



Public Hearings for the Proposed Rule:

Water Quality Standards to Protect Aquatic Life in the Delaware River

February 7, 2024

4:00PM – 6:00PM



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Statutory and Regulatory Background

Clean Water Act (CWA) **section 101(a)(2)** establishes a national goal of “wherever attainable...water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water.”

Under CWA **section 303(c)**, states have the primary responsibility for establishing and revising water quality standards (WQS) for their waters.

- WQS define the **desired condition** of waters.
- Two key aspects of WQS are designated uses and criteria – uses define the goals, and criteria define the water quality levels that will meet those goals.

CWA section **303(c)(4)(B)** authorizes the EPA Administrator to determine that new or revised WQS are necessary to meet CWA requirements.

Administrator's Determination

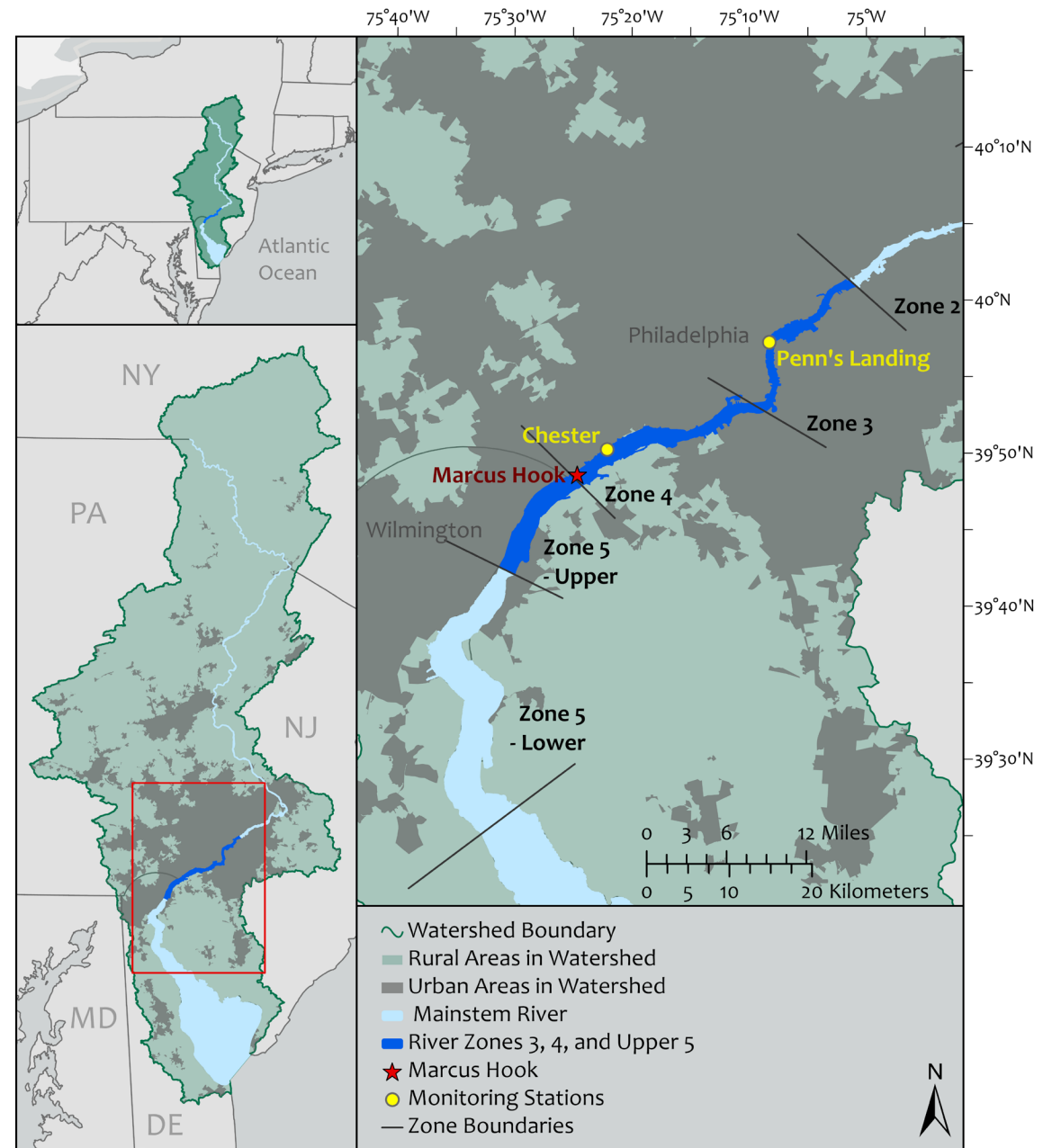
On December 1, 2022, the EPA determined, under CWA section 303(c)(4)(B), that revised WQS are necessary to protect the CWA section 101(a)(2) use of **fish propagation** in certain zones of the Delaware River.

