May 17, 2017

The Honorable Benjamin H. Grumbles
Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Section 401 Water Quality Certification Application
Conowingo Hydroelectric Project (FERC Project No. 405)
Cecil and Harford Counties

Dear Secretary Grumbles:

Exelon Generation Company, LLC ("Exelon") is in the process of relicensing the Conowingo Hydroelectric Project ("Conowingo Project") located in Cecil and Harford Counties, Maryland. Pursuant to Section 401 of the Clean Water Act, 33 U.S.C. § 1341, prior to obtaining a new license from the Federal Energy Regulatory Commission ("FERC"), Exelon must obtain a water quality certification from the Maryland Department of the Environment ("MDE"). Exelon has enclosed six compact discs, each of which contains a complete copy of Exelon's application for a water quality certification for the Conowingo Project ("Application"), including all supporting materials referenced therein. Exelon expressly reserves the right to supplement the Application, as necessary.

Exelon has provided below a brief overview of the commitments contained in the Application. As demonstrated in the Application, the Conowingo Project, as proposed, is consistent with applicable Maryland water quality standards. Further, the additional protection, mitigation, and enhancement ("PM&E") measures Exelon has committed to implement in connection with the relicensing of the Conowingo Project will provide immediate, measurable benefits to Maryland's aquatic resources.

Background

On January 31, 2014, Exelon submitted to MDE an application for a water quality certification for the Conowingo Project. That application included copies of the resource studies that had been completed to date as part of the FERC relicensing process. In addition, Exelon and MDE both had an opportunity to review and comment on the draft Lower Susquehanna River Watershed Assessment ("LSRWA") report prepared by the U.S. Army Corps of Engineers.

After review of both Exelon's application and the draft LSRWA report, MDE communicated to Exelon that an additional study to understand the impacts of sediment transport on water quality in the Susquehanna River and Chesapeake Bay ("Sediment Study") would be

required to evaluate Exelon's application for a water quality certification. While Exelon believed its application was complete and that no additional study was required for MDE to issue a water quality certification for the Conowingo Project, in December 2014, Exelon entered into an agreement with MDE to work with state agencies in Maryland, the U.S. Army Corps of Engineers, the U.S. Geological Survey, the University of Maryland Center for Environmental Science, and the U.S. Environmental Protection Agency to design and conduct a multi-year Sediment Study to provide additional information to MDE.

The goals of the Sediment Study were to quantify the amount of suspended sediment concentration, associated nutrients, suspended sediment load, and nutrient load present in the major entry points to the Lower Susquehanna River Reservoir System and the upper Chesapeake Bay. Exelon contributed $3.5 million to fund the Sediment Study.

Because states must act on applications under Section 401 of the Clean Water Act within one year and the Sediment Study would not be completed prior to January 31, 2015, on December 4, 2014 Exelon withdrew its application for a water quality certification, indicating its intent to refile within 90 days, as required by FERC policy. Exelon refiled its application for a water quality certification on March 3, 2015, and withdrew that application on February 5, 2016 pending conclusion of the Sediment Study. Exelon again refiled its application on April 25, 2016, and withdrew that application on February 17, 2017. On March 13, 2017, MDE indicated that it expected to receive Exelon's resubmission by no later than May 18, 2017 and would, upon receipt of the resubmission, initiate its review of the water quality impacts associated with the operation of the Conowingo Project.[1]

Overview of Commitments

As described more fully in the attached Application, Exelon has committed to a comprehensive suite of PM&E measures that will provide measurable and immediate benefits to Maryland aquatic resources.

FERC Final License Application

In its Final License Application ("FLA") filed with FERC, Exelon committed to enhance Dissolved Oxygen ("DO") at the Conowingo Project using the turbine venting systems on Units 1 through 7 and the aerating runners on Units 2 and 5, and to continuously monitor DO levels from May 1 through October 1 at the Station 643 location, located approximately 0.6 miles downstream of Conowingo Dam. Exelon also proposed to implement a Debris Management Plan to remove submerged debris from the area upstream of the powerhouse intakes and floating surficial debris in front of the powerhouse intakes, and to sponsor community-based clean-ups in the pond and downstream of Conowingo Dam.

In addition, Exelon proposed to implement a Sediment Management Plan that identifies benchmarks and thresholds for actions to address sediment issues that may affect operation of the Conowingo Project, and to conduct a bathymetric survey of Conowingo Pond every five years to monitor sediment transport and depositional patterns. Exelon also committed

[1] Letter from Ben Grumbles, Secretary, Maryland Department of the Environment to Vicky Will, Vice President, Operations Support, Exelon Generation Company, LLC (Mar. 13, 2017).

to implement a Shoreline Management Plan that includes measures and policies designed to, *inter alia*, control sediment introduction from lands within the Conowingo Project boundary. The FLA, a copy of which is included in the Application, provides further detail on these commitments and sets forth additional PM&E measures that will benefit Maryland aquatic resources.

Exelon is not proposing, as part of the Application, to address sediment and other pollutants introduced by unaffiliated third-party sources upstream of Conowingo Pond. Exelon has no ability to control upstream point and non-point sources and the Clean Water Act imposes no legal obligation on Exelon to address pollutants introduced by others. Moreover, the Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus, and Sediment ("TMDL") provides a comprehensive framework for addressing Chesapeake Bay water quality issues, including any impacts resulting from the reduction in trapping capacity behind Conowingo Dam caused by sediment introduced upstream of Conowingo Dam. Specifically, "[i]n developing the TMDL, EPA considered the impact of [the Susquehanna River] dams on the pollutant loads to the Bay and how those loads will change when the dams no longer function to trap nitrogen, phosphorus, and sediment."[2]

Settlement Agreement with U.S. Department of the Interior

In April 2016, Exelon entered into a Settlement Agreement ("Settlement Agreement") with the U.S. Department of the Interior ("Interior") in which Exelon agreed to further augment the PM&E measures described above.[3] Under the Settlement Agreement, Exelon will implement substantial improvements to the existing fish passage facilities at the Conowingo Project within three years of license issuance ("Initial Construction Items"). The Initial Construction Items include:

- Modifying the existing East Fish Lift to provide 900 cubic feet per second ("cfs") of attraction flow.
- Replacing the current 3,300-gallon hopper at the East Fish Lift with two 6,500-gallon hoppers.
- Reducing cycle time at each hopper at the East Fish Lift to be able to lift fish four times per hour.
- Completing modifications to the East Fish Lift structure to allow for trapping and sorting fish at the East Fish Lift facility and transporting them to the western side of the dam to a truck for transport upstream.
- Modifying the existing West Fish Lift to facilitate trap and transport.
- Constructing and maintaining structures, implementing measures, and/or operating the Conowingo Project to provide American shad and river herring a zone of passage to the fish passage facilities.

[2] Chesapeake Bay TMDL at 10-7.
[3] Offer of Settlement and Explanatory Statement, FERC Docket No. P-405-106 (filed May 12, 2016).

- Evaluating 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.

In addition to these Initial Construction Items, Exelon will commence trap and transport of American shad and river herring from the Conowingo Project to above the York Haven Hydroelectric Project beginning the first fish passage season after license issuance.[4] Exelon also has committed to trap and transport American eels at the west side of Conowingo Dam until 2030, and to implement volitional American eel passage starting in the 2031 fish passage season.

Five years after issuance of the new license, Exelon will commence a three-year "Initial Efficiency Test" of fish passage at the Conowingo Project. The Initial Efficiency Test will measure the passage efficiency of the improved facilities. If the facilities achieve an 85 percent upstream passage efficiency for adult American shad,[5] Exelon will continue to operate the facilities without further modification. Exelon will then conduct two-year "Periodic Efficiency Tests" every five years to ensure that the Conowingo Project maintains an upstream passage efficiency of 85 percent for adult American shad throughout the term of the new license.

If the Conowingo Project does not achieve an upstream passage efficiency of 85 percent after the Initial Efficiency Test or any Periodic Efficiency Test, Exelon will be required to implement measures to improve passage efficiency at the Conowingo Project. Exelon and Interior have agreed on a tiered list of potential measures, which are designed to address fish passage impediments associated with attraction flow and capacity limitations. The degree of the shortfall from the 85 percent passage efficiency target determines the scope of the additional mitigation and enhancement measures that will be required. As set forth in the Settlement Agreement, these additional mitigation measures range from the implementation of preferential turbine operating schemes to the construction of a new West Fish Lift.

In the first fish passage season after Exelon implements any measure or measures to improve passage effectiveness, Exelon will commence a three-year Post-Modification Efficiency Test. The Post-Modification Efficiency Test will measure the passage efficiency of the improved facilities. If the Conowingo Project achieves an upstream passage efficiency of 85 percent for American shad, Exelon will continue to operate the facilities without modification and will return to conducting two-year Periodic Efficiency Tests every five years. Again, if any Periodic Efficiency Test demonstrates that the Conowingo Project is not achieving an 85 percent passage efficiency, Exelon will implement measures from the tiered list of options, to be followed by a Post-Modification Efficiency Test. This cycle of testing and modifying, as necessary, will continue throughout the term of the license.

In addition to the improvements described above, Exelon will develop and implement a Fishway Operation and Maintenance Plan that will provide extensive information

[4] Exelon has agreed to annually trap and transport up to 80 percent of the run, up to a maximum of 100,000 fish for each species.

[5] Pursuant to the Settlement Agreement, Exelon receives credit toward achieving the upstream passage target efficiency of 85 percent as a result of its trap and truck operations.

about the operations of the Conowingo Project's fish passage facilities. The Settlement Agreement includes downstream American eel effectiveness monitoring, upstream American eel effectiveness testing, and downstream adult and juvenile American shad and river herring effectiveness testing. The plans for all the studies described in the Settlement Agreement will be contained in the Fishway Effectiveness Monitoring Plan—a document Exelon will develop in consultation with Interior, which is subject to approval by Interior and FERC.

In any year that Exelon is conducting a study, it will submit a yearly interim study report to Interior and FERC following the conclusion of the study year. The interim and final reports for upstream passage studies will be submitted to Interior by December 31st of each study year. The interim and final reports for downstream passage studies will be submitted to Interior 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 Exelon's success or failure in achieving the passage efficiency criteria set forth in the Settlement Agreement. In conjunction with submitting the final study report(s), Exelon also will provide Interior electronic copies of all data collected from the studies.

Further, Exelon agreed to meet annually with Interior and the Susquehanna River Anadromous Fish Restoration Cooperative to discuss the Fishway Effectiveness Monitoring Plan and Fishway Operation and Maintenance Plan. This meeting will occur no later than January 31 each year, unless Exelon and Interior agree on a different date. At this annual meeting, Exelon will discuss with Interior and the Susquehanna River Anadromous Fish Restoration Cooperative 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 Exelon proposes for the upcoming fish passage season.

Exelon has agreed to operate the Conowingo Project to achieve a downstream survival efficiency of at least 80 percent for the adult and 95 percent for the juvenile American shad and river herring moving downstream past the Conowingo Project. Exelon also has agreed to operate the Conowingo Project to achieve a downstream survival efficiency criterion of at least 85 percent for the adult American eel moving downstream past the Conowingo Project. If the results of the downstream studies indicate that the Conowingo Project is not achieving these efficiency criteria, Interior may exercise its reservation of authority to address the issue.

Each of the above commitments is described more fully in the Settlement Agreement, a copy of which is included in the Application.

Supplemental Eel Passage Commitments

Finally, Exelon recently submitted a filing with FERC ("Supplemental Filing") requesting that FERC incorporate certain eel passage requirements from the water quality certification for the Muddy Run Pumped Storage Project into the FLA for the Conowingo Project.[6]

[6] Supplemental Information Regarding Exelon Generation Company, LLC's Application for a New License, Docket No. P-405-106 (filed Apr. 21, 2017).

Specifically, Exelon committed to design, install and operate an eel trapping facility and eel holding facility along the western shore of the Conowingo Dam near the location of the current United States Fish and Wildlife Service trapping location and facility. Those facilities began operation on May 1, 2017 and will be operated by Exelon annually until 2030, at which point Exelon will construct and operate a volitional upstream eel facility at Conowingo Dam, for operation starting in 2031 through the term of the new FERC license, as described in the Settlement Agreement.

Exelon will submit daily emails and an annual report ("Annual Report") providing information regarding the operation of the eel passage facilities to the ("EPAG"), a group that is chaired by Exelon and composed of a representative from each of the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, United States Fish and Wildlife Service, the Maryland Department of Natural Resources Maryland Power Plant Research Project and the Susquehanna River Basin Commission.

Every three years, unless a different period is established by the PADEP in writing beginning in 2018 through 2030, Exelon will conduct stream segment evaluations through electrofishing or other methods identified after consultation with EPAG. Results of stream segment evaluations will be included in the Annual Report and will document dispersal of the stocked eels, estimate the approximate density of stocked eels, and evaluate the growth, condition, age, gender and level of infestation with *Anguillicoloides crassus* of stocked eels.

These additional eel passage commitments are described more fully in the Supplemental Filing, a copy of which is included in the Application.

