**BEFORE THE**
**MARYLAND DEPARTMENT OF THE ENVIRONMENT**

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| STEWARDS OF THE LOWER SUSQUEHANNA, d/b/a LOWER SUSQUEHANNA RIVERKEEPER ASSOCIATION<br>2098 Long Level Road<br>Wrightsville, PA 17368 | ) |
| and | ) FERC Project No. P-405<br>) MDE WSA App. No.17-WQC-02 |
| WATERKEEPERS CHESAPEAKE<br>P.O. Box 11075<br>Takoma Park, MD 20913 | ) |

**ADMINISTRATIVE APPEAL OF FINAL DECISION TO ISSUE CLEAN WATER ACT SECTION 401 CERTIFICATION FOR THE CONOWINGO HYDROELECTRIC PROJECT**

Stewards of the Lower Susquehanna, d/b/a Lower Susquehanna Riverkeeper Association (hereafter "Lower Susquehanna Riverkeeper") and Waterkeepers Chesapeake hereby respectfully request that the Maryland Department of the Environment ("MDE") reconsider and revise its Clean Water Act § 401 water quality certification ("Certification"), pursuant to Sections 26.08.02.10E and 26.08.02.10F(4) of the Code of Maryland Regulations ("COMAR"), 33 U.S.C. § 1341(a)(1), and Maryland's water quality standards set forth at Title 9, Subtitle 3 of the Maryland Environment Article. The Requesters hereby incorporate by reference all documents cited below as though fully stated herein.

## I. INTRODUCTION

### A. The Requesters Have Longstanding Interests In The Certification.

Stewards of the Lower Susquehanna is a non-profit watershed advocacy organization headquartered in Wrightsville, Pennsylvania. Established in 2005, it has more than 100 individual and organization members, and its mission is to protect and improve the ecological

and aesthetic integrity of the Lower Susquehanna River watershed and Chesapeake Bay. Lower Susquehanna Riverkeeper is a program of Stewards of the Lower Susquehanna, and leads the organization's work in advocating for strong environmental standards and policies that protect and serve the public interest. Lower Susquehanna Riverkeeper has participated actively in the Dam's relicensing process, for example by testifying at the June 2009 FERC Scoping Meeting,[1] and filing comments on Exelon's Initial Study Reports.[2]

Waterkeepers Chesapeake is a nonprofit watershed advocacy organization headquartered in Takoma Park, Maryland. It operates as a coalition of 18 independent Waterkeeper programs working throughout the Chesapeake and Delmarva Coastal Bays Watersheds. The coalition works to protect and improve the health of the Chesapeake Bay and the waterways in the region, including the Lower Susquehanna. Waterkeepers Chesapeake aims to amplify the voices of the individual Waterkeeper groups, and to work together on campaigns to stop pollution throughout the region that affects the Chesapeake.

**B. The Requesters Are Aggrieved By The Shortcomings In The Certification.**

Members of the Lower Susquehanna Riverkeeper and Waterkeepers Chesapeake have important legally-protected interests in the biological, chemical, and physical integrity of the waters situated below the Conowingo Hydroelectric Project. Members of both organizations use and enjoy that portion of the Lower Susquehanna River as well as the northern Chesapeake Bay,

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[1] Transcript, Federal Energy Regulatory Commission's Agency Scoping Meeting for the Conowingo Hydroelectric Project, No. 405, and the Muddy Run Pump Storage Project, No. 2355 (FERC Accession No. 20090612-4019, June 12, 2009).

[2] Lower Susquehanna Riverkeeper, *et al.*, Comments on Exelon's Initial Study Reports (FERC Accession No. 20120321-5173, Mar. 20, 2012). *See also* Lower Susquehanna Riverkeeper, *et al.*, Motion to Intervene and Comments re: Draft License Application for the Conowingo Hydroelectric Project (FERC Accession No. 20120709-5133, July 9, 2012).

for aquatic recreation, aesthetic enjoyment, recreational fishing, and to support their water-based organizational operations. Lower Susquehanna Riverkeeper Ted Evgeniadis patrols and stewards a large geographic area that begins at the Susquehanna River's confluence with the West Branch at Sunbury, Pennsylvania, and reaches downstream to the Chesapeake Bay at Havre de Grace, Maryland. Lower Susquehanna Riverkeeper member Keith Williams is the founding Director of Education and the current Executive Director of the NorthBay Education Foundation, one of the largest outdoor education programs in the nation, which operates on the Chesapeake Bay at the town of North East, Maryland. And Betsy Nicholas, Executive Director of Waterkeepers Chesapeake, uses the Bay and its tributary waterways five to eight times per year for patrolling and recreation, including by kayaking, rafting, boating, and canoeing. The quality and success of all these programs depends in large part on having good water quality and a high degree of ecological integrity and excellent aquatic habitat in the Lower Susquehanna River and Chesapeake Bay.