- Specifically, EPA determined that a **revised designated use** to protect fish propagation and **corresponding dissolved oxygen criteria** to protect that use are necessary in Zone 3, Zone 4, and the upper portion of Zone 5 (in total, river miles 108.4 to 70.0) of the Delaware River.
 - There are two federally listed endangered fish species – Atlantic Sturgeon and Shortnose Sturgeon – in these zones of the Delaware River. Available evidence suggests that these two fish species are the most oxygen-sensitive species in these zones.



Images from NOAA Fisheries

Map of Relevant Delaware River Zones





Summary of the EPA's Proposed Rule

In accordance with the CWA and the EPA's December 2022 Administrator's Determination, on December 13, 2023, the EPA issued a proposed WQS rule for the relevant zones of the Delaware River.

The EPA's proposed rule includes:

1. A designated use for aquatic life that includes propagation.
2. Criteria for dissolved oxygen to protect the current and proposed designated uses.

The EPA's proposed dissolved oxygen criteria are based largely on the oxygen requirements of Atlantic Sturgeon because that is one of the most sensitive species. However, EPA's proposed criteria are intended to protect all aquatic life in the relevant zones of the Delaware River.



Proposed Designated Use

Protection and propagation of resident and migratory aquatic life

Proposed Dissolved Oxygen Criteria

The EPA's proposed dissolved oxygen criteria are divided into three seasons. Each season has one or more criteria that consist of three components: Magnitude, Duration, and Frequency.

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Proposed Dissolved Oxygen Criteria

Seasons: The three seasons are periods that approximate different life phases for Atlantic Sturgeon.

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Proposed Dissolved Oxygen Criteria

Magnitude: The magnitude indicates the required level of dissolved oxygen in the water.

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Proposed Dissolved Oxygen Criteria

Duration: The duration specifies the time period over which water quality is averaged before comparison with the criteria magnitudes.

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Proposed Dissolved Oxygen Criteria

Exceedance Frequency: The exceedance frequency specifies how often (i.e., percentage of the time) each criterion can be exceeded in each season while still ensuring that the use is protected. For dissolved oxygen, an exceedance would occur when the oxygen level in the water is *below* the criterion value.

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Derivation of Proposed Criteria

Definitions

- *Saturation*: ratio of measured oxygen concentration in water to expected oxygen concentration when that water is in equilibrium with the atmosphere.
- *Concentration*: milligrams (mg) of oxygen per liter (L) of water.

Use of Percent Oxygen Saturation

1. The EPA proposed to express the criteria as percent oxygen saturation because saturation (vs. concentration) is most biologically relevant to aquatic life.
 - Physiological effects of oxygen on aquatic organisms are *directly* related to percent oxygen saturation and *indirectly* related to dissolved oxygen concentration.
2. In the Delaware River, percent oxygen saturation varies with water temperature less than dissolved oxygen concentration.

Derivation of Proposed Criteria

Juvenile Development Season (July 1 to October 31)

- The EPA followed a peer-reviewed modeling approach to evaluate the effects of temperature, salinity, and dissolved oxygen on the potential growth and mortality of a hypothetical cohort (or year class) of juvenile Atlantic Sturgeon.
- The EPA used the model to estimate the rate of change in the aggregate weight of the cohort during the *Juvenile Development* season, given various corresponding water quality conditions. EPA defined this rate of change as the “Habitat Suitability Index” or “HSI.”
 - A *positive* HSI indicates the cohort may increase in weight; a *negative* HSI indicates the cohort will decrease in weight.
- The EPA then selected two different values as the proposed criteria, a 10th percentile and a median, that are expected to result in a positive HSI if they are met 90% and 50% of the time, respectively.

