WATER RESOURCES ASSOCIATION
OF THE DELAWARE RIVER BASIN

February 20, 2024

VIA ELECTRONIC MAIL to *Federal eRulemaking Portal:* *https://www.regulations.gov/*

Comments by the Water Resources Association of the Delaware River Basin on Proposed Water Quality Standards to Protect Aquatic Life in the Delaware River Docket ID No. EPA–HQ–OW–2023–0222

The following comments are submitted by the Water Resources Association of the Delaware River Basin ("WRA") on the Water Quality Standards to Protect Aquatic Life in the Delaware River proposed by the Environmental Protection Agency ("EPA") and published in the Federal Register on December 21, 2023.

WRA is a nonprofit public information organization established in 1959 to serve the water users of the Delaware River Basin. WRA promotes the science-based management of water resources within the Delaware River Basin. In 1961, the WRA participated in the development of the federal-interstate compact and the creation of the Delaware River Basin Commission ("DRBC"). Since then, WRA has been a participant in and an observer of activities relating to water management in the Delaware Basin.

I. Background

For more than 60 years, the DRBC has worked with state and federal agencies to bring consistency and rationality to the regulation of the water resources in the Delaware River Basin. Some of DRBC's first water quality regulations in 1967 were directed at improving levels of dissolved oxygen ("DO") in the urbanized reach of the river. The success of the DRBC regulations, supported by federal grants to upgrade municipal wastewater treatment plants, brought about dramatic improvement in water quality in the river to the point where seasonal runs of shad and striped bass have returned and the overall health of the fishery is far better.

A. Critical Habitat Designation for Atlantic Sturgeon

Atlantic Sturgeon ("ATS") appears to be the targeted species for future water quality regulation in the Delaware Estuary because the species is on the Endangered Species List. In 2016, NOAA National Marine Fisheries Service ("NMFS") designated the entire Delaware Estuary as Critical Habitat for the continued successful propagation of ATS. According to NMFS, that designation was based on the best scientific and commercial data available to NMFS at the time taking into account any State efforts to protect the species. However, the

NMFS determination was flawed and cannot serve as a legitimate basis for EPA's proposed action for the following reasons:

1. Section 4(b)(2) of the ESA requires NMFS to take into consideration the economic impact of specifying an area as Critical Habitat however no such economic analysis was completed.

2. The ESA requires the Secretary of the Interior, through the listing Agency, to implement a Recovery Plan that includes "objective measurable criteria" for the conservation and survival of the listed species. A Recovery Plan with site specific management actions to achieve the necessary goals for conservation and survival of ATS has not been developed. Only when a proper Recovery Plan is developed and put in place can a determination be made whether DO standards will need to be modified.

3. NMFS failed to properly consider other relevant factors necessary for the designation given that DO levels are but one of several Physical and Biological Factors ("PBF") that need to exist in the Delaware Estuary.

B. DRBC Collaborative Process Terminated by EPA

In August 2016, EPA sent a letter to DRBC and its member states recommending that the 1967 Water Quality Standards ("WQS") be revised. In 2017, DRBC passed a resolution (2017-4) that set out a six-year plan of study to answer questions about whether the urbanized reach of the river should be redesignated for propagation of sensitive species of fish, and if so, what new DO criteria could be achieved.

Over five years, DRBC guided a collaborative process involving representatives of three of the Delaware River Basin ("DRB") states, two EPA regions, academics, fisheries, environmental groups, and experts of all types to prepare a **Draft *Analysis of Attainability: Improving Dissolved Oxygen and Aquatic Life Uses in the Delaware River Estuary*** ("Draft Attainability Analysis"). DRBC's process of developing this analysis and the series of recommendations brought together a diverse group of industries, regulators, and advocates with a shared vision to continue the historic improvement of water quality in the Delaware Estuary.

