capacity).

WFL Construction – Part 4
The Licensee shall design and construct an AWS that meets Service criteria for energy dissipation of the attraction flow while maintaining water quality standards.

WFL Construction – Part 5
The Licensee shall conduct an assessment of the ZOP downstream of the WFL to ensure that it continues to be passable over the range of flows in which the WFL is operational.

12.6.3 Improving Fish Lift Capacity

Included is a list of physical and operational modifications to the Project intended to address possible deficiencies in fish lift capacity. The tiered process for improving capacity is based on passage efficiency during the most recent efficiency test. The items included in the different tiers were developed to be commensurate with the degree of missing the required 85 percent passage efficiency criterion. If, based on the *Adjusted Efficiency* of the current test, all options from the corresponding tier have been exhausted; the items from the next highest numbered tier may be required, regardless of the current project passage efficiency. Implementation of modifications in the capacity tiers is independent of the implementation of similar items used to improve attraction efficiency in section 12.6.2. Both attraction and capacity improvements can be required simultaneously if deemed appropriate from the most recent study results, but only to the extent both improvements are needed to meet the *Target Efficiency*.

12.6.3.1 Improving Fish Lift Capacity - Tier I (Adjusted Efficiency 70% – 85%)

Within 2 years following any failure by the Licensee to reach upstream passage efficiency due to inadequate fishway capacity, the Licensee shall implement the modification to Project facilities described in this section.

Construct a new Entrance D with a separate crowder and holding pool
The Licensee shall build a new additional entrance, Entrance D, with a separate crowder and holding pool (Figure 10). The new hopper will be accessed from the new entrance and through a proposed collection gallery that will span the full length of the Kaplan turbine section of the powerhouse. Entrance D and the collection gallery are intended to provide access to the EFL from the Francis turbine section of the powerhouse. The new collection gallery will be located against and along the powerhouse wall. This improvement will not be required by the Service under this Prescription to be operational before year 15 of the license.

12.6.3.2 Improving Fish Lift Capacity - Tier II (*Adjusted Efficiency* less than 70%)

Within 3 years following any failure by the Licensee to reach upstream passage efficiency due to inadequate fishway capacity, the Licensee shall implement the modifications to Project facilities described in this section.

WFL Construction
The Licensee shall construct a new WFL (as described in section 12.6.2.3) in the west corner of the powerhouse tailrace. The Licensee will operate the new WFL as a tailwater to headpond fish lift with a collection facility for fish sampling that, at the Licensee's option, could be used as a fish trap and transport facility. This improvement will not be required by the Service under this Prescription to be operational for reasons of capacity before year 25 of the license.

12.7 Fish Passage Effectiveness Monitoring

Efficiency testing of both upstream and downstream fish passage, and determining mortality rates of American shad when using trap and transport are critical to evaluating the success of fish passage structures and operations, diagnosing problems, and determining both when modifications are needed and what modifications are likely to be effective. These measures are essential to ensuring the effectiveness of fishways over the term of the license, particularly in cases where the increasing size of fish populations as a result of improved upstream passage may also lower upstream fish passage efficiencies due to migrating fish crowding and exceeding daily or annual lift capacity, thus keeping some fish from successfully passing the project and limiting net effectiveness.

12.7.1 Fishway Effectiveness Monitoring Plan

The Licensee shall develop a Fishway Effectiveness Monitoring Plan (FEMP) in consultation and with the approval of the Service, and will submit the FEMP to the FERC for approval within 6 months of license issuance. The FEMP will contain the plans for the studies described in Sections 12.7.2 through 12.7.5. If the Service requests a modification of the FEMP, the Licensee shall file a written response with the Service within 30 days and send a copy of the response to FERC and resource agencies. Any modifications to the FEMP by the Licensee will require approval by the Service and, if necessary, FERC prior to implementation.