For nearly a decade, the Lower Susquehanna Riverkeeper and Waterkeepers Chesapeake have worked to help inform FERC, Exelon, Maryland and other Bay states, cooperating federal agencies, its members, and the public about the impending water quality issues associated with the changing circumstances at the Conowingo Hydroelectric Project. In particular, beginning in at least 2009, the Riverkeeper has raised the alarm and pressed the agencies and Exelon to conduct a thorough study of the changing bathymetry in Conowingo Reservoir, the increased accumulation of sediment and associated nutrients trapped by the Dam and Reservoir, the rapid approach of "dynamic equilibrium"—and the inevitable time when millions of tons of sediment trapped by the Project would be scoured out and discharged by the Project at one time, *in*

*addition to the upstream watershed load*, during storms or other large flow events that are statistically certain or very likely to occur during the requested 50-year license period.[3]

All the stakeholders in the relicensing proceeding have come to understand that the Project's Reservoir has already reached the state of dynamic equilibrium.[4] Yet the responsible agencies, including MDE, have neglected to study the full extent of the harm that is likely to occur to the water quality of the Lower Susquehanna River and the Chesapeake Bay as a result of Project-induced scouring. Instead, the multi-party cooperative Lower Susquehanna River Watershed Assessment ("LSRWA") produced a study that examined the effects of a flow event roughly equivalent to a 20-year storm.[5] Consequently, the administrative record for MDE's Certification and for the FERC relicensing lacks information about the effects of a 25-year, 50-year, 75-year, or 100-year storm that are all very likely or reasonably likely to occur during the 50-year requested license period.[6] Likewise, the administrative record lacks information about the environmental benefits, ecological considerations, and cost-efficient options for the sort of large-scale, long-term dredging operation needed to avoid and mitigate the threat of catastrophic

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[3] *See* n.1, *supra*. *See also* Lower Susquehanna Riverkeeper, et al., Letter to Elder Ghigiarelli, Jr., re: Public Comments on Conowingo Hydroelectric Project, Application for Water Quality Certification, Application # 17-WQC-02 (Sept. 11, 2017) and Attachment A thereto, Paul Frank, P.E., FlowWest, LSRWA Modeling Review Final Report (Aug. 25, 2017) (hereafter "Requesters' Comments on Certification"). *See also* Comments of Stewards of the Lower Susquehanna, Lower Susquehanna Riverkeeper, and Waterkeepers Chesapeake on Draft Lower Susquehanna River Watershed Assessment: Phase I (October 2014) (FERC Accession No. 20150203-5134, Feb. 3, 2015) (hereafter "Requesters' Comments on LSRWA").

[4] Certification at 12, ¶ 6.G. *See also* FERC, Final Multi-Project Environmental Impact Statement for Hydropower Licenses, Susquehanna River Hydroelectric Projects at 72-73, FERC/FEIS-0255F (March 2015); Exelon, Lodging of Filings Regarding Clean Water Act Section 401 Certification Challenges for Conowingo Hydro Project of Exelon Corporation under P-405 at 28, 65 (FERC Accession No. 20180525-5191, May 25, 2018).

[5] Requesters' Comments on Certification at 13-14 and Att. A thereto.

[6] *Id.*

scour events. While the LSRWA authors claimed that the benefits of dredging would be minimal or short-lived, that claim reflected two failures in the study: it seriously under-estimated the impacts of scour, and only modeled dredging scenarios that are nowhere near proportionate to the problem.[7] The Certification does not address these problems, or explain MDE's rationale for rejecting these concerns.

As a result of the foregoing problems, the recreational, aesthetic, and organizational interests of the Requesters and their members will be harmed by Project-induced scour that is not addressed or mitigated in the current version of the Certification. In addition, because MDE has not adequately studied, or required Exelon to adequately study the effects of Project-induced scour likely to occur during the license period, the Requesters and their members are deprived of specific and accurate data and information needed to fulfill its mission of educating the public about water quality problems in the Lower Susquehanna River and Chesapeake Bay, and advocating for appropriate regulatory and other controls to address those problems. These harms would be redressed by a decision by MDE to reconsider and revise the Certification and undertake additional actions as necessary to ensure that the scouring and discharge of sediment and associated nutrients from the Project will not cause or contribute to violations of the applicable water quality standards for the Lower Susquehanna River and Chesapeake Bay.