The Draft Attainability Analysis produced by DRBC indicated that the designated use of "propagation" of fish is achievable. The draft contained a Highest Attainable Dissolved Oxygen value of 5 milligrams per liter ("mg/L") that could be achieved with treatment upgrades at 11 discharge locations at a total cost of $153 million per year (Nitrogen Reduction Cost Study, Final Report for DRBC, prepared by Kleinfelder, Inc. 2021). The proposed new target minimum DO level, if achieved, would have the potential to

significantly improve water quality conditions when compared to the current DO level of 3.5 mg/L in the 1967 WQS. Unless substantial federal funds are provided, as was done under the Clean Water Act for the implementation of the 1967 DO criteria, the costs will fall on some of the poorest people living in some of the poorest and most underserved communities in the Delaware River Basin, ratepayers for water and wastewater services that can least afford it.

On December 1, 2022, the Washington DC office of EPA issued a determination letter unilaterally declaring "propagation" as a designated use of the urbanized reach of the Delaware Estuary. The determination letter set a timetable of 12 months to establish new water quality standards for DO, which has led to the proposal addressed by these comments.

II. EPA Proposed DO Criteria -- "Optimal" Conditions for Propagation of ATS

Rather than building on DRBC's work, which focused on developing a Highest Attainable Dissolved Oxygen ("HADO") criteria, EPA chose to propose water quality criteria designed to achieve "optimum" results for ATS propagation. In doing so, EPA used data and analysis that appear to have serious weaknesses, failed to address the question of attainability and excluded affected "stakeholders" from the states, DRBC or the regulated community from its deliberations.

A. EPA's Selection and Analysis of Data

ATS are propagating to some extent in some areas of the Delaware Estuary. Specific life stages have been documented in specific regions of the Estuary. For example, data from surveys conducted by Environmental Research and Consulting, Inc. ("ERC") for the Corps of Engineers in 2013, 2015, 2016, 2017 and 2018 provide robust data on ATS population and health, particularly for juveniles. For some reason, EPA appears to have ignored this data completely in its Technical Support Document ("TSD") in support of proposed new DO criteria. The numbers of fish in each ERC survey were generally an order of magnitude higher than the number reported by the Delaware State Department of Natural Resources and Environmental Control ("DNREC") for the same year. The Philadelphia Water Department has reviewed data from multiple surveys (DNREC and ERC) spanning 13 years and evaluating more than 5,000 individual ATS.

The evidence from DNREC and ERC surveys, taken as a whole, demonstrate:

1. ATS are propagating in some areas of the Delaware Estuary and have survived over the past 50 years with much lower DO conditions than are present today.

2. For years for which ATS census data exists, there appears to be very poor (if any) correlation between ATS propagation and antecedent DO levels. This suggests that other factors may have more influence than DO on ATS propagation, and this suggests that:

a. Despite spending substantial resources to increase DO, the ATS may decline due to other factors, or

b. ATS propagation may improve with only modest increases in DO if other factors can be identified and addressed.

For example, the laboratory studies upon which EPA relied, and the bioenergetic model EPA used to support its proposed criteria recognize that water temperature is a critical factor in ATS survival and growth. The TSD states:

"Air temperature in the Delaware River watershed has increased steadily since the early 1900s and at an accelerated rate during the past 30 years. Given the relationships that have been shown between increasing air temperature and increasing water temperature, along with consideration of global climate trends, it is reasonable to expect that the water temperature in the Delaware River could increase in the future. However, a rigorous estimate of expected changes in water temperature for the Delaware River does not exist. Therefore, when deriving dissolved oxygen criteria, EPA assumed that overall water temperature and the seasonal pattern of water temperature would not change from recent observations."

This is an unsupported assumption that on its face requires further analysis.

The TSD indicates that EPA relied heavily on a "bio-energetic model" of ATS growth as a surrogate for survival and propagation. The model, in turn, relied heavily on laboratory studies of ATS survivability. Three studies were referenced and the results are summarized in Figure 3 in the TSD. However, two of the studies (Campbell et. al. 2004 and EPA 2003) provided no useful data for the model. Therefore, the model relied heavily only on the study (performed in 2001 and reported in 2009) by Niklitschek et. al.