Recreation

As part of the FLA, Exelon developed a Recreation Management Plan for managing recreational resources at the Conowingo Project over the new license term. In the Recreation Management Plan, Exelon proposes to implement substantial improvements and enhancements to the recreation facilities at Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin, Dorsey Park, Peach Bottom Marina, Line Bridge, Conowingo Creek Boat Launch, Glen Cove Marina, Funk's Pond, Conowingo swimming pool, Conowingo Dam Overlook, and Fisherman's Park/Shures Landing.

These improvements and enhancements to the recreational facilities at the Conowingo Project are described more fully the Recreation Management Plan, a copy of which is included in the Application.

Minimum Flows

In addition to the fish passage enhancements, shoreline recreational improvements, and measures to address sediment introduction on Conowingo Project lands, Exelon has proposed to increase its minimum flows and to make them continuous year-round. Specifically, Exelon is proposing the following:

Month	Min. Flows (cfs)
December	4,000
January	4,000
February	4,000
March	4,000
April	18,200
May	18,200
June	7,500
July	5,500
August	4,500
September	3,500
October	4,000
November	4,000

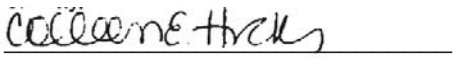
These flow conditions provide for an operational regime that adequately mitigates the impacts of the Conowingo Project's regulation of flow in the lower Susquehanna River, and protects suitable habitats and key natural processes. These flow conditions also adequately balance both environmental and economic interests.

Conclusion

As demonstrated in the Application, the Conowingo Project, as proposed, is consistent with applicable Maryland water quality standards. Further, the additional PM&E measures Exelon has committed to implement in connection with the relicensing of the Conowingo Project will provide immediate, measurable benefits to Maryland's aquatic resources. Accordingly, Exelon respectfully requests that MDE issue a water quality certification, consistent with the commitments set forth above and detailed in the enclosed application materials.

Please do not hesitate to contact the undersigned if you have any questions or require additional information regarding this matter

Sincerely,



Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Power
300 Exelon Way
Kennett Square, PA 19348
Tel: (610) 765-6791
Email: Colleen.hicks@exeloncorp.com

CC: Denise Keehner (MDE)
Andrea Baker (MDE)
Jonathan May (MDE)

Exelon Generation's

Application for a
Maryland Water Quality Certificate
for the Conowingo Hydroelectric Project

May 17, 2017

I. INTRODUCTION

Maryland's water quality standards comprise three elements: (1) designated use or uses of a water body; (2) water quality criteria necessary to protect the use or uses; and (3) an antidegradation statement. The mainstem segment from Conowingo Dam downstream to the confluence with Chesapeake Bay is designated Use II-P. Maryland's water quality criteria to protect this designated use are expressed in terms of chemical-specific concentrations, toxicity levels, and narrative criteria. These criteria include standards to address bacteria, dissolved oxygen, temperature, pH, turbidity, and toxic substances. Maryland's narrative criteria also prohibit pollution of State waters by sewage, industrial waste, or other waste, and the State's antidegradation policy protects existing water quality where it exceeds minimum requirements specified by water quality standards.

In support of its application for a new Federal Energy Regulatory Commission (FERC) license for the Conowingo Hydroelectric Project (Project), Exelon conducted a number of resource studies to assess the impacts and benefits of the Project. These relicensing studies, implemented pursuant to a FERC-approved study plan, led to the development of the Conowingo license application. The final license application was filed with FERC on August 30, 2012 (Final License Application).

In addition, on April 21, 2016, Exelon entered into a Settlement Agreement (Settlement Agreement) with the U.S. Department of the Interior (Interior), in which Exelon agreed to implement additional fish passage measures at the Project over the term of the new license. Exelon also recently submitted a filing with FERC (Supplemental Filing) requesting that FERC incorporate certain eel passage requirements from the water quality certification for the Muddy Run Pumped Storage Project (Muddy Run Project) into the license application for the Project.

The Final License Application (including the extensive environmental analysis set forth in Exhibit E), the FERC Final Environmental Impact Statement (FEIS), the relicensing studies, the Settlement Agreement with Interior, and the Supplemental Filing are incorporated into this water quality certificate application and submitted as part of the record. As summarized below, the relicensing studies demonstrate that the Project, as proposed, is consistent with applicable Maryland water quality standards. Specifically, the minimum flows pursuant to which the Project operates; the aeration capabilities of certain generating units; the recreational facilities; the operation of the East and West fish lifts; measures to protect rare, threatened, and endangered species; and the implementation of best management practices to minimize or eliminate sediment and nutrient delivery to Project waters ensure that the Project will meet applicable water quality standards and protect existing uses while operating under the new FERC license. The additional protection, mitigation, and enhancement (PM&E) measures that Exelon has committed to implement in connection with the relicensing of the Project also will provide immediate, measurable benefits to Maryland's aquatic resources.

II. MARYLAND WATER QUALITY STANDARDS

Maryland's water quality standards, described below, consist of three elements: (1) the designated use or uses of a water body; (2) the water quality criteria that are necessary to protect the use or uses; and (3) an antidegradation statement.

1. Designated Uses

a. Generally

Section 303(c) of the Clean Water Act requires that each state designate uses for each water body or segment thereof within the state.[1] A designated use can be either an existing use or a higher quality use, even if such higher use does not currently exist in that water body.[2] Under Section 303, designated uses can be propagation of fish and wildlife, recreation, public water supply, agriculture, navigation, and industrial use.[3] As set forth in EPA's regulations:

> [W]ater quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation.[4]

A state may designate several compatible uses for the same water body,[5] and can remove a designated use—as long as it is higher than an existing use—if the state can demonstrate that attaining the designated use is not feasible.[6]

Pursuant to these requirements, MDE has designated eight water use classes, including four applicable to the Project:[7]

- *Use I:* "Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life."[8] Use I waters include those that are suitable for:

  (a) Water contact sports;

---

1 33 U.S.C. § 1313(c).
2 *See* 40 C.F.R. § 131.3(f) (defining "designated uses" as "those uses specified in water quality standards for each water body or segment whether or not they are being attained").
3 33 U.S.C. § 1313(c)(2)(A).
4 40 C.F.R. § 131.2.
5 *See* 33 U.S.C. § 1370.
6 40 C.F.R. § 131.10(g). A designated use can be removed if "[d]ams, diversions or other types of hydrologic modifications preclude the attainment of the use. . . ." *Id.* § 131.10(g)(4).
7 *See* Md. Code Regs. § 26.08.02.02(B).
8 *Id.* § 26.08.02.02(B)(1).

(b) Play and leisure time activities where individuals may come in direct contact with the surface water;

(c) Fishing;

(d) The growth and propagation of fish (other than trout), other aquatic life, and wildlife;

(e) Agricultural water supply; and

(f) Industrial water supply.[9]

- *Use I-P:* "Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply."[10] Use I-P waters include all uses identified for Use I waters, as well as "[u]se as a public water supply."[11]

- *Use II:* "Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting."[12] Use II waters include all uses identified for Use I waters located in:

  (a) All tidally influenced waters of the Chesapeake Bay and tributaries, the Coastal Bays, and the Atlantic Ocean to the 3-mile boundary; and

  (b) Tidally influenced waters that are or have the potential for:

    (i) Shellfish propagation and storage, or harvest for marketing purposes; and

    (ii) Actual or potential areas for the harvesting of oysters, soft-shell clams, hard-shell clams, and brackish water clams.[13]

- *Use II-P:* "Tidal Fresh Water Estuary."[14] Use II-P waters include all uses identified for Use II waters, as well as "[u]se as a public water supply."[15]

b. Designated Uses at Conowingo

The mainstem segment from Conowingo Dam downstream to the confluence with Chesapeake Bay is designated Use II-P,[16] with the following subcategories applicable:

---

9 *Id.* § 26.08.02.02(B)(1)(a)-(f).
10 *Id.* § 26.08.02.02(B)(2).
11 *Id.* § 26.08.02.02(B)(2)(a)-(b).
12 *Id.* § 26.08.02.02(B)(3).
13 *Id.* § 26.08.02.02(B)(3)(a)-(b).
14 *Id.* § 26.08.02.02(B)(4).
15 *Id.* § 26.08.02.02(B)(4)(a)-(b).
16 *Id.* § 26.08.02.08(B)(2)(a).

- Migratory Spawning and Nursery: Applies from February 1 to May 31, inclusive.[17]

- Seasonal Shallow-Water Submerged Aquatic Vegetation (SAV): Applies from April 1 to October 30, inclusive, and to a depth of 2.0 meters. MDE's regulations note that "no grow zones" of SAV are present in this reach.[18]

- Open-Water Fish and Shellfish: Applies from January 1 to December 31, inclusive.[19]

2. Water Quality Criteria

Water quality criteria "are elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use."[20] Upon adoption by a state, these "ambient criteria" become the applicable regulatory requirements for the protection of designated waters to which they apply.[21]

As set forth in MDE's regulations, Maryland's water quality criteria to protect the above-described designated uses are expressed in terms of chemical-specific concentrations, toxicity levels, and narrative criteria. The water quality criteria applicable to the stream segment in which Conowingo is located are described below.

a. Chemical-Specific Concentrations

The segment of the mainstem Susquehanna River from Conowingo Dam to the confluence with Chesapeake Bay has been designated as Use II-P, with the following applicable subcategory uses present in this segment: Migratory Spawning and Nursery, Seasonal Shallow-Water SAV, and Open-Water Fish and Shellfish. Under MDE's regulations, therefore, the following criteria apply:

- *Bacteriological*: MDE's bacteriological criteria for Use II-P waters are the same as Use-I-P waters. These criteria address E. coli, freshwater enterococci, and marine water enterococci,[22] For each bacterial indicator, the regulations establish: (1) a steady state geometric mean indicator density for all areas; and (2) a range of single-sample maximum allowable densities, depending upon whether the full-body contact recreation in a given location is "frequent," "moderately frequent," "occasional," or "infrequent."[23] For freshwater enterococci, the steady state geometric mean density is 33 counts per 100 milliliters (ml), with a maximum allowable density ranging from 61 to 151 counts per 100 ml. For E. coli, the steady state geometric mean density is 126 counts per 100 ml, with a maximum allowable density ranging from 235 to 576 counts

17 *Id.*
18 *Id.*
19 *Id.*
20 40 C.F.R. § 131.3(b).
21 "For waters with multiple use designations, the criteria shall support the most sensitive use." 40 C.F.R. § 131.11(a).
22 *See* Md. Code Regs. §§ 26.08.02.03-3(A)(1)(a), 26.08.02.03-3(B).
23 *Id.* 26.08.02.03-3(A)(1)(a).

per 100 ml. For marine water enterococci, the steady state geometric mean density is 35 counts per 100 ml, with a maximum allowable density ranging from 104 to 500 counts per 100 ml.[24] There also is an added requirement that, in Shellfish Harvest waters, "there may not be any pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard in the use of waters for shellfish harvesting."[25]

- *Dissolved Oxygen (DO)*: DO criteria for Use II-P waters are the same as Use I-P waters ("the [DO] concentration may not be less than 5 milligrams/liter at any time"[26]), except for the following subcategories applicable in the reach downstream of Conowingo Dam:

    - Seasonal and Migratory Fish Spawning and Nursery: From February 1 through May 31, the DO level must be greater than or equal to 6 milligrams/liter (mg/l) for a 7-day averaging period, with an instantaneous minimum requirement of greater than or equal to 5 mg/l. For all other times during the year, the DO levels are as follows:

        (i) Greater than or equal to 5.5 [mg/l] for a 30-day averaging period . . . in tidal fresh waters (salinity less than or equal to 0.5 parts per thousand);

        (ii) Greater than or equal to 5 [mg/l] for a 30-day averaging period . . . (salinity greater than 0.5 parts per thousand);

        (iii) Greater than or equal to 4.0 [mg/l] for a 7-day averaging period . . .;

        (iv) Greater than or equal to 3.2 [mg/l] as an instantaneous minimum . . .; and

        (v) For protection of the endangered shortnose sturgeon, greater than or equal to 4.3 [mg/l] as an instantaneous minimum at water column temperatures greater than 29ºC (77ºF).[27]

    - Seasonal Shallow-Water SAV: Same as items (i) through (v), above, year-round.[28]

    - Open-Water Fish and Shellfish: Same as items (i) through (v), above, year-round.[29]

- *Temperature:* Temperature criteria for Use II-P waters are the same as Use I-P waters.[30] For Use I-P waters, MDE's regulations establish a maximum temperature of 90ºF "or

---

24 *Id.*
25 *Id.* § 26.08.02.03-3(C)(1); *see also id.* § 26.08.02.03-3(C-1)(1).
26 *Id.* § 26.08.02-03-3(A)(2).
27 *Id.* § 26.08.02.03-3(C)(8)(d)(i)-(v); *see also id.* § 26.08.02.03-3(C)(8)(b)(iii).
28 *Id.* § 26.08.02.03-3(C)(8)(c).
29 *Id.* § 26.08.02.03-3(C)(8)(d).
30 *Id.* § 26.08.02.03-3(C)(3).