## II. LEGAL REQUIREMENTS AND AUTHORITIES

Section 401 of the Clean Water Act gives states the authority to review any federally-permitted or licensed activity that may result in a discharge to navigable waters, and to condition the permit or license upon a certification that any discharge would comply with key provisions of

[7] *Id.*; *see also* Requesters' Comments on LSRWA at 9.

the Clean Water Act and appropriate state laws.[8] This expansive certification authority preserves a substantial role for the states in protecting water quality, even when permitting authority lies solely in federal hands. As the U.S. Supreme Court characterized it:

> State certifications under § 401 are essential in the scheme to preserve state authority to address the broad range of pollution… "No polluter will be able to hide behind a Federal license or permit as an excuse for a violation of water quality standard[s]. No polluter will be able to make major investments in facilities under a Federal license or permit without providing assurance that the facility will comply with water quality standards. No State water pollution control agency will be confronted with a fait accompli by an industry that has built a plant without consideration of water quality requirements."[9]

### A. Application of Clean Water Act § 401

Pursuant to § 401 of the Clean Water Act, a state certification is needed when there is:

> Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate … that any such discharge will comply with the applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of this title.[10]

The term "discharge" has been broadly interpreted to include the release of anything that flows out, including discharges from hydroelectric dams.[11] The discharge also need not be certain; rather, the mere possibility of a discharge is sufficient to trigger the requirements of § 401.[12] Moreover, the term "discharge" in § 401 is "without any qualifiers," it does not "require

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[8] 33 U.S.C. § 1341(a)(1).

[9] *S.D. Warren Co. v. Maine Bd. of Envtl. Protection*, 547 U.S. 370, 386 (2006) (citation omitted).

[10] 33 U.S.C. § 1341(a)(1).

[11] *S.D. Warren Co.*, 547 U.S. at 373.

[12] 33 U.S.C. § 1341(a)(1) (stating that certification is required when an activity "may" result in a discharge); *see also* U.S. EPA, *Clean Water Act Section 401 Water Quality Certification: A Water Quality Protection Tool for States and Tribes* (2010) at 4,

the addition of something foreign to the water" in order to trigger the state's authority to impose conditions and issue a certification.[13] Section 401 has "a broad reach…, and its object comprehends maintaining state water quality standards."[14]

When § 401 applies to a project due to a potential discharge, the certification process applies to the "activity as a whole," not merely to the discharge itself.[15] Therefore, the certifying state must determine whether any aspect of the project (not just a discharge) would violate the relevant federal or state laws. In the case of a hydroelectric dam project, for example, a certifying state must apply the certification process to a wide range of actions such as the trapping of nutrients and sediment behind the dam, changes to stream flow and water temperature, increases in total dissolved gas levels below the dam, and the release of sediments and nutrients below the dam during both routine operation and increasingly common storm events.[16]

### B. Procedure

Section 401(d) of the Clean Water Act directs states to certify § 401 projects only when the project activities would comply with all applicable federal and state laws. These laws include

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https://www.epa.gov/sites/production/files/2016-11/documents/cwa_401_handbook_2010.pdf ("EPA § 401 Guidance").

[13] *S.D. Warren Co.*, 547 U.S. at 371.

[14] *Id*. at 380.

[15] *PUD No. 1 of Jefferson County v. Washington Dept. of Ecology*, 511 U.S. 700, 712 (1994).

[16] Due to climate change, it is predicted that all parts of the U.S. will see increases in storm intensities, and the Northeast will also experience a 58% increase in the average number of days with very heavy precipitation. Garfin et al., *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment* (2013), at 6, 8, http://www.swcarr.arizona.edu/sites/all/themes/files/SW-NCA-color-FINALweb.pdf; Hall and Stuntz, *Climate Change and Great Lakes Water Resources* (Nov. 2007) at 6-7, http://online.nwf.org/site/DocServer/Climate_Change_and_Great_Lakes_Water_Resources_Report_FI.pdf.

the federal effluent limitations (§ 1311), federal water quality related effluent limitations (§ 1312), state water quality standards and implementation plans (§ 1313), federal new source performance standards (§ 1316), toxic and pretreatment effluent standards (§ 1317), and "any other appropriate requirement of State law."[17]

If a project would not comply with the applicable laws, a state must either deny § 401 certification,[18] or conditionally grant certification with "any effluent limitations and other limitations, and monitoring requirements necessary to assure" compliance with the law.[19] If a state denies certification, the federal permit or license for the project may not be issued.[20] In this way, § 401 grants states the authority to halt projects that illegally harm water quality. Alternatively, in cases where specific permit conditions would ensure compliance with the law, a state may conditionally grant certification and these conditions would become binding limitations on the permit or license.[21]

### C. Scope of State Authority

States have extensive authority to deny or impose conditions during the § 401 certification process. As EPA has explained in recent guidance, "[c]onsiderations can be quite broad so long as they relate to water quality," and "[c]ertification may address concerns related to the integrity of the aquatic resource and need not be specifically tied to a discharge."[22] In addition to ensuring compliance with the statutorily enumerated provisions of the Clean Water

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[17] 33 U.S.C. § 1341(a)(1), (d).