The Licensee shall submit yearly interim study reports to the Service and FERC following the conclusion of each study year. The interim and final reports for upstream passage studies will be submitted to the Service by December 31st of each study year. The interim and final reports for downstream passage studies will be submitted to the Service by August 1 following each study year. The final study report will include results for each life stage and type of study conducted with a determination of the Licensee's success or failure in achieving the passage efficiency criteria established in Section 12.2. In conjunction with submitting the final study report(s), the Licensee shall also provide electronic copies of all data collected from studies to the Service.

The Licensee shall meet with the Service and the Susquehanna River Anadromous Fish Restoration Cooperative (SRAFRC) to discuss the FEMP and FOMP. This meeting will

occur no later than January 31 each year unless the Licensee and the Service agree on a different date. At this annual meeting the Licensee shall discuss with the Service and SRAFRC the fish passage results from the previous year, review regulatory requirements for fish lift and eel passage operations, and discuss any upcoming modification or testing the Licensee proposes for the upcoming fish passage season.

12.7.2 Initial Efficiency Test, Post-Modification Efficiency Tests, and Periodic Efficiency Tests for Upstream Passage of American Shad and River Herring

The *Initial Efficiency Test* and any *Post-Modification Efficiency Tests* will consist of a three-year fish tagging and monitoring study of American shad and river herring using radio telemetry, or other best tracking technology. The *Periodic Efficiency Tests* will consist of a two-year American shad tagging study using the same techniques unless the Licensee elects, with Service concurrence, to conduct an additional one year of study.

The *Initial Efficiency Test* will begin in the 5th passage season after license issuance. The *Post-Modification Efficiency Test* will begin in the first fish passage season immediately following any required modification implemented from the tiers. The *Periodic Efficiency Test* will be conducted on every 5th year after a previous study determines that the *Adjusted Efficienc*y of the project is achieving 85 percent passage efficiency for American shad. Early Periodic Efficiency Tests may be delayed by up to two years to coincide with the schedule for tests at Muddy Run agreed upon in the 2015 Settlement Agreement between the Service and the Licensee.

These studies will use sufficient numbers of test fish to account for drop-back and other fish loss.

These fish will be collected from a downstream location, and be representative of the migrating population as a whole. Specific details of the telemetry studies such as sample sizes, collection of and release location of tagged American shad and river herring, arrangement of telemetry receivers, and appropriate statistical analyses shall be developed by the Licensee in conjunction with the Service and other resource agencies.

The Licensee shall submit final study plans to the Service and FERC for review and approval prior to initiating any study.

12.7.2.1 Trap and Transport Credit for American Shad

The Licensee will receive additional credit toward the upstream passage efficiency criterion for adult American shad that are trapped and transported upstream of York Haven Dam. The Service will recognize the benefits to the species by giving credit towards the calculation of whether the efficiency criterion for upstream shad passage is met, due to the value to restoration of avoiding the passage of impediments at the upstream hydroelectric projects.

Details of the credit toward the efficiency criterion are provided in Appendix B. Part of the calculation of the credit toward efficiency criterion requires an estimate of the mortality associated with trap and transport operations. In the 4th year after license issuance, the Licensee shall work with the Service and other resource agencies to develop a one-year study to estimate the mortality of fish which are trapped and transported to areas upstream of York Haven Dam.

Such a study will include assessment of immediate mortality (mortality occurring during transport) as well as delayed mortality (mortality occurring during some time period after release). The results of the study will be used to modify, as necessary, the mortality input utilized in the trap and truck credit. The Service's proposed methodology for this study is included in Appendix C; however the Licensee and the Service have not agreed upon a final methodology and final study design is expected to take place post-licensing.