the ambient temperature of the surface . . . waters, whichever is greater."[31] This criterion applies in areas "outside the mixing zone."[32]

- pH: Criteria for pH in Use II-P waters are the same as those in Use I-P waters.[33] "Normal pH values may not be less than 6.5 or greater than 8.5."[34]

- *Turbidity:* Turbidity criteria for Use II-P waters are the same as Use I-P waters.[35] "Turbidity may not exceed levels detrimental to aquatic life."[36] With regard to turbidity resulting from any discharge, such turbidity "may not exceed 150 units at any time or 50 units as a monthly average," measured in Nephelometer Turbidity Units.[37]

- *Color:* "Color in the surface water may not exceed 75 units as a monthly average. Units shall be measured in Platinum Cobalt Units."[38]

- *Water Clarity Criteria for Seasonal Shallow-Water SAV:* MDE's regulations establish three ways in which a segment can achieve attainment with the water clarity criteria:

  (1) SAV occupies at least 12,149 acres – the acreage restoration goal for this segment of the Susquehanna River.[39]

  (2) The shallow-water acreage that meets or exceeds the water clarity criterion is 2.5 times greater than the acreage restoration goal of 12,149 acres. For this segment, the water clarity criteria application depth is 2.0 meters,[40] so the Secchi depth equivalence criteria are 1.4 meters for tidal fresh waters, 1.4 meters for oligohaline waters, and 1.9 meters for mesohaline waters.[41] These criteria apply from April 1 to October 1 of each year.[42]

  (3) A combination of the actual SAV acreage attained and meeting the applicable water clarity criteria in an additional, unvegetated shallow water surface area equals 2.5 times the remaining SAV acreage necessary to meet the segment's restoration goal.[43]

- Chlorophyll a: "Concentrations of chlorophyll a in free-floating microscopic aquatic plants (algae) may not exceed levels that result in ecologically undesirable

---

31 *Id*. § 26.08.02.03(A)(3)(a).
32 *Id.* "Mixing zones" are established pursuant to MDE regulations. *See id.* § 26.08.02.05.
33 *Id*. § 26.08.02.03-3(C)(4).
34 *Id*. § 26.08.02.03-3(A)(4).
35 *Id*. § 26.08.02.03-3(C)(5).
36 *Id*. § 26.08.02.03-3(A)(5)(a).
37 *Id*. § 26.08.02.03-3(A)(5)(b).
38 *Id.* § 26.08.02.03-3(A)(6); *see id.* §§ 26.08.02.03-3(C)(6), 26.08.02.03-3(C-1)(1).
39 *Id.* § 26.08.02.03-3(C)(9)(a)(i); *see also id.*§ 26.08.02.03(C)(9)(c).
40 *See id.* § 26.08.02.08(B)(2)(a).
41 *Id.* § 26.08.02.03-3(C)(9)(b).
42 *Id.*
43 *Id.* § 26.08.02.03-3(C)(9)(a)(iii).

consequences that would render tidal waters unsuitable for designated uses."[44]

- *Toxic Substance Criteria:* Use II-P waters are subject to MDE's toxic substances criteria established: "(a) For protection of fresh water and freshwater-adapted estuarine aquatic organisms"; and "(b) To protect public water supplies and the wholesomeness of fish and shellfish for human consumption."[45] MDE's regulations set forth criteria for some 112 toxic substances, including inorganic substances, organic compounds, polycyclic aromatic hydrocarbons and phthalates, and pesticides and chlorinated compounds.[46]

b. Narrative criteria

MDE has adopted the following "general" narrative criteria that apply to all surface waters throughout Maryland:

> The waters of this State may not be polluted by:
>
> (1) Substances attributable to sewage, industrial waste, or other waste that will settle to form sludge deposits that (a) are unsightly, putrescent, or odorous, and create a nuisance, or (b) interfere directly or indirectly with designated uses;
>
> (2) Any material, including floating debris, oil, grease, scum, sludge, and other floating materials attributable to sewage, industrial waste, or other waste in amounts sufficient to:
>
> (a) Be unsightly;
>
> (b) Produce taste or odor;
>
> (c) Change the existing color to produce objectionable color for aesthetic purposes;
>
> (d) Create a nuisance; or
>
> (e) Interfere directly or indirectly with designated uses;
>
> (3) High temperature or corrosive substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which (a) interfere directly or indirectly with designated uses, or (b) are harmful to human, animal, plant, or aquatic life;

---

44 *Id.* § 26.08.02.03-3(C)(10).
45 *Id.* § 26.08.02.03-3(C-1)(2).
46 *See id.* § 26.08.02.03-2(G).

(4) Acute toxicity from any discharge outside the mixing zone established under Regulation [26.08.02.05] for the application of acute criteria for protection of aquatic life; and

(5) Toxic substances attributable to sewage, industrial wastes, or other wastes in concentrations outside designated mixing zones, which (a) interfere directly or indirectly with designated uses, or (b) are harmful to human, plant, or aquatic life.[47]

3. Antidegradation

MDE has established an antidegradation policy applicable to surface waters within Maryland, which provides: "Where water quality is better than the minimum requirements specified by the water quality standards, that water quality shall be maintained."[48] MDE regulations meet this requirement by establishing and maintaining a list of waters designated as "Tier II" waters where the water quality exceeds minimum water quality standards.[49]

47 *Id.* § 26.08.02.03(B).
48 *Id.*§ 26.08.02.04-1(A).
49 *Id.* § 26.08.02.04-1(O).

III. GENERAL PROJECT INFORMATION

As required by Maryland Code of Regulations § 26.08.02.10(B)(1), Exelon is providing the following general project information for this Water Quality Certificate Application.

A. Applicant Information

The exact name, address, and telephone number of the Applicant:

Exelon Generation Company, LLC
300 Exelon Way
Kennett Square, PA 19348
Tel: (610) 765-5959

The Applicant is a foreign limited liability company qualified to do business in Maryland.

The exact name, address, and telephone number of the person authorized to act as agent for the Applicant in this application:

Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Generation Company, LLC
300 Exelon Way
Kennett Square, PA 19348
Tel: (610) 765-6791
Colleen.hicks@exeloncorp.com

B. Facility Description

The Project is a peaking hydroelectric facility that utilizes a limited active storage reservoir to generate during peak electricity demand periods. The Project is located on the Susquehanna River (at river mile 10) in Maryland, which has a total drainage area of 27,100 square miles. Conowingo Dam is located in Maryland connecting Cecil and Harford counties, as is the lowermost six miles of the Project reservoir, Conowingo Pond. The remaining eight miles of Conowingo Pond are located in Pennsylvania, within York and Lancaster counties. The Project consists of: 1) a main dam with an integrated powerhouse, 2) a spillway, 3) a reservoir (Conowingo Pond), 4) an intake and powerhouse, and 5) two fish lifts.

Conowingo Dam

The Conowingo Dam is a concrete gravity dam with a maximum height of approximately 94 feet and a total length of 4,648 feet. The dam consists of four distinct sections from east to west: a 1,190-foot long non-overflow gravity section with an elevation of 115.7 feet; an ogee shaped spillway, the major portion of which is 2,250 feet long with a crest elevation of 86.7 feet, and the minor portion of which is 135 feet long with a crest elevation of 99.2 feet; an intake-powerhouse section which is 946 feet long; and a 127-foot long abutment section. 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 also support US Highway Route No. 1, which passes over the top of Conowingo Dam.

Spillway

The gated spillway at Conowingo Dam is ogee shaped, the major portion of which is 2,250 feet long with a crest elevation of 86.7 feet, and the minor portion of which is 135 feet long with a crest elevation of 99.2 feet. Flow over the ogee spillway sections is controlled by 50 stony-type crest gates with crest elevations of 86.7 feet and two regulating gates with crest elevations of 99.2 feet. Each of the crest gates is 22.5 feet high by 38 feet wide; each gate has a discharge capacity of approximately 16,000 cubic feet per second (cfs) at a reservoir elevation of 109.2 feet.

The two regulating gates are 10 feet high by 38 feet wide and have a discharge capacity of approximately 4,000 cfs per gate at a reservoir elevation of 109.2 feet. The Dam's tailwater elevation, which varies with discharge, is at an approximate elevation of 20.5 feet with all units operating with no spillway discharge (*i.e.*, 86,000 cfs).

Three 90-ton gantry cranes are used to perform gate operations. Normally only two of the three gantry cranes are active. All three gantry cranes can be powered from the 440-volt bus on the headworks. Each gantry crane contains diesel generators for emergency backup power. The cranes are mounted on tracks that traverse the powerhouse intake structure and spillway sections of the dam.

Conowingo Pond

Conowingo Pond extends approximately 14 miles upstream from Conowingo Dam to the lower end of the Holtwood Project tailrace. Conowingo Pond is generally maintained at an elevation of 109.2 feet (NGVD1929), with a surface area of approximately 8,500 acres and a total impoundment design volume of 310,000 acre-feet at that elevation.

Conowingo Pond serves many diverse uses including hydropower generation, water supply, industrial cooling water, recreational activities, and various environmental resources. Relative to hydropower generation, Conowingo Pond serves as the lower reservoir for the Muddy Run Project, located 12 miles upstream of the Conowingo Dam. Conowingo Pond also serves as a cooling water source for the Peach Bottom Atomic Power Station (PBAPS) and the York Energy Center, both located approximately seven miles upstream of the Conowingo Dam. The Muddy Run Project has a maximum pumping capacity of 28,000 cfs, while PBAPS has a maximum withdrawal capacity of 3,450 cfs (2,230 MGD). The York Haven Energy Center is permitted to withdraw up to 20 cfs (13 MGD) for cooling water. In addition, Old Dominion Electric Cooperative has authorization to withdraw up to 8.7 MGD of water from Conowingo Pond for use as cooling and processing water for the Wildcat Point Generating Facility.

Conowingo Pond is used as a public water supply source, with the City of Baltimore and Chester Water Authority (CWA) having permitted maximum withdrawals of 387 cfs (250 MGD) and 46 cfs (30 MGD), respectively.

Intakes and Powerhouse

The intakes for each turbine are individually protected by seven trash racks; five are entirely steel (clear spacing of 5.375 inches) and two are steel-framed with wood racks (clear spacing of 4.75 inches). The top two racks are constructed of wood due to frazzle ice accumulations on the steel sections.

The first seven units (1-7), which are Francis turbine/generating units, are completely enclosed within the powerhouse, while the last four units (8-11), which are Kaplan units, are an outdoor type of construction thereby eliminating a superstructure in this area.

For Units 1-7, a 27-foot diameter butterfly valve is installed at the entrance to the scroll case. These valves are operated by oil pressure cylinders which are opened from a central oil pressure system, but are rarely used. Dewatering is performed by placement of headgates and stoplogs.

The main power station superstructure enclosing Units 1-7 includes the generator room and the electrical bay. The electrical bay is located between the generator room and the powerhouse headworks and consists of the 13.8-kilovolt (kV) bus and switching equipment. Compartments for step-up transformers are located on the roof of the electrical bay, together with the station service control room and the main control room. Two house turbines are also enclosed within the powerhouse. These Francis turbine/generating units are rated at 1,900 horsepower each when operating at full gate under a normal head. These two units are utilized to provide station service and black-start capability.

Units 8-11 are of an outdoor type of construction. There are no valves within the intake; unit dewatering is performed by placement of headgates and stoplogs. Generator circuit breakers and electrical equipment are located in a two-story structure between the generator area and the headworks. The main step-up transformers are located on the roof of this structure.

Fish Passage Facilities

The Project currently operates two fish lifts. The West Fish Lift, adjacent to the dam's right abutment, is currently operated under an agreement with the United States Fish and Wildlife Service (USFWS) for American shad egg production and other research purposes. The newer East Fish Lift, which uses the regulating gate bays for attraction flow, is used primarily to pass American shad, river herring, and other migratory fishes during the April-June migration season.

Tailrace

The tailrace is approximately 2,800 feet in length, extending from the powerhouse to the downstream end of Rowland Island. The tailrace width ranges from approximately 900 feet near the powerhouse to 1,500 feet near Rowland Island.

C. Description of the Project Operations and Discharge

The Project utilizes a limited active storage reservoir located on the Susquehanna River to generate during peak electricity demand periods, discharging waters once passed through the turbines. Discharge also results from spillage of excess waters through the existing gates and over the spillways at the Project. The Project is typically operated semi-automatically as the generation setting (in MW) is programmed into the control system; however, turbines can be brought on-line manually by an operator to ensure an efficient start-up until the generation setting is reached. At times, the Project is also operated in either full manual or automatic mode, and this type of operation is typically dictated by the prevailing river flow and system load conditions. The Project license allows for the Conowingo Pond to fluctuate between elevation 101.2 feet and 110.2 feet, NGVD 1929. Conowingo Pond has limited storage capability (2.0 hours at 250,000 cfs), and the pond's actively used storage is small compared to the flows experienced in the river.