[18] *Id.* § 1341(a)(1).

[19] *Id.* § 1341(d).

[20] *Id.* § 1341(a)(1).

[21] *Id.* § 1341(d).

[22] EPA § 401 Guidance, *supra* n. 12, at 23.

Act (§§ 1311, 1312, 1313, 1316, and 1317), certifying states must assure compliance with "any other appropriate requirement of State law."[23] Courts have consistently interpreted this provision to mean that all state water quality standards must be satisfied.[24] State water quality standards include designated uses for water bodies,[25] as well as the quantitative (numeric) and qualitative (narrative) criteria needed to achieve the designated uses,[26] and anti-degradation.[27] Therefore, certifying states have the obligation to ensure compliance with not only numeric water quality standards (and the total maximum daily loads ("TMDLs") used to enforce them), but also mandates designed to protect recreational uses and aquatic life.[28] Indeed, courts have repeatedly allowed certifying states to deny certifications based on the need to comply with state water quality standards, including non-quantitative standards such as the protection of aquatic life and shellfish habitat.[29]

In the case of Exelon's application for certification, the legal mandate to expansively enforce all state water quality standards prevents Exelon from simply relying on the Chesapeake Bay TMDL to absolve itself of any obligation to address the sediment pollution from the Dam.

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[23] 33 U.S.C. § 1341(d).

[24] *See, e.g., PUD No. 1 of Jefferson Co.*, 511 U.S. 700 (holding that state water quality standards, including minimum stream flow requirements, should be enforced through § 401 certifications).

[25] 40 C.F.R. § 131.10.

[26] *Id.* § 131.11.

[27] *Id.* § 131.12.

[28] *Anacostia Riverkeeper Inc. v. Jackson*, 798 F. Supp. 2d 210, 238 (D.D.C. 2011) (holding that a state's total maximum daily loads for a water body must ensure protection of all state water quality standards, including *all* designated uses and water quality criteria, in order to satisfy the Clean Water Act).

[29] *See, e.g., AES Sparrows Point LNG v. Wilson*, 589 F.3d 721, 733 (4th Cir. 2009); *Islander East Pipeline Co., LLC v. McCarthy*, 525 F.3d 141 (2d Cir. 2008).

The Chesapeake Bay TMDL did not include a wasteload or load allocation to accommodate discharges of sediment or nutrients scoured from behind the Dam, and did not purport to relieve Exelon of its responsibility for such discharges. MDE is therefore empowered to look beyond the Chesapeake Bay TMDL and independently ensure the Project's sediment discharges do not interfere with attainment of the TMDL, or with the designated uses, which ensure support of estuarine and marine aquatic life and shellfish harvesting.[30] MDE must also ensure compliance with Maryland's narrative water quality standards which prohibit pollution by any material in an amount that would "[c]hange the existing color to produce objectionable color for aesthetic purposes" or "[i]nterfere directly or indirectly with designated uses," among other things.[31] In other words, MDE may not grant § 401 certification unless it imposes conditions that prevent the violation of all numeric and narrative water quality standards, and all designated uses.

### D. Review of § 401 Certification Decisions

The federal permitting or licensing agency (here FERC) has no authority to review a state's decision about a § 401 certification. If a state denies certification, the federal agency may not issue the permit or license,[32] and if the state conditionally grants certification, all state conditions must be included in the permit or license without review.[33] Only a court can review

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[30] *See* COMAR 26.08.02.08(B) (designating the Lower Susquehanna as Class I-P and Class II in various segments); COMAR 26.08.02.02(B) (designating Class II waters as "Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting").

[31] COMAR 26.08.02.03(B).

[32] 33 U.S.C. § 1341(a).

[33] *Id.* § 1341(d); *see also American Rivers, Inc. v. FERC*, 129 F.3d 99, 102-111 (2d Cir. 1997) (holding that FERC did not have the authority to exclude any state § 401 certification conditions on a FERC hydropower license, and that only a court could review the legality of state-imposed certification conditions).

the legality of state-imposed certification conditions.[34] Depending on the nature of the challenge, either a federal court or a state court may be the appropriate forum to review a § 401 certification decision.[35]

In the case of this Certification, there are no genuine issues as to the scope of MDE's Clean Water Act § 401 authority; while there may be factual questions about how discharges from the Conowingo Hydroelectric Project affect or will affect water quality in the Lower Susquehanna River and Chesapeake Bay, and questions about whether the conditions MDE includes in the Certification are sufficiently related to those effects, those questions only implicate Maryland law.