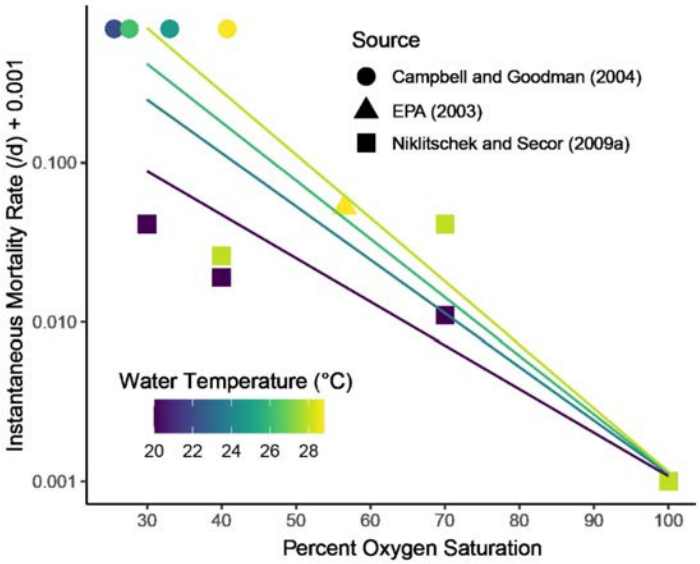

Figure 3: Relationship between Instantaneous Mortality Rates, Percent Oxygen Saturation, and Water Temperature. Oxygen saturation levels were as reported for experimental tests or as calculated from reported dissolved oxygen concentrations (Table 2).

The study by Nikiltschek et. al. in 2009 contains only six meaningful data points, none in the region of DO and temperature that generally currently prevail in the area of the river around Chester critical for ATS propagation. These data points alone are not sufficient to support a bioenergetic model driving a proposed criteria for DO, especially without at least a check on attainability.

- Mortality for juvenile ATS ranged from 1%/day to 5%/day at DO level ranging from 30 to 70% saturation and water temperatures ranging from 20 and 28.8 degrees C.
- The relationship between the six data points does not appear to be "log-linear."
- The model assumed uniform conditions for salinity of 0.5 ppt and 50 grams for fish size which were probably not consistent with real-world conditions.

To test the sensitivity of the model to assumptions based on the sparse laboratory data (and other factors like salinity and fish size), runs could have been made using a variety of assumptions consistent with the data. It is not clear that this was done. If it was, the results were not presented in the TSD.

EPA made an effort to "ground truth" their bioenergetic model by correlating ATS occurrence data from annual DNREC surveys, expressed in terms of Catch per Unit Effort ("CPUE") against model results predicted based on prevailing DO and temperature conditions at the two locations where data was available (Penns Landing and Chester).

Presumably, the correlation was plotted with model prediction based on DO and temperature conditions for the year antecedent to each ATS survey (when the fish would have been reared). However, only ATS census data from DNREC was used. Data from the ERC surveys was ignored. The results were summarized in Figure 4 of the TSD.

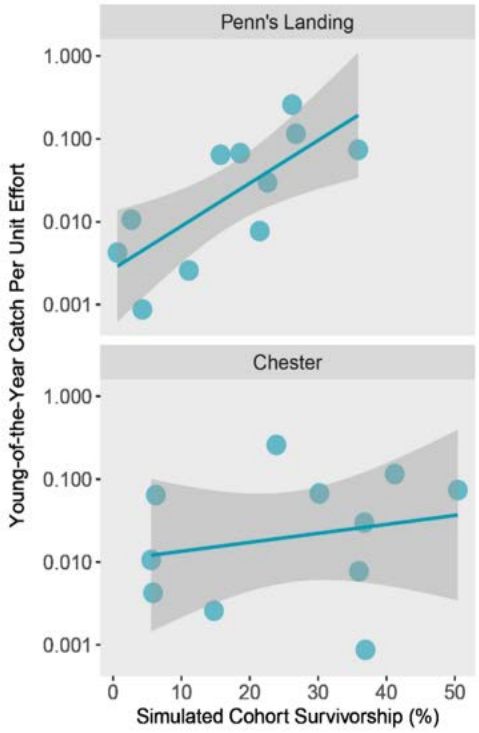

Figure 4: Relationship between Simulated Cohort Survivorship and Observed Annual Catch per Unit Effort Index for Young-of-the-Year Atlantic Sturgeon in the Delaware River. The simulated cohort survivorship was calculated using the mortality model and water quality data from the Penn's Landing and Chester monitoring stations.