The following factors also influence the management of water levels (all elevations below are NVGD 1929) within Conowingo Pond:

- Conowingo Pond must be maintained at elevation of 107.2 feet on weekends between Memorial Day and Labor Day to meet recreational needs;
- The Muddy Run Project typically does not operate its pumps below elevation 104.7 feet due to cavitation;
- PBAPS begins experiencing cooling problems when the elevation of the pool drops to 104.2 feet;
- The Chester Water Authority cannot withdraw water below elevation 100.5 feet;
- The PBAPS Nuclear Regulatory Commission license requires PBAPS to shut down completely if Conowingo Pond is at or below 99.2 feet;
- The York Energy Center cannot withdraw water below elevation 98.0 feet; and
- The City of Baltimore cannot withdraw water below elevation 91.5 feet.

The current flow regime below Conowingo Dam was formally established with the signing of a settlement agreement in 1989 between the Project owners and several federal and state resource agencies. The flow regime was determined through negotiations and based on several studies, including a habitat-based instream flow study conducted by the Susquehanna River Basin Commission (SRBC). In addition, studies were subsequently completed by MDNR that examined

benthic macroinvertebrate populations. These study results were used to establish the flow regime below Conowingo Dam as follows:

March 1 – March 31	3,500 cfs or natural inflow, whichever is less
April 1 – April 30	10,000 cfs or natural inflow, whichever is less
May 1 – May 31	7,500 cfs or natural inflow, whichever is less
June 1 – September 14	5,000 cfs or natural inflow, whichever is less
September 15 – November 30	3,500 cfs or natural inflow, whichever is less
December 1 – February 28	3,500 cfs intermittent (maximum six hours off followed by equal amount on)

The downstream discharge must equal these values or the discharge measured at the Susquehanna River at the Marietta United States Geological Survey (USGS) gage (No. 01576000), whichever is less. The Marietta USGS gage is located approximately 35 miles upstream of Conowingo Dam above the Safe Harbor Dam. The drainage area at the Marietta gage is 25,990 square miles. The Conowingo USGS Gage No. 01578310 is located on the downstream face of Conowingo Dam (RM 10), and has a drainage area of 27,100 square miles.

During periods of regional drought and low river flow, Exelon has requested and received FERC approval for a temporary variance in the required minimum flow release from the Project. Specifically, Exelon has sought approval to count the leakage from the Project (approximately 800 cfs)[50] as part of the minimum flow discharge. This temporary variance is typically approved by resource agencies (*i.e.*, SRBC, MDNR, PFBC, and USFWS) as well.

When implemented, the temporary variance allows Exelon to maintain an adequate pond level elevation and storage capacity throughout a low-flow period. Maintaining water storage volume is critical under low-flow conditions, not only for electric generating capacity, but also to ensure an adequate water supply is available for recreational interests and consumptive water usage on Conowingo Pond.

As noted above, the current Maryland State DO standard applicable to discharges from Conowingo Dam is as follows:

[50] As a result of a recent agreement with resource agencies, beginning in 2012 the minimum flow variance, when in effect, will count approximately 580 cfs as part of the minimum flow discharge at the Project. The remaining portion of the Project leakage (approximately 220 cfs) will be credited to the PBAPS facility, as part of its consumptive use agreement.

February 1 through May 31: DO ≥ to 6 mg/L for a 7-day averaging period.

June 1 to January 31: DO ≥ 5.5 mg/L for a 30-day averaging period; 4.0 mg/L for a 7-day average; 3.2 mg/L as an instantaneous minimum year round; and for protection of endangered shortnose sturgeon, 4.3 mg/L as an instantaneous minimum at water column temperatures greater than 77°F (29°C).

Exelon's 2012 Water Quality Study Report completed for the relicensing of the Project provides data that show discharge from Conowingo Dam (as measured at Station 643) met the state DO standards 100% of the time in 2010. This report also documents that measured DO concentrations in the transects below Conowingo Dam were all greater than 5.5 mg/L.

D. Discharge Treatment Equipment

Of the 11 main Conowingo turbines, seven currently have the ability, through an air venting system installed at each of these turbines, to aerate waters as it passes through these turbines. Since the initial installation in 1991, the turbine venting system has been used to meet the Maryland DO standards. With no venting from 1982-1988, hourly DO values were less than 5 mg/L 20.3% of the time with 8.6% of the values less than 4.0 mg/L, and some years had DO levels below 5 mg/L nearly 40% of the time. In contrast, 1989-2007 hourly DO values less than 5 mg/L occurred only 0.03% (11 hours) of the time, and no readings were less than 4.3 mg/L. In addition, Exelon installed aerating turbine runners in two Francis units in 2005 and 2008, providing additional measures to increase DO concentrations in Project discharges.

E. Duration of Discharge Activity Under New License

The current FERC license expired on September 1, 2014 and Exelon is currently operating under annual licenses issued by FERC. Exelon formally initiated the FERC relicensing process for the Project with the filing of a Notice of Intent and Pre-Application Document (PAD) on March 12, 2009. Exelon is requesting that FERC issue a new license for the continued operation of the facility under FERC jurisdiction for a period of 50 years.

F. Discharge Monitoring

Exelon continuously monitors flows from the Project; DO levels are monitored from May 1 through October 13 at the Station 643 location approximately 0.6 miles downstream of Conowingo Dam. Exelon intends to continue this monitoring at this location for the entire term of the new FERC license.

IV. PROJECT IMPACTS AND MITIGATION MEASURES

Set forth below is an overview of the environmental impacts of Exelon's Project under current and proposed operating conditions as identified in the FERC relicensing studies. A detailed environmental analysis of the Project can be found in the enclosed Exhibit E and resource study reports that were submitted with the Final License Application, as well as the enclosed FEIS prepared by FERC pursuant to the National Environmental Policy Act. Exhibit E, the resource study reports, and the FEIS are incorporated into this Application. Exelon expressly reserves the right to supplement this Application, as necessary.

Also described below are Exelon's proposed PM&E measures. More details about Exelon's proposed PM&E measures can be found in the Final License Application, the Settlement Agreement, and the Supplemental Filing. The PM&E measures ultimately included in the Project's new license and water quality certification will reflect settlement discussions between stakeholders and Exelon.

A. Results of Project Relicensing Studies and FERC's FEIS

Exelon's Integrated Licensing Process studies supporting the Final License Application and FERC's FEIS demonstrate that the Project meets Maryland water quality standards and provides rich shoreline and recreation resources.

1. Water Quality

Exelon's analysis of the water quality issues, summarized below, is set forth in Exhibit E, Section 3.3.2.

Water Quality Study. Exelon's study of seasonal and diurnal water quality, Revised Study Plan (RSP) 3.1, demonstrates that Project operations have little, if any, adverse impact on water quality, and that the Project is meeting state water quality standards. Notably:

- State DO water quality standards are being met downstream of the Project.[51]
- A comparison of water temperature data collected upstream and downstream of the dam confirmed that the operation of the Project has no measurable effect on the temperature of the water being released downstream; water temperatures were uniform throughout the lower Conowingo Pond and the tailwater area under a variety of unit operating and river flow conditions.[52]
- Average DO conditions within all the turbine boils were always at or above standards, and were usually similar to the DO conditions measured downstream of the Project at

[51] Seasonal and Diurnal Water Quality in Conowingo Pond and Below Conowingo Dam, RSP 3.1 at i (Conowingo RSP 3.1).
[52] *Id.* at ii, 18.

Station 643.[53]

RSP 3.1 involved weekly monitoring of DO, water temperature, surface pH, and turbidity at five historically (1996-1999) established transects in Conowingo Pond as well as three transects established for this study below Conowingo Dam between April and October 2010. Fecal coliform samples also were collected once per month at the midpoint station of each transect. Additionally, discharge "boils" of operating turbines were sampled hourly (0600 hr to 1800 hr) on 20 dates in July and August (preselected by FERC during study scoping).

Water temperature data collected in Conowingo Pond (at Transect 5, approximately 0.5 miles upstream of Conowingo Dam) were compared to data collected at monitoring Station 643, approximately 0.6 miles downstream of Conowingo Dam, to assess the effect of Project operations on the temperature of water being released downstream. DO and temperature data collected in the turbine boils and the downstream transects were compared to that measured at the continuous DO monitoring station (Station 643) to confirm that Station 643 is a representative location for determining compliance with the applicable Maryland state DO standards.

Relative to the historic records, flows in the Susquehanna River during the 2010 sampling period were lower in April through September but higher in October. Likewise, incoming water temperatures were higher in April through September and lower in October relative to historical records. Comparison of water temperature data collected upstream and downstream of Conowingo Dam in 2010 confirmed that the operation of the Project has no measureable effect on the temperature of the water being released downstream. Water temperatures were uniform throughout lower Conowingo Pond and the tailwater area under a variety of unit operating and river flow conditions. Moreover, the temperature of the water measured at Station 643 was also consistently similar (R^2 square ≥ 0.99) to that measured along transects in both the lower Conowingo Pond and in the tailwater areas.

Comparisons of the water temperature of specific turbine boils to the temperature measured at Station 643 were also made. The water temperature recorded at downstream Station 643 was virtually identical to that of turbine discharge boils.

Aeration capabilities on the smaller Francis generating units (Units 1-7) increase the DO concentration of the water being released from the Project and ensure the discharges meet current state DO standards. DO concentrations measured at the three transects below Conowingo Dam (and Station 643) were at, or above, the instantaneous minimum standard on all sampling days in 2010. Comparison of DO concentrations along the downstream transects with the DO measured at Station 643 indicated that Station 643 is representative of DO conditions measured along Transects 6 and 7 most of the time. DO concentrations measured in the turbine boils were above the Maryland State instantaneous standard of 3.2 mg/L.

---

[53] *Id.*; Final License Application Exhibit E at E-85 to E-86.

A detailed comparison of DO concentrations measured in the turbine boils to the DO measured at Station 643 indicated that under most combinations of unit operation, DO concentrations measured at Station 643 are representative of DO conditions in the turbine boils. Exceptions can occur when one or more of the larger Kaplan turbines (Units 8-11) are operating and the head pond is stratified with bottom water DO less than 5.0 mg/L. Under these circumstances, DO measured at Station 643 is, at times, somewhat higher than the average DO concentration measured in the turbine boils. However, when DO was averaged across all the turbine boils during a given sampling day, the DO concentrations in the turbine discharge were shown to be the same as that measured at Station 643 during the same period (33% of the time, 85 of 255 observations), and within + 0.5 mg/l of Station 643 72% of the time (184 of 255 measurements). Moreover, a frequency plot of the differences in DO values observed between the turbine boils and Station 643 showed that the distribution was nearly equal between observations when Station 643 under or over recorded the DO measured in the turbine boils.

Numeric State Water Quality Standards. It is anticipated that the Project will continue to meet current Maryland water quality standards for the term of the new license. The 2010 water quality study (Normandeau and GSE 2012a) demonstrated that:

- Water temperature in the Project discharge is similar to pond water temperatures and is unaffected by Project operations;
- DO and temperature measured at Station 643 are very similar to the DO and temperature conditions measured in the turbine discharge boils and along the downstream transects. Thus, Station 643, is a good, representative location for monitoring compliance with state standards; and
- State DO standards in the Conowingo tailrace were met or exceeded 100% of the time during the period May 1 through October 31, 2010 as measured at Station 643.
- The minimum and maximum turbidity values recorded downstream of Conowingo Dam were 1.1 and 31.9 NTU units, and were within Maryland water quality standards.

The FERC FEIS also concluded existing project operations generally do not exceed state standards for water temperature and DO, and determined that no further measures to protect or enhance water temperature and DO at the Project are needed.

Erosion and Sediment

The Susquehanna River basin, draining parts of New York, Pennsylvania, and Maryland, is responsible for approximately 46%, 26%, and 33% (respectively) of the nitrogen, phosphorus, and sediment loads delivered to the Chesapeake Bay annually.[54] The majority of this sediment is

[54] Chesapeake Bay TMDL (Dec. 29, 2010), available at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLSection4_final.pdf

introduced to the Susquehanna River system as a result of man-made practices; nitrogen, phosphorus, and sediment loads originate from both point (*e.g.*, municipal wastewater facilities, industrial discharge facilities, etc.) and non-point (*e.g.*, agricultural lands, stormwater runoff, etc.) sources in the Susquehanna River basin. Of all these sources, agriculture is the largest contributor of nitrogen (44%), phosphorus (44%), and sediment (65%) loading to the Chesapeake Bay.[55]

In contrast to these upstream sources, relatively little sediment is introduced from Project lands. While erosion along the Conowingo Pond shoreline (including the mouths of tributaries) and the Conowingo tailrace shoreline is present, this erosion is predominantly due to natural processes (wind generated waves, extremely high river flow, surface runoff, and mass wasting).