12.7.3 Upstream American Eel Effectiveness Testing

Unless the Service and the Licensee agree that no effective technology is available to enable such testing, the Licensee shall conduct an upstream efficiency study on juvenile American eel at the WFL facility in the year immediately following license issuance. The study will determine the American eel upstream passage efficiency of the eelway throughout the upstream migration season. The study will consist of two components, including determining attraction efficiency to the facility and passage efficiency of the facility once an eel enters the structure. Efficiency studies will be repeated following any modifications to the operation or physical structure to evaluate the relative success of the modifications. The Licensee shall provide an annual report on the efficiency study to the Service by December 31 of the study year.

12.7.4 Downstream Adult and Juvenile American Shad and River Herring Effectiveness Testing

The Licensee shall conduct downstream passage effectiveness studies of American shad and river herring in 2027 in coordination with the Service. As part of the Conowingo FEMP for downstream passage, the Licensee will evaluate both juvenile and adult life stages using a study protocol developed cooperatively with the Service to include a Conowingo Pond route of passage study. A route of passage study will be conducted to determine the routes chosen by downstream migrating fish through the Project under various generation conditions to determine if there are preferred routes of passage at the dam. The route of passage study will be conducted for 2 years to account for inter-annual variation in flow conditions. The Licensee will have the option to extend the route of passage study for an additional year.

In addition to the route of passage study, a one year separate and discrete passage study for both adult and juvenile American shad and river herring shall be conducted to

estimate survival through the Kaplan and Francis turbines under best gate efficiency. This study will commence in 2027. The effects of barotrauma during turbine passage will be included as part of the turbine survival studies for all life stages when possible. Results of the studies will be used to determine through-Project survival (i.e. via spill, Francis turbines, Kaplan turbines, etc.), and immediate and latent mortality for each route to achieve the passage criteria.

In the event the Licensee is unable to achieve the efficiency criteria for survival based on the results of the downstream studies, the Department may exercise its reservation of authority to address the issue.

12.7.5 Downstream American Eel Effectiveness Monitoring

The Licensee shall conduct or participate in two separate studies on downstream migrating American eel in the Susquehanna River. The studies can be done concurrently or separately, and will be conducted in conjunction with the American eel downstream studies undertaken by the Licensee of the Muddy Run Hydroelectric Project. The Licensee shall initiate studies when the Service determines that sufficient numbers of downstream migrants can be collected in the upper watershed to conduct a valid study.

First, the Licensee shall participate in a basin-wide study coordinated by the Service to determine timing of downstream migration of American eels in the Susquehanna River (see USFWS 2014d). To complete this study, the Licensee shall contribute $75,000 to the Service to collect and tag fish for use in the basin-wide study. Radio telemetry monitoring will be conducted by the Licensee year-round for 3 consecutive years.[9]

In addition to the basin-wide migration timing study, the Licensee will conduct a study at Conowingo Dam to determine migratory delay, route of downstream passage (i.e. via spill, Francis turbines, Kaplan turbines, etc.), and immediate and latent mortality for each route. If a sufficient number of tagged fish encounter the Project, a route of passage study can be done concurrently with the basin-wide downstream migration study using the same tagged eels assuming appropriate tag technology is available to assess latent mortality of those fish during the study.

In the event the Licensee is unable to achieve the efficiency criterion for survival based on the results of the downstream studies, the Department may exercise its reservation of authority to address the issue.

12.8 Fishway Inspections

[9] Mobile tracking and data analysis for this study will be the responsibility of the Service. Annually, the Service will share with the Licensee all data collected as part of the basin-wide study.

The Licensee shall provide Service personnel and other Service-designated representatives, timely access to the fish passage facilities at the Project and to pertinent Project operational records for the purpose of inspecting the fishways to determine compliance with the Fishway Prescription.