## III. EFFECTS OF THE CONOWINGO HYDROELECTRIC PROJECT ON THE LOWER SUSQUEHANNA RIVER AND CHESAPEAKE BAY ENVIRONMENT[36]

The Conowingo Dam Project has profoundly altered the Lower Susquehanna River system. It has historically trapped an average of 50-67% of the annual sediment load (1.5 to 2 million tons), along with the nitrogen and phosphorus attached to the trapped sediment. If not for the Conowingo Dam, this load would have been delivered to the Lower Susquehanna River and Chesapeake Bay at normal rates. Exelon incorrectly claims that the Conowingo Dam Project has functioned as a "best management practice" for the Chesapeake Bay,[37] but this is an overly simplistic portrayal of the Project's effects. In fact, the Dam and its Reservoir have produced an

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[34] *American Rivers, Inc. v. FERC*, 129 F.3d at 102, 112.

[35] EPA § 401 Guidance, *supra* n. 12, at 31.

[36] All the information presented and issues raised here were included in Lower Susquehanna Riverkeeper's and Waterkeepers Chesapeake's comments to MDE regarding Exelon's application for a § 401 water quality certification.

[37] Exelon Generation, Section 401 Water Quality Certification Application, Conowingo Hydroelectric Project (FERC Project No. 405), Cecil and Harford Counties at 19 (May 17, 2017).

enormous artificial repository of sediment and associated nutrients that can be scoured by high flow events, re-mobilized, and delivered downstream by large storm-induced flows. In fact, these scoured loads add additional pollutant loads at times when the downstream receiving waters are already vulnerable, receiving their heaviest loads of suspended pollution from the Susquehanna River Watershed.

The threshold flow needed to produce scouring will be surpassed many times during the requested license period. As the U.S. Geological Survey ("USGS") stated in a 2012 peer-reviewed report:

> The evidence presented in this report indicates that the predicted changes are not just a theoretical issue for future consideration, but are already underway. These changes in the reservoirs are already overwhelming the progress being made to reduce constituent loads from the Susquehanna River watershed. Therefore, efforts to reduce nutrient and sediment inputs to the Chesapeake Bay will need to include consideration of changes in the trapping of sediment entering, and scouring of sediment in, the reservoirs along with the management actions implemented upstream in the watershed.[38]

Thus, scoured loads deliver much greater quantities of sediment and nutrients to the Chesapeake Bay than the natural loading that would have occurred during the same flow events had the Project not been in place. Particularly in the case of very large storms – such as 25-year, 50-year, 75-year, and 100-year return interval flow events, for which there is a substantial to reasonable likelihood of occurrence during the requested license period, as discussed below – Project-induced scouring could overwhelm pollution reductions undertaken upstream in the Lower Susquehanna River watershed. Indeed, as discussed in detail in section IV.C, below, the

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[38] USGS. *Flux of Nitrogen, Phosphorous, and Suspended Sediment from the Susquehanna River Basin to the Chesapeake Bay during Tropical Storm Lee, September 2011, as an Indicator of the Effects of Reservoir Sedimentation on Water Quality* at 13 (2012), https://pubs.usgs.gov/sir/2012/5185/pdf/sir2012-5185-508.pdf.

effects of climate change will likely lead to more frequent and severe scouring events at the Project.

The Requesters therefore reiterate the proposal stated in their public comments on Exelon's application for a § 401 certification: the Certification should (1) include a detailed analysis of the effects of climate change, and (2) include conditions requiring Exelon to contribute financially to a specific plan for removing at least 4 million tons of sediment annually from the Conowingo Reservoir, in order to offset the 1.5-2 million tons collected in the Reservoir annually at the time the Chesapeake Bay TMDL modeling was performed, to eventually remove 100 million tons of material from the Reservoir that would be vulnerable to scouring during the proposed license period, and to maintain that level thereafter.[39] These conditions, at a minimum, would be necessary to avoid nutrient and sediment-related violations of state water quality standards as required by 33 U.S.C. § 1341(d).

## IV. REASONS FOR RECONSIDERATION

The Certification does not address the issues described above, which are longstanding and well-documented, nor does it offer an explanation of MDE's rationale for rejecting these concerns. To fulfill its duties under state and federal law and ensure attainment of water quality standards below the Conowingo Hydroelectric Project, MDE must address the following issues in its reconsideration and revision of the Certification:

### A. The Certification Must Be Revised To Address The Water Quality Effects Of Scoured Sediment Caused By The Conowingo Hydroelectric Project.