While relatively small amounts of sediment are introduced to the Susquehanna River basin from the Project area, the Conowingo Dam historically trapped significant amounts of sediment and associated nutrients generated by upstream sources. In fact, it has been estimated that Conowingo Pond has trapped approximately two-thirds of the sediment generated upstream in Pennsylvania and New York since Conowingo Dam was constructed in 1928.[56] In this capacity, Conowingo Dam has essentially functioned as the Chesapeake Bay's Best Management Practice (BMP).[57]

Despite the positive contribution of the Conowingo Dam made over the years, the Environmental Protection Agency (EPA) recognized that sediment-related pollution impacts to the Chesapeake Bay from upstream sources need to be addressed directly without reliance on Conowingo Dam. Consequently, the EPA established the Chesapeake Bay Total Maximum Daily Load (TMDL) in 2010 to address the *sources* of sediment. According to the EPA:

> The TMDL – the largest ever developed by EPA – identifies the necessary pollution reductions of nitrogen, phosphorus and sediment across Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia and sets pollution limits necessary to meet applicable water quality standards in the Bay and its tidal rivers and embayments. Specifically, the TMDL sets Bay watershed limits of 185.9 million pounds of nitrogen, 12.5 million pounds of phosphorus and 6.45 billion pounds of sediment per year – a 25 percent reduction in nitrogen, 24 percent reduction in phosphorus and 20 percent reduction in sediment. These pollution limits are further divided by jurisdiction and major river basin based on state-of-

[55] Chesapeake Bay TMDL (Dec. 29, 2010), available at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLSection4_final.pdf

[56] Lower Susquehanna River Watershed Assessment (LSRWA) August 15, 2013 Quarterly Meeting, available at http://mddnr.chesapeakebay.net/LSRWA/Docs/LSRWA%20Aug%2015%202013%20meeting%20enclosures.pdf, page 25.

[57] The Chesapeake Bay Foundation stated that "The dam, historically, has been the Bay's best [Best Management Practice], removing much of what normally would have flowed downstream, particularly phosphorus and sediment." Chesapeake Bay Foundation, *Inaccuracies in Funk and Bolton's Letter About Conowingo Dam* (Nov. 2012), *available at* http://governor.maryland.gov/documents/inaccuraciesfactsheet.pdf.

> the-art modeling tools, extensive monitoring data, peer-reviewed science and close interaction with jurisdiction partners.
>
> The TMDL is designed to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place by 2025, with at least 60 percent of the actions completed by 2017. The TMDL is supported by rigorous accountability measures to ensure cleanup commitments are met, including short-and long-term benchmarks, a tracking and accountability system for jurisdiction activities, and federal contingency actions that can be employed if necessary to spur progress.[58]

To that end, states are implementing measures to reduce sediment and nutrient loads from major sources. Implementation of the TMDL program will result in the Bay and its tidal tributaries achieving water quality standards for dissolved oxygen, water clarity, and chlorophyll by the year 2025.

Concurrent with EPA's implementation of the TMDL, the U.S. Army Corps of Engineers and MDE partnered to conduct the Lower Susquehanna River Watershed Assessment (LSRWA), which studied sediment transport and nutrient loading in the Susquehanna River's lower three impoundments (Lake Clarke, Lake Aldred, Conowingo Pond), the reach downstream of Conowingo Dam, and the Susquehanna Flats.

The LSRWA evaluated measures at the three impoundments to manage sediment and nutrient loads that may be mobilized during high flow/storm events. Results from the LSRWA study, however, suggest that the measures under consideration are not practicable or effective, and are cost-prohibitive. For example, the LSRWA's modeling analysis indicated that dredging 3 million cubic yards of sediment from Conowingo Pond would only result in a 1.4 percent reduction of total sediment outflow load to Chesapeake Bay.[59] Moreover, the cost of dredging and upland disposal of 3 million cubic yards of sediment from Conowingo Pond is estimated at $48 to $267 million annually.[60]

Consistent with the EPA TMDL and Clean Water Act approach of addressing pollution at its source, Exelon has proposed several measures to address sediment management as it relates to the Project. These measures include incorporation of BMPs on Project lands to protect and stabilize streambanks and to establish riparian buffers as part of a Shoreline Management Plan (SMP). During relicensing, Exelon also conducted a bathymetric survey of Conowingo Pond to establish a baseline for future surveys to monitor sediment accumulation, and assess remaining storage

[58] Chesapeake Bay TMDL Executive Summary, http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLExecSumSection1through3_final.pdf.
[59] Lower Susquehanna River Watershed Assessment (LSRWA) Final Report, at 137 (May 2015) http://dnr.maryland.gov/waters/bay/Documents/LSRWA/Reports/LSRWAFinalMain20160307.pdf.
[60] *Id.* at ES-5.

capacity. As part of its relicensing proposal, Exelon has committed to undertake additional bathymetric surveys every five years to continue the monitoring program.

Citing the LSRWA findings, the FERC FEIS also concluded that operational changes at Conowingo would not address the sediment transport issue, and that dredging of Conowingo Pond would be cost prohibitive and ineffective. Because it is a watershed-wide issue, FERC found that there was no justification for requiring Exelon to implement measures such as dredging to help control sediment and nutrient loading in the Bay, which would occur in the long-term whether or not Conowingo Dam was in place.

*Effects on the Suspension of Toxic Compounds and Algae Growth***.** Under Exelon's proposed action, effects on DO in Conowingo Pond and below the dam will not create conditions leading to algal blooms. Additionally, Project peaking operations, under Exelon's proposed action, will not affect any potentially toxic compounds in suspension from upstream sources nor cause the re-suspension of any compounds present in surficial bottom sediment also delivered from the upstream watershed.

*Salinity and Salt Wedge Encroachment in the Lower Susquehanna River***.** Under Exelon's proposed action, Project impacts on the encroachment of saline water in the tidal portion of the Susquehanna River are expected to be low. Exelon's environmental analysis indicates that the Project does not influence salinity levels in the lower Susquehanna River. Elevated salinity appears to be related to prolonged drought and low river flow conditions.

Effects of Project Operations on Flooding. Under the proposed action, the Project would have little or no impact on downstream flooding. Because of the limited storage available in Conowingo Pond (2.0 hours at 250,000 cfs), the dam cannot substantially change flooding durations that are days-long, and managing the pond to do so would be ineffective. The pond's actively used storage is small compared to the flows experienced in the river. The three alternatives investigated in Exelon's study represented a wide range of operational changes that could be made to Conowingo Dam, and none of the investigated operational alternatives would substantially reduce flooding in Port Deposit if implemented.

The FERC FEIS also concluded that Project operation has little effect on downstream flooding, stating that the storage available in Conowingo Pond is not enough to mitigate even relatively small events such as the 10-year flood. Additionally, FERC concluded that there do not appear to be any operational changes that could be made that would reduce downstream flooding for the 10-, 50-, 100-, or 500-year storm events.

2. Aquatic Resources

Exelon's analysis of aquatic resource issues, summarized below, is set forth in Exhibit E, Section 3.3.3. Exelon's studies confirmed that Conowingo Pond and the Project tailrace support a diverse assemblage of fishes and a healthy multi-species sport fishery supported by natural reproduction. Moreover, Project operations do not appear to be adversely impacting fish propagation.

Additional studies concluded that water level fluctuations attributable to Project operations do not affect: (1) littoral habitat; (2) fish access to Conowingo tributaries; and (3) the downstream emergent aquatic vegetation (EAV)/SAV communities, or species' use of EAV/SAV-associated habitats.

a. Velocity Barriers and Flows

Exelon's study on velocity barriers concluded that there was no evidence suggesting that water velocities present a barrier to upstream migration of American shad or river herring.[61] Only at the highest Project discharge rate modeled do velocities in some areas of the river appear to be in excess of the fishes' swimming abilities. This does not preclude migrating alosines from reaching the dam, however, as American shad and river herring will seek slower currents, avoid excessive velocity, and alternate between swimming and resting. In addition, a radio telemetry study conducted in 2010 clearly illustrated the American shad's ability to traverse the length of the riverine portion of the Susquehanna River below Conowingo Dam.

Moreover, fish migrated upstream with little observable difficulty regardless of Project discharge. There is no clear indication that migratory behavior or movement to the immediate vicinity of Conowingo Dam and Powerhouse is adversely influenced by operations of Conowingo Dam in the approximately 4-mile river reach below the tailrace. Variations in migration times did occur among upstream forays, but these did not positively correlate to Conowingo Dam discharge. Radio telemetry data indicate that regardless of Project discharge, tagged adult American shad migrated upstream to the Dam with little observable difficulty.

Flow conditions in the river are naturally turbulent, inhibiting sediment deposition until the change in hydraulic gradient near the tide line at Deer Creek. The majority of the non-tidal river reach would essentially consist of bedrock substrate without the Project, except where there is a discrete sediment supply. The sediment from major tributaries, Octoraro Creek and Deer Creek, is the source for sediment deposited in areas of locally dissipated flow. These areas provide unique combinations of depth, velocity and substrate, providing areas of refuge for species and life stages that are not well suited for the conditions found in the river's main channel.

Fish stranding can occur below the Conowingo Dam spillway when downstream water levels decline following peaking generation. Stranding is highest in the summer, compared to the spring and fall season. However, resident fish species such as gizzard shad and common carp made up 90% or more of the stranded fish. Very low numbers of anadromous fish species such as American shad, river herring, and white perch were documented, and only in spring and early summer. Dead fish documented were highest in spring (18% of the total) and less than 4% of the total in the summer and fall seasons.

[61] Final License Application Exhibit E at E-144 to E-145.

In the FEIS, FERC concluded that few fish are killed by stranding under existing operation, and about 90 percent of those killed were gizzard shad, carp, and catfish species. Although implementing an alternative flow regime could reduce this source of mortality, FERC concluded that the results of Exelon's stranding surveys indicate that the magnitude of this benefit would be minor.

b. Fish Lifts and Upstream Passage

East Fish Lift and West Fish Lift. The East Fish Lift, located near the mid-point of the Conowingo Dam, was constructed in 1991 to allow for direct passage of fish to Conowingo Pond. The East Fish Lift also supported interim trap and transport operations pending completion of the upstream fish passage facilities at the Holtwood, Safe Harbor, and York Haven Projects. Radio telemetry data collected in 2010 indicates that 73% (65 of 89) of adult American shad that migrated to the Project tailrace entered into the East Fish Lift and 45% (40 of 89) of those adult American shad that migrated to the Project tailrace successfully completed passage through the East Fish Lift. The study, in conjunction with Exelon's companion study on East Fish Lift attraction flows, did not identify any single operational parameter for the Project or the East Fish Lift that may result in substantial improvements in fish passage effectiveness at the East Fish Lift.

Exelon conducted an additional site-specific telemetry study in the spring of 2012 to provide more information on the effectiveness and efficiency of the East Fish Lift operation. 2012 radio telemetry data indicate that 44% (29 of 66) of adult American shad that migrated to the Project tailrace entered into the East Fish Lift. Of those adult American shad that migrated to the Project tailrace successfully, 26% (17 of 66) completed passage through the East Fish Lift.

The West Fish Lift has been in operation since 1972 and has a remaining life expectancy of up to 15 years.[62] According to the PFBC, the West Fish Lift is currently adequate to provide enough fish for spawning American shad at the site, and supporting the hatchery and stocking program.

Upstream American Eel Passage. Exelon conducted biological and engineering studies which described the spatial distribution and size characteristics of American eels in the Conowingo tailrace, examined the engineering feasibility and costs of upstream and downstream passage options, and assessed the cumulative impacts to biodiversity of the Susquehanna River ecosystem of upstream and downstream passage of American eel, among other objectives.[63] American eel were collected between 2005 and 2011 utilizing a ramp facility located near the West Fish Lift. The annual catch at this facility ranged from 19 to 85,000 elvers. Exelon collected eels at two locations in the spillway in 2010 and 2011. Of these locations, the location known as spillway 50 (extreme eastern side of the spillway) captured slightly more elvers (697) than the East Fish Lift spillway ramps (569).

---

62 Final Study Report Biological and Engineering Studies of the East and West Fish Lifts (Conowingo RSP 3.9).
63 Biological and Engineering Studies of American Eel (Conowingo RSP 3.3).

Upstream Alewife and Blueback Herring Passage. Based on annual passage counts, the East Fish Lift is capable of passing more than 200,000 river herring in a single day of operation. Personal observations by East Fish Lift operating crews note that if herring are present in the Conowingo tailrace, the bulk of the run occurs during a very short period of time (3 to 7 days), or on a single day.

Hydraulic model outputs indicate that there are relatively few areas in the non-tidal river reach where water velocities are greater than the burst speeds of river herring (> 6 fps) resulting from discharges of 10,000 and 40,000 cfs. Additionally, there are significant areas of passage where the velocity is below burst speed and in the range of sustained or prolonged swim speeds. There is no evidence available to suggest that discharge velocities preclude migrating alosines from reaching the dam. No matter what the strategy, seeking slower currents, avoiding excessive velocity, swimming and resting, etc., river herring successfully reach the dam.

c. Entrainment and Impingement

The overall entrainment and impingement impact on resident fishes is moderate for gizzard shad and low for all other target species (bluegill, channel catfish, largemouth bass, smallmouth bass, and walleye). Fish lacking the swimming ability to avoid the intakes will pass through the bar racks and not be impinged. Passage survival through the Francis units 1-7 is high (100-95%) for juvenile bluegill; high to moderate-high (100-90%) for juvenile channel catfish and smallmouth bass; and high to moderate (100-85%) for juvenile gizzard shad, largemouth bass and walleye. Adult bluegill and smallmouth bass survival is moderate-high to low-moderate (95-80%); adult channel catfish, gizzard shad, and largemouth bass were rated moderate-high to low (95-<80%); and adult walleye were rated moderate to low (90-<80%).