Appendices to U.S. Department of the Interior Modified Fishway Prescription for the Conowingo Hydroelectric Project No. 405 (filed June 8, 2016)

Appendix A. Calculation of Fishway Capacity for a 6,500-Gallon Hopper

Biological Parameters	λ_m= 0.052 (season/day)	Season-to-Day run compression coefficient; empirically determined designed parameter
	β=0.15 (day/hr)	Hour-to-Day run compression coefficient; empirically determined design parameter
	T=15 min	Lift cycle time (recommended)
Hopper Size	Vol_H=868.9ft^3	Estimate of proposed hopper volume (6,500 gallons)
	V_{fH}=0.1 (ft^3/lbf)	Volume required per fish-pound; USFWS criterion; for lift times greater than 15 minutes, a 30 percent increase in V_{fH} is recommended

Allowable peak biological loadings

Flb_h= (Vol_H/v_{fH}*T)	Flb_h= 34,756 lbf/hr	Allowable loading of fish in pounds per peak hour
Flb_d=Flb_h/ β	Flb_d= 231,706 lbf/day	Allowable loading of fish in pounds during the peak day

$Flb_s = Flb_d / \lambda_m$	Flb_s= 4,455,897 lbf/season	Allowable loading of fish in pounds during an entire season

Appendix B. Calculating Trap and Transport Credit

Credit Towards an Overall Efficiency Criterion (85 percent of the fish entering the Conowingo Tailrace)

For a given number of shad trapped and transported we can estimate the number that would need to pass Conowingo Dam via the fish lift to result in the same number of spawners upstream of York Haven Dam. This number is termed "lift equivalents" (L_e) and is calculated as:

$$[1] \qquad L_e = (\Sigma_{i=1}^{n} TT_i) \cdot (1 - TT_m)/D$$

Where TT_i is the number trapped and transported each year during a single or multi-year study to measure passage efficiency, and TT_m is the mortality associated with trapping and transporting shad. Harris and Hightower (2011) estimated mortality of trapped and transported shad in the Roanoke River to be 15 percent. However, SRAFRC (1997) gave estimates of mortality for holding shad prior to trap and transport, mortality during the transport, and delayed mortality following release. When all these factors are considered, the overall mortality associated with trap and transport operations was 6 percent, which was used in this model. The denominator (D) in equation [1] will be calculated using the maximum efficiency of each of the two upstream dams with the highest passage efficiency over the three year study and the average of these efficiencies. For example, if the highest efficiencies of Holtwood, Safe Harbor, and York Haven Dams over the three year study were 0.60, 0.78, and 0.50, respectively, then the denominator would be calculated as $D = 0.60 \cdot 0.78 \cdot (\frac{0.60+0.78}{2}) = 0.3229$. It was assumed that other than the mortality associated with trap and transport operations, no other negative impacts on their fitness occurred compared to shad that would migrate via multiple fish passage facilities to areas upstream of York Haven Dam.

The L_e can be added to the observed number that were lifted past Conowingo Dam during the study period to arrive at an adjusted total number that are passed via the fish lift (L_a).

[2] $L_a = L_e + \Sigma_{i=1}^{n} L_i$

where L_i is the observed number lifted in each year.

During a radio telemetry study at Conowingo Dam, an estimate of passage efficiency will be made and given the total number of shad actually passed (lifted and released into Conowingo Pond + trapped and transported upstream), an estimate of the total number of shad downstream of Conowingo Dam during all years of the study can be made.

[3] $N = (\Sigma_{i=1}^{n} P_i)/E_o$

where P_i is the total number passed each year and E_o is the estimated passage efficiency during the study. Equation [3] also assumes that no mortality is suffered while attempting to pass Conowingo Dam.

The variance of N can be estimated by the delta method using the estimated variance of E_o.

[4] $\text{Var(N)} + [\text{Var}(E_0)/E\frac{4}{\cap}] \cdot (\sum_{i=1}^{n} P_i)^2$

The adjusted passage efficiency is then the adjusted number that are lifted during the study divided by the total number of shad downstream of Conowingo Dam during all years of the study.