Even ignoring the ERC ATS census data, the agreement of the model with real data was poor for the Penns Landing site and even worse for the area of critical concern around Marcus Hook and the Chester USGS gauge. This alone should have given pause to using the model to support very specific DO criteria for the entire reach of the Estuary.

It is interesting that Figure 4 did not identify the years associated with each data point. The ability to extract meaning from data presented graphically is lost if important information like the year associated with the data points is not included. For example, the level of effort of the DNREC surveys varied considerably from year to year. 2019 and 2020 were COVID pandemic years which may have affected the survey effort. This is not entirely accounted for by the CPUE metric. Also, 2012 was a particularly low flow, high water temperature year

(it was one of two years on which DRBC calibrated its Eutrophication Model). ATS individuals counted by DNREC in 2012 and 2013 were low (22 and 9, respectively) but factors in addition to low DO may have affected the counts in these years.

USGS maintains two continuous monitoring locations in the Delaware Estuary for DO that have relatively long periods of historical data. Data from the location at Penn's Landing were used by DRBC to calibrate their Eutrophication Model. This is located a considerable distance upstream of the specific region where most ATS propagation in the Delaware Estuary is thought to be occurring. The DO at the Chester location is generally higher than at Penn's Landing, but so is the water temperature.

The TSD presented an analysis of DO and temperature conditions superimposed on a colored background showing regions of positive and negative growth of ATS based on the output from the bioenergetic model. This was done for data from the Penn's Landing and Chester USGS gauge locations. The plots cover data from the months of July through October for a 20-year period. Presumably, each data point (circle) is a monthly average, so there would be 80 points on each graph. Most of the points are below and to the right of the curved red line (which denotes zero growth – i.e. neutral conditions). This suggests that the majority of the average monthly conditions would allow for growth (and propagation) of ATS. The clouds of data for both sites appear to have more points outside the "zero growth" envelope due to temperature than due to DO, and this is more pronounced for the Chester site (where most ATS propagation is believed to occur) than for the Penn's Landing site. This suggests that temperature may be a more important consideration than DO for successful ATS propagation. Again, no dates are associated with any of the data points, so important information on trends and outlier years is lost. Furthermore, in light of the poor correlation of the actual ATS survey data against the model prediction (Figure 4), the value of this analysis can be called into question.

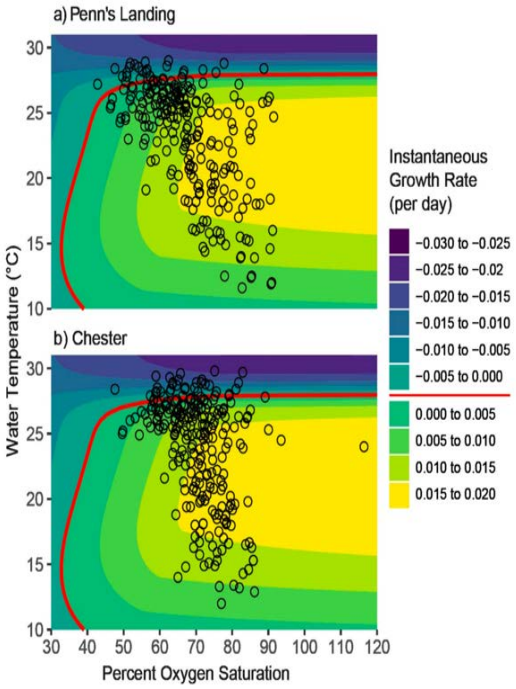

Figure 5: Response of Instantaneous Growth Rate of Juvenile Atlantic Sturgeon to Water Temperature and Percent Oxygen Saturation. The instantaneous growth rate is predicted by the bioenergetics model. Salinity was assumed to be 0.5 ppt (Figure 2) and fish size was assumed to be 50 grams. Black circles show the distribution of percent oxygen saturation and water temperature between July 1 and October 31 during 2002 to 2022 at the Chester and Penn's Landing monitoring stations. The red contour line delineates the region with positive growth from the region with negative growth.