Survival of juvenile fish passing the Kaplan units 8-11 is high (100-95%) for bluegill, channel catfish, and smallmouth bass; and high to moderate (95-90%) for juvenile gizzard shad, largemouth bass, and walleye. Survival for adult life stages is high to moderate (95-90%) for bluegill and smallmouth bass; high to low (100-<80%) for channel catfish; moderate-high to low-moderate (95-80%) for gizzard shad and largemouth bass; and moderate-high to low (95-<80%) for walleye, the largest of the adult life stages.

Passage survival through the two house turbines is moderate-high (95-90%) for bluegill; moderate-high to low-moderate (95-80%) for channel catfish and smallmouth bass; and moderate-high to low (95-<80%) for gizzard shad, largemouth bass, and walleye. For the adult life stage, bluegill and channel catfish have the highest survival potential at moderate-high to low (95-<80%), smallmouth bass have a moderate to low survival potential (90-<80%), and the remainder (gizzard shad, largemouth bass, and walleye) have a low survival potential rating (<80%).

The entrainment potential for most resident fish species is low at the Project.[64] Entrainment, when it occurs, does not necessarily result in injury to fish. In fact, Exelon's study estimated survival rates for juvenile American shad are greater than 90%.[65] Adult American shad have a survival rate of 86.3% when passing through the Project's Kaplan units, and a survival rate of 93.0% when passing the Project's Francis units.[66]

d. Downstream Passage

Downstream Juvenile and Adult Shad Passage. Downstream passage of juvenile and post-spawned adult American shad (and other herring species) occurs via the Project turbines during the October-November and June timeframes, respectively. Site-specific studies at Conowingo indicate a high survival rate for juvenile American shad passing through the turbines (~90% for passage through the Francis units and ~95% for passage through the Kaplan units). Site-specific studies at Conowingo also indicate a high survival rate for adult American shad passing through the turbines (~93% for passage through the Francis units and ~86% for passage through the Kaplan units).

Downstream Adult Eel Passage. Upon maturity, a portion of the eels transported or volitionally passed upstream will migrate downstream and pass through one or more of the dam's turbines. Site-specific data collected in the fall of 2011 indicate that adult American eel survival at Conowingo ranges from 89.8% to 100%.

Downstream Juvenile and Adult Alewife and Blueback Herring Passage. Downstream passage of juvenile and post-spawned adult river herring species occurs via the Project turbines during the October-November and June time frames, respectively. Juvenile American shad are considered to be a proxy for juvenile river herring, and adult American shad a conservative proxy given the differences in body size between adult American shad and adult river herring.

Both site-specific survival and literature based studies indicate a relatively high survival rate for juvenile and adult American shad passing through the turbines. Site-specific studies at Conowingo indicate a relatively high survival rate for juvenile American shad passing through the turbines (~90% for passage through the Francis units and ~95% for passage through the Kaplan units). Site-specific studies at Conowingo indicate a relatively high survival rate for adult American shad passing through the turbines (~93% for passage through the Francis units and ~86% for passage through the Kaplan units).

e. Downstream Aquatic Communities

The Susquehanna River below Conowingo Dam supports numerous fish species, including gizzard shad, white perch, common carp, quillback, comely shiner, channel catfish, walleye, smallmouth and largemouth bass, along with seasonal migrants like American shad, blueback herring, alewife,

---

64 Conowingo Downstream Passage RSP 3.2 at ii.
65 *Id.* at iii, 9; Conowingo Juvenile Shad RSP 3.2 at 5, 11.
66 *Id.* at iii; *see also* Final License Application Exhibit E at E-125.

sea lamprey, American eel and striped bass. While some species have increased or declined in abundance, the fish species assemblage has remained healthy, diverse and robust; the same core group of species was observed in the 1980s. The river continues to support a healthy year-round sport fishery.

Exelon completed an instream flow study to analyze the impact of the flow regime on aquatic habitat downstream of the Conowingo Dam for the proposed continued operation of the Project. Habitat preferences for different life stages of several aquatic species were incorporated into the study, and included American shad, shortnose sturgeon, smallmouth and striped bass, river herring and macroinvertebrates. Habitat was quantified spatially throughout the river reach below Conowingo Dam for steady state flows between 2,000 cfs, and 86,000 cfs, which encompassed the Project's normal operating flow range.

Table 1 quantifies the habitat available for the various species and life stages, expected to be present in the river reach below Conowingo Dam during various periods of the year, at the existing minimum flows, as a percentage of the maximum available habitat. The results of this analysis showed that the existing flow regime for the Project provides habitat which has the ability to support the different life stages of the species present in the study area.

Table 1: Percentage of the Maximum Weighted Usable Area Habitat for the Proposed Minimum Flow Regime

Period	Minimum Flow	Target Species	Percentage of Maximum Available Habitat for Specified Minimum Flow
December-February[67]	3,500	Shortnose Sturgeon juveniles	57
		Shortnose Sturgeon adults	57
		Smallmouth bass juveniles	100
		Smallmouth bass adults	73
		Trichoptera	85
March	3,500	Shortnose Sturgeon juveniles	57
		Shortnose Sturgeon adults	57
		River Herring spawning	96
		Smallmouth bass adults	73
		Trichoptera	85
April	10,000	American shad spawning	53
		American shad fry	78
		Striped bass spawning	42
		Striped bass fry	35
		Shortnose sturgeon spawning	60
		Shortnose sturgeon fry	76
		River Herring spawning	82
May	7,500	American shad spawning	41
		American shad fry	69
		Striped bass spawning	34
		Striped bass fry	27
		Shortnose sturgeon spawning	49
		Shortnose sturgeon fry	66
		River Herring spawning	96
June	5,000	American shad fry	58
		American shad juvenile	94
		Striped bass fry	18
		Striped bass juvenile	59
		Smallmouth bass spawning	100
		Smallmouth bass adults	82
		Trichoptera	94
July	5,000	American shad fry	58
		American shad juvenile	94
		Striped bass juvenile	59
		Smallmouth bass fry	57
		Smallmouth bass adults	82
		Trichoptera	94
August-September 1-14	5,000	American shad juvenile	94
		Striped bass juvenile	59
		Smallmouth bass juvenile	100

[67] The 3,500 cfs minimum flow is provided on an intermittent basis, typically with a maximum six hours off followed by equal amount on. During off periods the minimum flow provided is 800 cfs. Percent of maximum WUA represents conditions at 3,500 cfs.

Period	Minimum Flow	Target Species	Percentage of Maximum Available Habitat for Specified Minimum Flow
		Smallmouth bass adults Trichoptera	82 94
September 15-November	3,500	American shad juvenile Striped bass juvenile Smallmouth bass juvenile Smallmouth bass adults Trichoptera	88 50 100 73 85

The Freshwater Mussel Characterization study below Conowingo Dam found that mussels are fairly well established in the Project area.[68] Species included eastern elliptio (*Elliptio complanata*), alewife floater (*Anodonta implicata*), eastern floater (*Pyganodon cataracta*), tidewater mucket (*Leptodea ochracea*), and eastern lampmussel (*Lampsilis radiata*). The study found that much of the reach below the dam is a challenging environment for mussels, due to the bedrock/boulder-dominated river bottom and turbulent water flow.

FERC's analysis of instream flows downstream of Conowingo within the FEIS determined that Exelon's current flow regime is generally adequate for protection of aquatic resources downstream of the Project, although some adjustments to these flows such as eliminating periods of zero minimum flow in December through February and increasing the minimum flow to 7,500 cfs in the first half of June could provide additional protection to downstream aquatic habitat.

f. Migratory Fish Reproduction

The Impact of Plant Operation on Migratory Fish Reproduction study evaluated the potential impact of Project operations, including the current minimum flow regime, on the reproduction of target anadromous fish (*e.g.*, American shad, river herring, striped bass, and white perch). The study found that Project operations had minimal to no adverse impacts on these species, and that any population declines—particularly in the case of river herring—were likely attributable to impacts unrelated to Project operations.

Further, sampling was conducted in the spring of 2012 to gather additional information on the occurrence of ichthyoplankton in the Susquehanna River downstream of Conowingo Dam. The study showed that the lower Susquehanna River continues to provide recruitment for many fish species. Nearly 20 different taxa were collected in the plankton nets during the 2012 sampling. The ichthyoplankton collections were similar to those obtained in the early 1980s. Gizzard shad eggs and larvae, continually increasing in numbers in the lower Susquehanna, proved to be the predominant species. White perch eggs and larvae, abundant historically, have dramatically

[68] Freshwater Mussel Characterization Study Below Conowingo Dam (RSP 3.19).

diminished from the sampling area. Reproduction of river herring continues to be well documented in the lower Susquehanna River.

The condition factor and length-weight relationships of representative common fish species downstream of Conowingo Dam associated with the existing flow regime are comparable to those from other normal, natural populations and are indicative of relatively favorable conditions and habitats in the lower Susquehanna River.

3. Terrestrial Resources

Exelon's analysis of terrestrial resource issues, summarized below, is set forth in Exhibit E, Section 3.3.4.

The potential effects of Project operations on downstream SAV communities are likely to be minimal, and any effects are minimized further by the timing of high flow/high water events, which occur mostly during periods when SAV is not present. The assessment of potential operational impacts on SAV requires consideration of seasonality. Submerged vegetation species common to the low salinity waters of the upper Chesapeake Bay and tributaries become established generally from July through September. The presence of these species below Conowingo Dam generally coincides with periods of minimal water level fluctuation and low flows. River flows for the months of July, August, and September exceed a flow equivalent to the maximum generation at Conowingo (86,000 cfs) only 1.0 to 3.5 percent of the time, based on flow duration curves for the USGS Gage at Conowingo Dam (developed as part of the Hydrologic Study of the Lower Susquehanna River). Peaking operations at Conowingo are, on average, more infrequent during the summertime growing period than at other times of the year, lowering the potential for effects associated with elevated generation flows on downstream SAV communities. In contrast, flows at or exceeding 86,000 cfs during the winter and spring seasons (December-May) occur approximately 9.9 to 22.5 percent of the time, based on the results of the Hydrologic Study of the Lower Susquehanna River. As such, although the potential effects of Project operations on downstream SAV communities is likely to be minimal, they are minimized further by the timing of high flow/high water events, which more often occur during periods when SAV is not present.

The FERC FEIS determined that SAV downstream of Conowingo dam is limited to areas that have finer-grained substrate or are protected from high water velocities associated with high river flows. The highest concentrations of SAV are in the lower part of the river closer to the mouth of the river, where river levels are influenced by tidal flow from the Chesapeake Bay and velocities tend to be lower. Portions of the river closest to Conowingo Dam have a steeper gradient, a substrate of primarily bedrock and boulder, and little SAV. FERC concluded that SAV distribution downstream of the dam is more influenced by existing substrate conditions and natural high-flow events, which have the potential to scour and redistribute finer-grained substrate, than by normal day-to-day project operation.

EAV communities below Conowingo Dam are not likely to be impacted to a significant degree by Conowingo operations over the range of generation flows. According to the results of EAV vegetation studies, the maintenance of EAV communities below Conowingo Dam likely are controlled more by water elevation than by flow intensities. This may explain why significant EAV growth was observed in the eastern channel of McGibney Island, an area subject to elevated water velocities during periods of higher generation flows. The less frequent peaking flows during the summer likely promote colonization by EAV by providing reduced water elevations and frequent but brief periods of inundation.

The relicensing studies also determined that existing botanical habitat is functioning properly, and that terrestrial wildlife populations are present and functioning properly. No Project impacts are anticipated for botanical or terrestrial wildlife resources.

4. Rare, Threatened, and Endangered Species

Exelon's analysis of rare, threatened, and endangered species issues, summarized below, is set forth in Exhibit E, Section 3.3.5.

Exelon conducted relicensing studies to examine potential impacts of the Project on rare, threatened, and endangered species, including the bald eagle, osprey, black-crowned night heron, shortnose and Atlantic sturgeon, and the Maryland darter.