MDE rightly and correctly included the following critical acknowledgment in the Summary of Findings in the Certification:

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[39] To be clear, Exelon need not and should not be the only financial contributor to this plan.

> Although the Dam has in the past trapped and stored sediment and nutrients and served as a barrier to downstream transport to the Bay, the Reservoir is now full, as no efforts have been undertaken over the life of the Project, such as routine dredging, to maintain any trapping function. As a result, sediments and nutrients move downstream, and *during large storm events, significant amounts of trapped sediment and nutrients are scoured from the behind the Dam and discharged downstream*. By releasing significant amounts of sediment and nutrients through scouring during storm events, the Dam has altered the nature, timing, and delivery method of these materials with adverse consequences for the Lower River and the Bay. Nutrients discharged as a result of the in-filled state of the Reservoir adversely impact [dissolved oxygen] levels and thus aquatic life in the [dissolved oxygen] Non-Attainment Area.[40]

Unfortunately, the Certification includes no conditions targeted to prevent the harm that will be caused by the discharge of scoured sediment. The current version of the Certification contains conditions that *might incidentally* involve the removal of sediment from Conowingo Reservoir, under the requirement for a "nutrient corrective action plan" and associated options for mitigating nutrient discharges from the project.[41] But the Requesters are not aware of any study or other evidence that establishes a quantitative relationship between the required nutrient reductions to the volume of sediment removal from the Reservoir that would be needed to achieve those reductions. In short, the Certification simply neglects to address this critical threat to water quality.

MDE's findings, like Exelon's application, appear to rely heavily on the LSRWA. But, as discussed in detail in the Requesters' public comments: (1) the modelers did not evaluate larger-sized storms for which there is a reasonable chance of occurrence during the license period; (2) for those flow events that were modeled, the modelers used a fatally-flawed approach that likely substantially underestimated the effects of those flows on sediment discharges; and (3) the

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[40] Certification at 12, ¶ 6.G. (emphasis added).

[41] *Id*. at 15-16, ¶ 7.D.iii-iv.

modelers did not properly evaluate the effects of sediment and nutrients during the growing season for submerged aquatic vegetation ("SAV"). These flaws are discussed in detail in the attachment to the Requesters' public comments, which are incorporated herein by reference[42], and summarized below:

**1. The LSRWA modelers did not model a 25-year, 50-year, 75-year, or 100-year return interval flow event, which have a high to reasonable chance of occurring during the license period.**

Exelon is requesting a 50-year operating license. The following table sets forth the approximate chance that a particular return interval flow event will occur during a given 50-year period, and it demonstrates there is a reasonable chance that such storm events will occur during the license period.

| **Return interval flow event** | **Percentage chance of occurring in a given 50-yr. period**[43] |
|---|---|
| 100-year | 40% |
| 75-year | 49% |
| 50-year | 63% |
| 25-year | 87% |
| 20-year | 92% |

The LSRWA modeled flow events representing only an approximately 20-year return interval flow event. In particular, the modelers depicted Tropical Storm Lee, an approximately 20-year return interval flow event.[44] The modelers also set out to depict a high-flow event that occurred in January 1996 (for which the peak flow represented approximately a 25-50 year return interval

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[42] Requesters' Comments on Certification, *supra* n. 3.

[43] National Oceanic and Atmospheric Administration, National Weather Service, Flood Return Period Calculator, https://www.weather.gov/epz/wxcalc_floodperiod. *See also* LSRWA Review at 8.

[44] *Id*. at 2, 5-7.

flow event), but because of errors discussed in the section below, the resulting analysis was approximately equivalent to evaluating a 20-year return interval flow event, similar to Tropical Storm Lee.

The decision not to model and study the effects of a larger return interval flow event was a serious omission in the LSRWA. Because the relationship between sediment concentration and flow is exponential (as detailed below), a 50-year, 75-year or 100-year return interval flow event would have produced sediment scouring effects substantially greater than storms modeled by the LSRWA modelers. Since such storms are likely to occur during the license period, Maryland lacks the sort of analysis that would be necessary to estimate the Project-induced effects that must be offset by conditions in the § 401 certification.

**2. The LSRWA modelers underestimated the effects of the flow events they modeled by using *averages* to represent peak flow conditions and associated sediment concentrations.**

Both the USGS and the Corps' models represented "peak" Tropical Storm Lee conditions based on *daily average flow* rather than using other methods of calculating peak conditions, a choice that caused the LSRWA to underrepresent the storm's effects.[45] In particular, while the highest daily average flow recorded during Tropical Storm Lee was 709,000 cubic feet per second ("cfs"), the highest *24-hour running average flow* was 746,000 cfs, and the highest *instantaneous flow* was 778,000 cfs. Similarly, for one part of their analysis, the Corps modelers represented Tropical Storm Lee by its *storm average flow*, which was just 632,000 cfs. These choices likely explain why the models predicted sediment quantities that were lower than the best available estimates or actual measured data suggested.[46]

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

[46] *Id*. at 2-6, 12.