B. Consideration of Attainability, Cost and Affordability

DRBC's Attainability Analysis, conducted over almost five years with substantial technical and public input and involvement by representatives of both EPA Region 2 and Region 3 recommended a scenario that relies primarily on advanced wastewater treatment to reduce ammonia loads to the Estuary to achieve the highest attainable dissolved oxygen (HADO) condition within the FMA. DRBC's eutrophication model showed sharply diminishing returns in improved DO levels at progressively lower NH3 limits, and below 1.5 mg/L, improvement is almost nil.

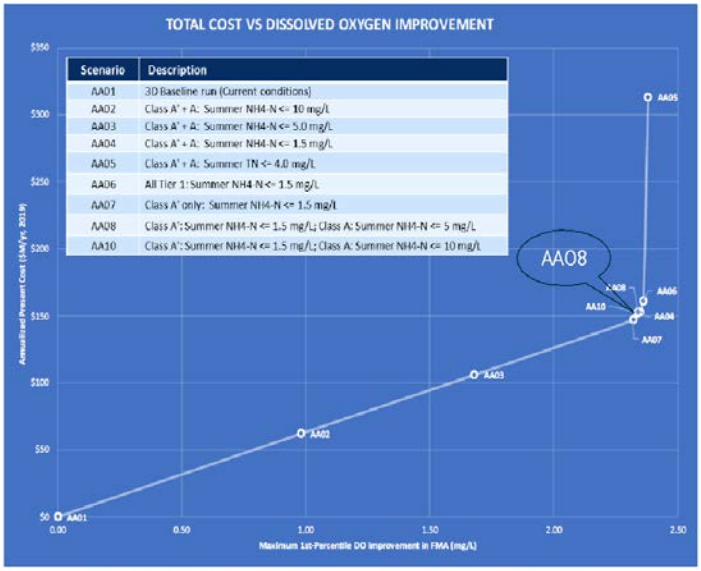

Figure 4-4: Cost versus DO improvement within the FMA for each AA scenario

The HADO condition depicted above was developed assuming: 1) full implementation of CSO long-term control plans, 2) effluent DO concentrations of 4 mg/L, 3) seasonal variations of ammonia effluent levels based on expected treatment performance, and 4) a ten percent reserve capacity for future growth. The HADO simulation results showed the minimum DO at the lowest point of the sag moved upstream by 10 miles and increased by approximately 2.3 mg/L, a biologically significant enhancement of the minimum DO conditions that typically occur between July and September.

C. Concerns About Cost and Attainability in EPA's Current Proposal

Based on a review of EPA's proposal and the TSD, WRA has the following concerns:

1. The DRBC HADO conditions were based on discharge limits for major dischargers that were estimated to cost $153 million per year in annualized capital and O&M expense.

2. The Kleinfelder study shows a sharp increase in total annual cost of achieving NH3 limits below 1.5 mg/L and DO improvements above the HADO. It is not clear that even with a level of expenditure higher than $153 million per year the more stringent criteria being proposed by EPA can ever be met.

3. Comments from EPA officials reported in the press have noted that to achieve the proposed DO criteria, wastewater plants would have to "install nitrification technology at a

combined cost of $137 million a year for 30 years." An EPA spokesperson was quoted as saying, "That technology is proven to work, and has been widely adopted in other places." The source for this estimate is unclear. Nor is it clear that the installation of nitrification technology alone will be sufficient to achieve the proposed EPA criteria. Before proposing criteria more stringent than the HADO developed by DRBC, EPA should have performed its own Attainability Analysis.