The bald eagle is not listed as threatened or endangered by Maryland, but is listed as threatened by Pennsylvania. Shoreline forests along Conowingo Pond and the Susquehanna River downstream of Conowingo Dam provide habitat that currently supports 11 pairs of breeding bald eagles and many foraging and roosting bald eagles each year.[69]

Exelon's study on the osprey, which is not listed as threatened or endangered by Maryland, but is listed as threatened by Pennsylvania,[70] sought to identify locations in the Project area inhabited by osprey.[71] A total of 11 osprey nests were found in the Project area in 2010 and a twelfth nesting location was identified in 2011. Of these nests, four are located in the Maryland portion of the Project area and eight are located in the Pennsylvania portion of the Project area.[72]

The black-crowned night heron is not listed as threatened or endangered by Maryland, but is listed as endangered in Pennsylvania.[73] Field surveys identified approximately three to six birds regularly foraging below Conowingo dam in Maryland, traveling between Rowland Island and Fisherman's Park, and roosting in trees over the water on Rowland Island. No black-crowned night

69 Final License Application Exhibit E at E-234.
70 Osprey Nesting Survey, RSP 3.30 (Conowingo RSP 3.30); 58 Pa. Code § 133.21(2)(i) (2012).
71 Conowingo RSP 3.30 at i.
72 *Id.* at 11-12, Figure 4.1-1; Final License Application Exhibit E at E-245.
73 58 Pa. Code § 133.21(1)(xii).

heron nests were observed, however, and these locations are not anticipated to change in character over the new license term.[74]

The Northern Map Turtle, is listed as endangered by Maryland. Exelon funded studies in the Lower Susquehanna River below Conowingo Dam, conducted by researchers from Towson University, that (1) addressed whether current and potential nesting sites can be modified to enhance nesting success by Northern Map Turtles; (2) determined the severity and impacts of altered basking frequency as a function of changes in river flow and human boating; (3) began a pilot study to determine the feasibility of creating artificial basking platforms; and (4) began a pilot study to determine the feasibility of a rapid population assessment of map turtles in the lower Susquehanna River.

Study results indicated that nesting of Northern Map Turtles occurs at several locations along the Susquehanna River below Conowingo Dam. During the 2011 studies, predation rates on nests from raccoons, foxes, and feral dogs was nearly 100% at several locations. However, a few select historical nesting sites were relatively free of predation. Nesting most often occurred on sunny days after rain events, and was observed as early as 0630 hours and as late as 1930 hours, but no nocturnal nesting was observed. Turtles were found to make almost immediate use of newly-opened gaps (*i.e.*, tree-falls) in the forest canopy, suggesting that attempts to create new nesting sites by habitat manipulations could be successful, as turtles will quickly utilize new gaps in the canopy cover as nesting sites. Northern map turtles have been identified within the Project boundary.

In Maryland, MDNR identified 13 Maryland state-listed plant species. Species-specific surveys were not conducted. Although the general habitat for a plant may be present in the Project area, none of these species were observed during any of the field studies. It is anticipated that based on habitat suitability and prior documented occurrences, certain plant species of concern are present in the Project area. Continued operation of the Project will not result in adverse impacts to these species.

Shortnose sturgeon is listed as federally endangered. The historic abundance of shortnose sturgeon in the Susquehanna River is poorly understood. There appears to be little documentation of sturgeon historically occurring upstream of the site of Conowingo Dam beyond a few anecdotal accounts of captures published in the late 1700s and early 1800s. No directed, fishery-independent studies to evaluate sturgeon presence in the Susquehanna River have been conducted; however, a few shortnose sturgeon collections have been documented in the lower Susquehanna River, including from the Conowingo Dam tailrace. Exelon conducted monitoring of the Susquehanna River for tagged sturgeons from other river systems (Delaware River, Potomac River) that might use the Susquehanna River. No tagged sturgeon were recorded in the Susquehanna River in the Exelon studies.

[74] Black-Crowned Night-Heron Nesting Survey, RSP 3.31 (Conowingo RSP 3.31) at 17.

Atlantic sturgeon is also listed as federally endangered. Historically, Atlantic sturgeon abundance was considered to be high, and in the late 1800s large scale commercial fisheries commenced. The Delaware Bay fishery was the largest, but Chesapeake Bay supported several fisheries as well, specifically in the James, York, Rappahannock, Wicomoco/Pokomoke, Nanticoke, Choptank, Potomac, and Patuxent Rivers. By 1901 the mid-Atlantic fishery had collapsed. Reviews of fishery dependent and independent captures for Atlantic sturgeon in Chesapeake Bay from the late 1950's through the mid-1990s yielded limited occurrences suggesting to researchers that stocks were depressed to the point that meaningful reproduction was not occurring. The most informative contemporary data regarding distribution of Atlantic sturgeon in the upper Chesapeake Bay comes from the USFWS's coast-wide sturgeon tagging database and the USFWS and MDNR reward program for live sturgeon captured in the Maryland portion of Chesapeake Bay. Welsh et al.[75] compiled reports from the reward program for 1996-2000 depicting the distribution of collections reported throughout much of the upper Chesapeake Bay. Only two were from as far up bay as Elk Neck (adjacent to the Susquehanna River) and none were from the Susquehanna River.

Exelon conducted monitoring of the Susquehanna River for sonic transmitter tagged sturgeons from other systems (Delaware River, Potomac River) that might use the Susquehanna River during 2010 and 2011 with fixed station acoustic telemetry receivers.[76] Monitoring was conducted when a number of Atlantic sturgeon might have been at large with active acoustic transmitters. No tagged sturgeon were recorded in the Susquehanna River in the Exelon studies.[77]

FERC concluded in the FEIS that while there is suitable habitat downstream of Conowingo for both shortnose and Atlantic sturgeon species, only occasional individual shortnose sturgeon have been reported from the river below the Conowingo Dam, and there is no evidence of any recent occurrence of Atlantic sturgeon in the lower Susquehanna River. Therefore, continued operation of the Project would not be likely to adversely affect either the shortnose or Atlantic sturgeon.

In Conowingo Pond, Chesapeake logperch, listed as threatened by Maryland, is considered to be locally abundant. In the 2010-2011 lower Susquehanna River Maryland darter surveys, Chesapeake logperch were found to be widely distributed and abundant. Chesapeake logperch was the second most abundant darter species over 193 sampling locations, and the most abundant darter species in Octoraro Creek. The species is established under the existing operational regime. Continued operation of the Project will not result in adverse impacts to this species.

Surveys for Maryland darter, a federally endangered species, were conducted seasonally from fall 2010 through fall 2011 in the lower Susquehanna River (157 locations), Octararo Creek (12 locations), and Deer Creek (24 locations). Deer Creek sampling included the riffle where the

---

[75] Welsh, S.A., S.M. Eyler, M.F. Mangold, and A.J. Spells. 2002a. Capture Locations and Growth Rates of Atlantic Sturgeon in the Chesapeake Bay. American Fisheries Society Symposium 28: 183-194.

[76] Shortnose and Atlantic Sturgeon Life History Studies, RSP 3.22 (Conowingo 3.22).

[77] Exelon is continuing to consult informally with the National Marine Fisheries Service on shortnose and Atlantic sturgeon.

species was recorded as last observed, as well as sites upstream and downstream of it. No Maryland darters were collected; however, five of six darter species were recorded in the lower Susquehanna River Basin. The collection of numerous other darters indicated that the method was a sound approach for sampling Maryland darter. The study represents the most extensive and intensive sampling effort conducted in the Lower Susquehanna River for Maryland darter. The study results strongly indicate that it is unlikely that the species still exists in the Project area, so operations will not have any impacts on the species.

5. Recreation Resources

Exelon's analysis of recreation issues, summarized below, is set forth in Exhibit E, Section 3.3.6.

A thorough evaluation of recreation resources in the Project vicinity was performed. Exelon's Recreational Inventory and Needs Assessment (1) inventoried recreation in the Project area to identify public access points within the Project boundary; (2) estimated the amount of recreational use occurring at the Project; and (3) determined whether enhanced and/or new recreation facilities are needed to support recreation use at the Project.[78] The assessment, which involved on-site data collection for one year, found that recreational users are satisfied with existing recreation conditions and opportunities at the Project, and that capacity at the Project's numerous and diverse recreation facilities far exceeds demand.[79] Even with an estimated one-third increase in recreation demand at the Project through 2050,[80] Project recreation facilities are expected to continue to be substantially underutilized.[81]

The Project offers extensive formal and informal recreation sites which provide the recreating public trails, day use and interpretive sites, boat launch facilities, a swimming pool, wildlife viewing areas, and shoreline fishing opportunities. Exelon partners with state, county, municipal, non-profit agencies, and individuals for the development and management of these recreational facilities which, together with public access lands administered directly by Exelon, occupy over 720 of the 1,270 acres of Project lands above the ordinary high water mark.

Although user surveys indicate high levels of satisfaction and Exelon's studies show excess capacity at existing Project recreation facilities, Exelon believes that improvements to existing facilities will enhance access and recreational use of the Project, consistent with FERC's policy of maximizing public recreation at licensed hydropower projects.

6. Land Use

Exelon's analysis of land use issues, summarized below, is set forth in Exhibit E, Section 3.3.7.

---

78 *See* Recreation Management Plan at i, included in Volume III of the Final License Application.
79 *Id.* at 6-41 (calculating facility use and capacity at Project recreation areas to range from 10 to 40%).
80 *Id.* at 7-4; *see also* Final License Application Exhibit E at E-293.
81 Recreation Management Plan at 7-6 to 7-7.

Project lands, which consist mainly of recreational and undeveloped, publicly accessible land, have little effect on the land use in the area. Land use adjacent to the Project is currently dominated by agricultural land and heavily forested land. The Project as it exists and as it is proposed is fully consistent with adjacent land uses and provides public benefits including parks, trails, and interactive displays. As there are currently no proposed changes to Project operations, use of adjacent lands is not anticipated to be affected.

Exelon undertook a number of studies to evaluate the Project's benefits and effects on the numerous environmental resources and uses that relate to the Project's shoreline. These studies contributed to the development of the SMP, a comprehensive plan for the management of the Project shoreline over the new license term.

In the FEIS, FERC concluded that implementation of Exelon's proposed SMP would provide a single source for shoreline management guidelines, policies, and an overall framework for managing the Conowingo shorelines over the terms of the new license. The proposed plan would bring all existing shoreline management programs and activities, such as the current residential lot and cottage lease program, and any other guidelines, into a single, comprehensive document. Project lands would remain available for public recreational uses, and private and commercial uses would continue to be allowed on project lands pending proper reviews. Exelon would review permit applications for activities such as improvements to leased cottages, construction of boat docks, piers, and landscaping, and would ensure that all residential cottages sewage systems meet local standards on an annual basis.

B. Protection, Mitigation, and Enhancement Measures

1. Flow Regime & Water Quality

The existing flow regime ensures that project operations will not adversely affect SAV/EAV, and will support the propagation of fish, shellfish, and wildlife, and aquatic habitat downstream of Conowingo dam. Nonetheless, Exelon proposes to increase its minimum flows and to make them continuous year-round to provide additional protection to downstream aquatic habitat, as recommended in FERC's FEIS. Specifically, Exelon proposes the following minimum flows:

Month	**Minimum Flows (cfs)**
December	4,000
January	4,000
February	4,000
March	4,000
April	18,200

Month	Minimum Flows (cfs)
May	18,200
June	7,500
July	5,500
August	4,500
September	3,500
October	4,000
November	4,000

These flow conditions provide for an operational regime that adequately mitigates the impacts of the Project's regulation of flow in the lower Susquehanna River, and protects suitable habitats and key natural processes.

2. Fish Passage

Significant catches of river herring were made at the existing East Fish Lift in 1997 (242,815 herrings), 1999 (130,625 herrings), and 2001 (284,291 herrings). After 2002, however, very few river herring have been passed, with the maximum annual catch of 530 recorded in 2005. American shad catch at the existing East Fish Lift show a similar trend. Between 2000 and 2004, the average annual East Fish Lift catch was 137,923 fish. However, in subsequent years the annual American shad catch has fallen dramatically from 68,926 fish in 2005 to 12,733 fish in 2013.

These trends suggest that other non-Project factors may have a greater effect on American shad and river herring populations in the watershed. In addition, predation, bycatch, and competition are possible factors impacting the American shad and river herring populations. In the ocean, American shad and river herring are likely preyed upon by many species of fish, marine mammals, and seabirds. Inshore, it has been suggested that striped bass predation may limit the American shad population. Bycatch in commercial fisheries is a threat of significant concern for American shad and river herring populations. Significant bycatch primarily occurs in coastal ocean trawl fisheries for Atlantic herring, Atlantic mackerel and squids.

Data shows that the fish assemblage in the lower Susquehanna River has become increasingly dominated by gizzard shad since the 1970s. Gizzard shad thrive in warm, shallow bodies of water that have a soft mud bottom, high turbidity, and relatively few predators, such as Conowingo Pond. Gizzard shad in early life stages consume zooplankton, often to the detriment of other young fishes, such as juvenile American shad. Additionally, it has been noted that at times the overabundance of gizzard shad appears to impede the ability for American shad to enter and utilize the East Fish Lift effectively.