Derivation of Proposed Criteria

Spawning and Larval Development and Overwintering Seasons

- Because the EPA's cohort modeling approach for the *Juvenile Development* season relies on experimental studies conducted on juvenile Atlantic Sturgeon at warmer temperatures, it does not apply to spawning and larval development lifestages and has minimal relevance to the cold overwintering period.
- The EPA concluded that the percent oxygen saturations that would be protective of juveniles experiencing stressful (high) water temperatures during the *Juvenile Development* season would also be protective of larvae and overwintering juveniles not experiencing high water temperatures.
- Therefore, the EPA proposed to apply the same 10th percentile criterion from the *Juvenile Development* season to both the *Spawning and Larval Development and Overwintering* seasons.

Dissolved Oxygen Criteria Alternatives

The EPA is specifically requesting public comment on three dissolved oxygen criteria alternatives.

The EPA requests comment and additional information on whether and how one or more of these alternatives could protect the current and proposed aquatic life designated uses in the relevant zones of the Delaware River and if so, what anticipated benefits would be associated with the alternative(s) compared to the EPA's proposed criteria.



Dissolved Oxygen Criteria Alternatives

Alternative 1: Dissolved Oxygen Criteria Expressed as Concentration (mg/L)

Season	Water Temperature (°C)	Magnitude (mg/L)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	23.3 (14.7)*	5.6 (6.7)*	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	N/A ⁺	5.4	Daily Average	10% (12 Days Cumulative)
	N/A ⁺	6.1	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	12.4 (5.6)*	7.0 (8.3)*	Daily Average	10% (12 Days Cumulative)

* The 90th percentile of seasonal water temperature and corresponding criterion is used for the main estimate, while the average water temperature and corresponding criterion is shown in parentheses.

⁺ Water temperature is not applicable during the Juvenile Development season because the criteria magnitudes are derived from the EPA's Atlantic Sturgeon cohort model, described in section IV.C.1 of this preamble.

Dissolved Oxygen Criteria Alternatives

Alternative 2: Single Dissolved Oxygen Criterion During the Juvenile Development Season with a 10% Exceedance Frequency

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Dissolved Oxygen Criteria Alternatives

Alternative 3: Inclusion of a 1-in-3-Year Interannual Exceedance Frequency

Season	Magnitude (Percent Oxygen Saturation)	Duration	Exceedance Frequency
Spawning and Larval Development (March 1 – June 30)	66%	Daily Average	10% (12 Days Cumulative)
Juvenile Development (July 1 – October 31)	66%	Daily Average	10% (12 Days Cumulative)
	74%	Daily Average	50% (61 Days Cumulative)
Overwintering (November 1 – February 28/29)	66%	Daily Average	10% (12 Days Cumulative)

Interannual Exceedance Frequency: Criteria cannot be exceeded more than once in every three-year period



Next Steps

- For more information on the proposal, please visit: <https://www.epa.gov/wqs-tech/water-quality-standards-delaware-river>
- The public comment period closes on **Tuesday, February 20, 2024.**
- The EPA will provide written responses to comments upon promulgation of the final rule.

How to Make a Written Comment

You may send comments, identified by Docket ID No. EPA-HQ-OW-2023-0222, by any of the following methods:

- **Online:** www.regulations.gov (our preferred method). Follow the online instructions for submitting comments.
- **Mail:** U.S. Environmental Protection Agency, EPA Docket Center, Standards and Health Protection Division Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460
- **Hand Delivery:** EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004, Attention Docket ID No. EPA-HQ-OW-2023-0222.
 - Hand deliveries and couriers may be received by scheduled appointment only.

All submissions received must include the Docket ID No. EPA-HQ-OW-2023-0222 for this rulemaking. Comments received may be posted without change to www.regulations.gov, including any personal information provided. Once submitted, comments cannot be edited or removed from the docket.