4. Unlike in the Great Lakes or the Chesapeake Bay, there is no generous federal funding mechanism in place or proposed to significantly reduce the financial burden on utility ratepayers in the Delaware River Basin from regulations that will follow from the proposed criteria. In particular, low-income ratepayers will not be able to afford the rate increases that will be driven by the proposed regulations that will come on top of costs of recent and proposed regulations for removing lead service lines, treating drinking water and wastewater residuals for PFAS, and continuing to address combined sewer overflows among other mandates.

5. EPA's unilateral deviation from the recommendations of DRBC's Draft Attainability Analysis without consultation with or support from the stakeholders participating in DRBC's collaborative process has jeopardized stakeholder cooperation and increased the potential for protracted litigation that may substantially extend the timetable for implementation of new standards and improved water quality conditions.

III. An Adaptive Management Strategy Should be Developed to Define Future Actions

Adaptive management strategies have been successfully utilized in the Basin in other circumstances to measure progress over time and allow regulatory decisions to be based on the results of a series of implementation measures and investments. Here, adaptive management strategies are appropriate to consider in making further improvement in water quality conditions rather than simply moving ahead with new water quality criteria for DO given that (1) the Atlantic Sturgeon have continued to inhabit the Delaware River during periods where they experienced much lower DO levels than presently exist, (2) ATS are propagating to some extent in portions of the area currently designated as the Fish Maintenance Area of the Delaware River, (3) the trend in DO levels has been increasing, and (4) projects are underway to significantly reduce ammonia levels in the Estuary.

Along with implementation of a robust survey methodology and monitoring to measure long-term progress in ATS propagation, adaptive management steps can be taken to improve DO conditions above current levels. Through an adaptive management process, opportunities for water quality improvements could be defined with a committed group of stakeholders that would include treatment projects (some of which are already underway)

with a broader scope to address relevant habitat conditions in addition to DO, and focused sampling, monitoring and funding programs. Through such an effort, feasible strategies may be identified such as nutrient trading and side-stream aeration that together could achieve water quality improvements at lower costs. WRA would be pleased to participate in such a process.

IV. Conclusion

WRA supports improved water quality and the application of sound science in water resources policy decision-making. However, the requisite data on occurrence and health of the ATS population in the Delaware River are seriously lacking. EPA, NMFS, state agencies and others interested in supporting the Critical Habitat classification of the Delaware River and enhancing propagation of ATS should demonstrate their support by funding rigorous, ongoing surveys to locate and measure the extent of actual propagation success, and monitor population health of the species. Data from these surveys should be made available to all interested parties. A consortium of affected dischargers and others might be willing to participate in funding such an ongoing effort.

The DO criteria proposed by USEPA is based on too many unsubstantiated assumptions and is overly restrictive because propagation of ATS is occurring under current water quality conditions and the proposed criteria may not be attainable. Accordingly, WRA is requesting that EPA suspend for two years any further action on the proposed water quality criteria for DO in the Delaware Estuary and during that time:

1. Revisit the science on which the proposed DO criteria have been based, including specifically the assumptions in the bioenergetic model and the correlation between ATS census numbers (using ALL available data) and antecedent DO conditions, and conduct an Attainability Assessment and a comprehensive economic analysis for any resulting proposed new DO criteria.

2. Support a robust data gathering effort to document the current status of propagation of ATS and develop an ongoing assessment process by which the impact of future regulatory action can be measured.

3. Develop and implement an adaptive management strategy to increase DO in the Delaware Estuary as described above.

4. Assist regulated entities facing significant new costs to secure federal funding for improvements to meet future water quality standards and specific discharge limits.

WATER RESOURCES ASSOCIATION
OF THE DELAWARE RIVER BASIN

Sincerely,

Preston Luitweiler, P.E.
Chair, WRADRB Science and Policy Committee

Skelly Holmbeck
Executive Director, WRADRB