Despite these non-Project impacts, Exelon's proposed improvements to fish passage facilities will substantially enhance fish passage. As set forth in the Settlement Agreement, Exelon will implement substantial improvements to the existing fish passage facilities at the Project within three years of license issuance (Initial Construction Items). The Initial Construction Items include:

- Modifying the existing East Fish Lift to provide 900 cfs of attraction flow.
- Replacing the current 3,300-gallon hopper at the East Fish Lift with two 6,500-gallon hoppers.
- Reducing cycle time at each hopper at the East Fish Lift to be able to lift fish four times per hour.
- Completing modifications to the East Fish Lift structure to allow for trapping and sorting fish at the East Fish Lift facility and transporting them to the western side of the dam to a truck for transport upstream.
- Modifying the existing West Fish Lift to facilitate trap and transport.
- Constructing and maintaining structures, implementing measures, and/or operating the Project to provide American shad and river herring a zone of passage to the fish passage facilities.
- Evaluating 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.

In addition to these Initial Construction Items, Exelon will commence trap and transport of American shad and river herring from the Project to above the York Haven Hydroelectric Project beginning the first fish passage season after license issuance.[82] Exelon also has committed to trap and transport American eels at the west side of Conowingo Dam until 2030, and to implement volitional American eel passage starting in the 2031 fish passage season.

Five years after issuance of the new license, Exelon will commence a three-year "Initial Efficiency Test" of fish passage at the Project. The Initial Efficiency Test will measure the passage efficiency of the improved facilities. If the facilities achieve an 85 percent upstream passage efficiency for adult American shad,[83] Exelon will continue to operate the facilities without further modification. Exelon will then conduct two-year "Periodic Efficiency Tests" every five years to ensure that the

[82] Exelon has agreed to annually trap and transport up to 80 percent of the run, up to a maximum of 100,000 fish for each species.

[83] Pursuant to the Settlement Agreement, Exelon receives credit toward achieving the upstream passage target efficiency of 85 percent as a result of its trap and truck operations.

Project maintains an upstream passage efficiency of 85 percent for adult American shad throughout the term of the new license.

If the Project does not achieve an upstream passage efficiency of 85 percent after the Initial Efficiency Test or any Periodic Efficiency Test, Exelon will be required to implement measures to improve passage efficiency at the Project. Exelon and Interior have agreed on a tiered list of potential measures, which are designed to address fish passage impediments associated with attraction flow and capacity limitations. The degree of the shortfall from the 85 percent passage efficiency target determines the scope of the additional mitigation and enhancement measures that will be required. As set forth in the Settlement Agreement, these additional mitigation measures range from the implementation of preferential turbine operating schemes to the construction of a new West Fish Lift.

In the first fish passage season after Exelon implements any measure or measures to improve passage effectiveness, Exelon will commence a three-year Post-Modification Efficiency Test. The Post-Modification Efficiency Test will measure the passage efficiency of the improved facilities. If the Project achieves an upstream passage efficiency of 85 percent for American shad, Exelon will continue to operate the facilities without modification and will return to conducting two-year Periodic Efficiency Tests every five years. Again, if any Periodic Efficiency Test demonstrates that the Project is not achieving an 85 percent passage efficiency, Exelon will implement a measure or measure(s) from the tiered list of options, to be followed by a Post-Modification Efficiency Test. This cycle of testing and modifying, as necessary, will continue throughout the term of the license.

In addition to the improvements described above, Exelon will develop and implement a Fishway Operation and Maintenance Plan (FOMP) that will provide extensive information about the operations of the Project's fish passage facilities. The Settlement Agreement includes downstream American eel effectiveness monitoring, upstream American eel effectiveness testing, and downstream adult and juvenile American shad and river herring effectiveness testing. The plans for all the studies described in the Settlement Agreement will be contained in the Fishway Effectiveness Monitoring Plan (FEMP)—a document Exelon will develop in consultation with Interior, and which is subject to approval by Interior and FERC.

In any year that Exelon is conducting a study, it will submit a yearly interim study report to Interior and FERC following the conclusion of the study year. The interim and final reports for upstream passage studies will be submitted to Interior by December 31st of each study year. The interim and final reports for downstream passage studies will be submitted to Interior 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 Exelon's success or failure in achieving the passage efficiency criteria set forth in the Settlement Agreement. In conjunction with submitting the final study report(s), Exelon also will provide Interior electronic copies of all data collected from the studies.

Further, Exelon agreed to meet annually with Interior 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 Exelon and Interior agree on a different date. At this annual meeting Exelon will discuss with Interior 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 Exelon proposes for the upcoming fish passage season.

Exelon has agreed to operate the Project to achieve a downstream survival efficiency of at least 80 percent of the adult and 95 percent of the juvenile American shad and river herring moving downstream past the Project. Exelon also has agreed to operate the Project to achieve a downstream survival efficiency criterion of at least 85 percent of the adult American eel moving downstream past the Project. If the results of the downstream studies indicate that the Project is not achieving these efficiency criteria, Interior may exercise its reservation of authority to address the issue.

Finally, in the Supplemental Filing, Exelon committed to design, install and operate an eel trapping facility and eel holding facility along the western shore of the Conowingo Dam near the location of the current United States Fish and Wildlife Service (USFWS) trapping location and facility. Those facilities began operation on May 1, 2017 and will be operated by Exelon annually until 2030, at which point Exelon will construct and operate a volitional upstream eel facility at Conowingo Dam through the term of the new FERC license, as described in the Settlement Agreement.

Exelon will submit daily emails and an annual report (Annual Report) providing information regarding the operation of the eel passage facilities to the (EPAG), a group that is chaired by Exelon and composed of a representative from each of the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, USFWS, the Maryland Department of Natural Resources Maryland Power Plant Research Project and the SRBC.

Every three years, unless a different period is established by the PADEP in writing beginning in 2018 through 2030, Exelon will conduct stream segment evaluations through electrofishing or other methods identified after consultation with EPAG. Results of stream segment evaluations will be included in the Annual Report and will document dispersal of the stocked eels, estimate the approximate density of stocked eels, and evaluate the growth, condition, age, gender and level of infestation with *Anguillicoloides crassus* of stocked eels.

3. Rare, Threatened, and Endangered Species

Bald Eagle Management Plan. Exelon's Bald Eagle Management Plan, which was developed in consultation with the USFWS, the Pennsylvania Game Commission (PGC), and the MDNR, addresses the use of Project lands by bald eagles for nesting, roosting, and foraging based on the

national Bald Eagle Management Guidelines.[84] It provides a framework for evaluating and implementing land management practices that minimize impacts to bald eagles on Project lands. Exelon anticipates that implementation of the plan will enhance and benefit bald eagles on Project lands and in the region as a whole.

Osprey Protection Measures. Twelve osprey nests were found in the Project area; four in the Maryland portion of the Project and eight in the Pennsylvania portion.[85] To appropriately protect these and other nests, Exelon's SMP includes an Osprey Management Policy developed in consultation with state and federal agencies.[86] The Policy includes the establishment of appropriate buffers to prevent visual or auditory disturbances of nests during the breeding and nesting season (January to late July). The policy also includes the following measures to protect ospreys nesting on Exelon lands:

- Nest Buffers: Nest buffers of 330 feet will be implemented during breeding season for most activities. For activities with the potential to emit excessive noise (which excludes routine Project operation and maintenance activities), larger buffers up to 600 feet will be implemented during breeding season.

- Herbicide application for vegetation control will be avoided within 330 feet of nests during breeding season.

- Tower nests: In the event that nests located in towers are identified as problem nests, Exelon will consult with the USFWS to identify the appropriate best management practices and obtain applicable permits for nest removal or relocation. A typical best management practice for problem nests in towers is the installation of nest platforms on towers or nearby.

Changes to existing vegetation management practices are not proposed.

4. Recreation Resources

Using the suggestions received through user preference surveys, informal comments received at public meetings, and formal written comments submitted during the relicensing process, Exelon has developed a Recreation Management Plan for managing recreational resources at the Project over the new license term. Exelon is proposing to improve and enhance Lock 13, Lock 15, Muddy Creek Boat Launch, Cold Cabin, Dorsey Park, Peach Bottom Marina, Line Bridge, Conowingo Creek Boat Launch, Glen Cove Marina, Funk's Pond, Conowingo swimming pool, Conowingo Dam Overlook, and Fisherman's Park/Shures Landing.

Exelon believes these enhancements reflect its commitment to provide high-quality public recreation at the Project, meet current and future recreational demand in the Project area, and

[84] Because the Bald Eagle Management Plan includes sensitive information about the species, it was filed as privileged in Volume IV of the Final License Application. Exelon will file a copy upon request.
[85] *Id.* at 11-12, Figure 4.1-1; Final License Application Exhibit E at E-245.
[86] Conowingo SMP at 6-6.

appropriately consider the needs of persons with disabilities. The estimated cost for constructing these recreation improvements is approximately $2.5 million.

5. Land Use / Sediment Erosion and Control

Exelon's proposed sediment and erosion mitigation measures reflect the relative impact of Project operations on sediment and nutrient delivery to the Susquehanna River. Exelon has developed a SMP which will ensure, among other things: (1) protection of environmental resources such as wetlands, fish and wildlife habitat, and spawning areas; (2) maintenance of water quality; and (3) minimization of sediment and nutrient delivery to Project waters.

The proposed SMP includes a land classification system, and a "Sensitive Natural Resource Protection Overlay," which identifies the locations of natural or cultural resources within the Project boundary that may be affected by Project operations or the activities of lessees of Project lands or recreating members of the public. Prior to undertaking any ground-disturbing activity or significant exterior maintenance, or permitting a lessee to undertake such activities, Exelon will review the overlay to determine if natural or cultural resources may be affected. If so, Exelon will take appropriate avoidance or mitigation measures consistent with the plans, programs, and policies consolidated within the SMP to better inform shoreline users and the public, and to enhance coordination with government agencies and interested non-governmental organizations.

The SMP encompasses the following policies and practices:

- Shoreline Erosion Control Policy to guide the modification of shoreline vegetation for control purposes.
- General Maintenance Policy to address shoreline buffer maintenance and modification.
- Erosion and Remediation Policy to monitor and remediate erosion affecting Project resources.
- Shoreline Vegetation Management Policy to guide the maintenance and modification of shoreline vegetative cover.
- Viewsheds and Shoreline Access Policy to address modifications to shoreline vegetation to enhance water views and access.
- Woody Debris Policy to provide for Exelon's treatment of woody debris.
- Leased Premises Policy for Non-Cottage Lands to guide the lease of Project lands and waters for non-Project purposes, consistent with the provisions of the Standard Use and Occupancy Article, any relevant L-Form standard articles, or a FERC order approving the lease, as applicable.
- Leased Premises Policy for Cottage Lands to incorporate the comprehensive rules and regulations for leases of Project lands for existing seasonal cottages, and to reflect

Exelon's policy not to permit any new cottage leases.

- Conowingo Islands Public Use Policy to limit access and use areas for leased lots on islands in Conowingo Pond for seasonal cottages.

- Public Recreation and Access Facilities to govern parcels of Project land that are leased to local, county, or state agencies, or commercial vendors for development and operation of public recreation and access facilities.

- Limitations on Public Recreation Access to restrict public access to Project lands for operational, public safety, and security reasons, such as prohibiting hunting and fishing in posted secure areas, and prohibiting the use of off-road vehicles on all Project lands.

- Overall Land Use Monitoring and Enforcement to provide for regular inspection of Project facilities and property to ensure adherence by lessees and members of the public to applicable contractual or regulatory requirements, and implementation of measures necessary to ensure compliance.

In addition, the SMP provides for the protection of aquatic and terrestrial resources and habitat on Project lands by requiring all activities undertaken by Exelon or its permittees to incorporate BMPs to minimize or eliminate sediment and nutrient delivery to Project waters. The BMPs will minimize soil erosion, control sedimentation, and restrict the use of impervious surfaces associated with new construction activities. Exelon also will implement BMPs for the use of pesticides and fertilizers, and restrict removal of vegetation.

Finally, the SMP incorporates Exelon's plans for management of rare, threatened, and endangered species, as well as for historic properties.

V. CONCLUSION

The PM&E measures proposed in Exelon's FERC application for a new license, the Settlement Agreement, and the Supplemental Filing coupled with existing Project features, will ensure that operation of the Project meets Maryland water quality standards. To the extent that studies have identified Project impacts to water quality, these impacts have either already been addressed (*e.g.*, aeration of the turbines to improve DO), or will be addressed in the new license (*e.g.*, American eel passage facilities, implementation of sediment and nutrient best management practices, improvements to recreation facilities). Accordingly, the State of Maryland should certify that the Project will comply with applicable Maryland water quality standards.

SUPPORTING DOCUMENTATION

Project FERC License Application (The entire FERC license (four volumes) is also provided for the Water Quality Certificate Application in a separate folder on the CD.)

Project FERC Licensing Study Report and Management Plans

- Water Quality Study Report
- Eel Study Report
- Instream Flow Study Report
- Migratory Fish Study Report
- Telemetry Study Report
- Shoreline Management Plan
- Recreation Management Plan

FERC Final Environmental Impact Statement (FEIS)

Settlement Agreement with U.S. Department of the Interior

Supplemental Filing