While the modelers at least recognized that their model outputs constituted underestimations, they chose to respond by increasing the assumed inflow load by 10%.[47] As discussed in more detail in the LSRWA Review, simply increasing the modeled loads by a mere 10% was unjustified and likely did little to improve the validity of the modeling.[48]

The LSRWA analysis also involved modeling of the January 1996 high-flow event, but the modelers represented that storm based on daily average flows rather than instantaneous flows.[49] While use of the *daily average* measure meant that the modelers considered the January 1996 flow event as having a peak of 622,000 cfs, the *instantaneous flows* (measured in 15-minute increments) peaked at 909,000 cfs.[50] As a result, the modeling for the January 1996 event represented something closer to a 20-year return interval flow event, similar to Tropical Storm Lee and significantly smaller than the high-flow events reasonably likely to occur during the requested license period.

The consequences of these choices were substantial because the relationship between flow and transport of sediment is an exponential, not linear, relationship, as illustrated in the figure below.[51] Had the LSRWA modelers represented these storms using a more appropriate measure of peak flows, because of the exponential relationship they would certainly have predicted much greater sediment and nutrient effects. Instead, the LSRWA models presented an unjustified rosy picture of the likely effects of future high-flow events.

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[47] *Id*. at 4.

[48] *Id*. at 4-5.

[49] *Id*. at 7.

[50] *Id*.

[51] *Id*. at 6 (citing Scott and Sharp, USGS, Sediment Transport Characteristics of Conowingo Reservoir at 19, fig.6 (Feb. 2014)).

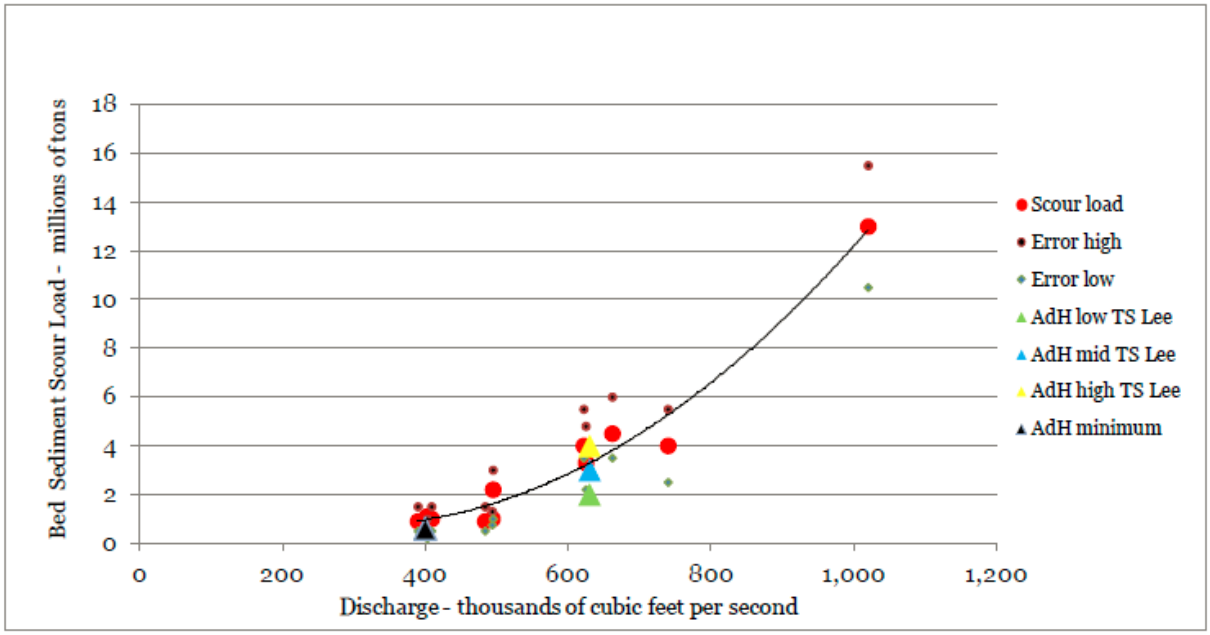


Figure 16 Scour load predictions by the USGS with AdH model results

**3. The LSRWA modelers did not properly evaluate the effects of a large flow event on the SAV growing season.**

The LSRWA modeling considered the effects of sediment discharges to the Chesapeake Bay during the months of January, June, and October. The modelers made this choice despite the fact that the 1967-2013 historic flow record shows there were more days at or above the scouring threshold during March, April, and May than all other remaining months.[52] As a result, the SAV growing season was largely excluded from the analysis.