[5] $E_a = L_a/N$

The associated variance from the delta method is:

[6] $Var(E_a) = [Var(N)/N^4] \cdot L_a^2$

The 95 percent confidence interval for E_a can be approximated as:

[7] $95\%\ C.\ I. \approx 1.96 \cdot \sqrt{Var(E_a)}$

If the upper 95% confidence limit is greater than or equal to the efficiency criterion, then the criterion is considered to be met.

Appendix C. Service's Proposed Methodology for Trap and Transport Mortality Study

To assess the mortality associated with trap and transport (T&T) of American shad collected at Conowingo Dam and transported to areas upstream of York Haven Dam, a study design similar to that of Millard et al. (2005) will be employed. This study will have both a treatment (T&Ted shad) and a control group (shad not T&Ted). The purpose of having both a treatment and a control group is to evaluate both the immediate and delayed mortality associated with T&T operations while controlling for mortality associated with handling stress while carrying out the study.

Control groups will consist of shad that are caught in the lifts at Conowingo Dam, sorted from non-target species, and rather than being loaded into a truck and transported upstream, they will be released to a large holding tank located at Conowingo Dam (size to be determined) and monitored for 72 hours post-release.

Treatment groups will consist of shad that are caught in the lifts at Conowingo Dam, sorted from non-target species, loaded into a truck, and driven around in the truck for a length of time equivalent to the trip duration to areas upstream of York Haven Dam. After simulating transport, the shad will be placed into a holding tank located at Conowingo Dam and monitored for 72 hours post-release.

Experimental tanks for both treatment and control groups will be located at Conowingo Dam in order to eliminate any confounding effects of differences in water temperature/chemistry between treatment and control groups and to isolate the effects of transport. Experimental tanks will be set up with flow through conditions using water pumped from the tailrace of Conowingo Dam.

Each week throughout the fish passage season, a truck load's worth of fish (exact number yet to be determined) will be used in both treatment and control groups. Thus, the experiment will be temporally replicated for 4 – 8 weeks depending on the duration of the spawning run in a given year. This will allow assessment of mortality over the range of water temperatures experienced by shad throughout the season.

During the 72 hour monitoring period, dead shad will be removed from the tank as soon as they are noticed. Mortality will be quantified as the number of dead shad divided by the number of shad that entered either the treatment or control group. Mortality in the treatment group will include all shad that died during the entire

process from loading them into the truck to those found dead at the end of the 72 hour monitoring period.

Statistical Analysis

It will be assumed that total mortality of the treatment group consists of two components: 1) mortality associated with transport and release of the shad; and 2) mortality associated with experimental handling of the shad. Thus, total mortality of the treatment group = T&T mortality + handling mortality. The control group would only experience mortality associated with experimental handling. The instantaneous handling mortality rate (m_h) will be estimated from the control group as

$$M_h = -ln(S_c)$$

where S_c is the survival of the control group over all replicates throughout the season. The instantaneous total mortality in the treatment group will be estimated as

$$M_t = -ln(S_t)$$

where S_t is the survival of the treatment group over all replicates throughout the season. The conditional mortality associated with trap and transport (conditioned on handling mortality) is

$$u_{TT} = A - \left[\frac{A \cdot M_h}{-ln(1-A)}\right]$$

where A is the fraction of fish that die from all causes (1-S_t). This equation is based on the traditional fisheries expression $u = A \cdot F/Z$ where u = the expectation of death from fishing, A = total mortality rate from all causes, F = the instantaneous fishing mortality rate, and Z = the total instantaneous mortality rate. Estimation of the conditional mortality associated with trap and transport (u_{TT}) according the above equation is preferred because it account for the probability that the two sources of mortality, trap and transport stress and handling stress, occur simultaneously over the monitoring period (Millard et al. 2005).

Literature Cited

Millard, M.J., J.W. Mohler, A. Kahnle, and A. Cosman. 2005. Mortality associated with catch- and-release angling of striped bass in the Hudson River. North American Journal of Fisheries Management. 25: 1533-154

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