These omissions, if not corrected, will have grave adverse effects on water quality from which the Lower Susquehanna River and Chesapeake Bay may struggle for years to recover.

**B. The Certification Must Address All Applicable Water Quality Standards.**

[52] *Id*. at 9-10.

The Certification includes conditions aimed at addressing the effects of the Conowingo Hydroelectric Project's discharges upon dissolved oxygen below the Project, but does not adequately address or protect against violations of the other applicable water quality standards, including designated uses and narrative water quality standards. Maryland's designated uses require that MDE ensure support of estuarine and marine aquatic life and shellfish harvesting, both of which are vulnerable to smothering and other adverse effects in the event of large-scale discharges of nutrient-laden sediment. MDE must also ensure compliance with Maryland's narrative water quality standards which prohibit pollution by any material in an amount that would "[c]hange the existing color to produce objectionable color for aesthetic purposes" or "[i]nterfere directly or indirectly with designated uses."[53] A catastrophic discharge of Project-induced scour would severely discolor the northern Chesapeake Bay, making it unsuitable for aquatic wildlife habitat and SAV growth.

### C. The Certification Must Account For The Effects Of Climate Change In Developing Appropriate Conditions To Prevent Project-Induced Scour.

Over the past century or so, the Northeast (including the Chesapeake Bay region) has experienced increases in the average annual temperature, amount of precipitation, and amount of extreme precipitation events, and these trends are expected to continue and strengthen in the coming years due to climate change. For example, the average temperature in the Northeast is expected to rise between 2.7 and 3 °F by 2035, between 3.6 and 4.8 °F by 2055, and between 4.7 and 8 °F by 2085, compared with the average temperature in 1971-1999. In addition, the annual amount of precipitation in the Northeast is expected to increase between 2-7% in 2041-2070, compared with 1971-2000. Finally, the frequency of extreme precipitation, defined as the

[53] COMAR 26.08.02.03(B).

number of days with over an inch of precipitation, is expected to increase by about 10-20% in the Chesapeake Bay watershed by 2041-2070, compared with 1971-2000. As part of the reconsideration requested herein, MDE must account for and address these significant climate-related impacts because they will likely increase the predicted levels of scouring threshold exceedances that were originally assumed for the Project.

Moreover, MDE cannot rely on the Chesapeake Bay TMDL to account for the effects of climate change, and must independently analyze the best available climate projections for the region in order to account for these additive impacts. Fundamentally, MDE has a legal obligation to consider more than mere TMDL compliance (or noncompliance) because the agency must also analyze whether the Project as a whole will interfere with the River's designated uses and narrative water quality standards under the expected climate conditions in the coming decades. The Chesapeake Bay TMDL does not analyze the effects of the Conowingo Dam on Maryland's state water quality standards under any conditions, much less under the projected future climate in the Northeast, and this climate analysis is an essential component of the state certification process.

Furthermore, any increases in nutrient and sediment pollution from the Dam due to climate change were simply not considered in the Chesapeake Bay TMDL. To the extent the Conowingo Hydroelectric Project's effects were included in the TMDL, the TMDL's assumptions about pollution levels did not account for the additive effects of climate change. In fact, only a very vague and preliminary assessment of climate change was completed for the Chesapeake Bay TMDL as a whole in 2010, due to limitations in the modeling that was available at the time. Although the TMDL's "Midpoint Assessment" is expected to incorporate more up-to-date information about the impacts of climate change, it remains unclear precisely how

climate change impacts will change the TMDL load allocations, if at all. Moreover, there are no indications the Midpoint Assessment will consider the impacts of climate change on the Conowingo Dam's specific effects. Therefore, MDE must complete its own, independent analysis of the effects climate change will have on the Conowingo Dam Project's impacts to Maryland's water quality standards, and incorporate the results of that analysis into the revised Certification conditions.

## CONCLUSION

For all the foregoing reasons, Lower Susquehanna Riverkeeper and Waterkeepers Chesapeake request that MDE reconsider the Certification and revise it as needed to address the issues raised in this request.

Submitted June 8, 2018, by the undersigned counsel for Lower Susquehanna Riverkeeper and Waterkeepers Chesapeake.

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## CERTIFICATE OF SERVICE

I hereby certify that on this 8th day of June, 2018, that I have served the foregoing document upon the Secretary of the Environment, Maryland Department of the Environment, via courier delivery to 1800 Washington Boulevard, Baltimore, MD 21230.

/s/ Jennifer C. Chavez
Jennifer C. Chavez