Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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November 13, 2018

The Honorable Thomas C. Hoye, Jr., Mayor
Office of the Mayor
141 Oak Street
Taunton, MA 02780

Dear Mayor Hoye,

We appreciated the opportunity to meet with your team from the City of Taunton, Hall & Associates, and BETA Group on October 22, 2018, to discuss issues related to Taunton's NPDES permit. As a follow up to the meeting, we are sending this letter to provide you and your team with an update about MassDEP's efforts to review our water quality criteria for marine dissolved oxygen (DO). We thought it would be helpful to provide this detailed written explanation, which can be used for future reference on this topic.

As you are aware, MassDEP has been actively working on the review of our marine DO criteria since spring 2017. We anticipate completing the review and development of marine DO criteria recommendations in late 2019. MassDEP hired consultants to assist in the review process, and to date we have gathered technical information and engaged EPA Headquarters, EPA Region 1, and a technical advisory committee in the review. Our technical advisory committee includes representatives from US EPA, MA Coastal Zone Management, MA Fish and Game, RI Department of Environmental Management, University of Rhode Island, U.S. Geological Survey, and Great Bay National Estuarine Research Reserve.

MassDEP's criteria review has considered EPA's Virginian Province Approach (VPA), which has been the basis for DO criteria developed and adopted in the mid-2000s by other states on the East Coast (including CT, NY, and RI). Through the review process, we have learned that the science has evolved significantly since EPA's guidance for this approach was published in 2000. In consultation with EPA, we have developed an approach that builds on the VPA while considering new information from the National Marine Fisheries Service (NMFS) and other

literature sources. Additional factors that need to be considered in the VPA are whether; 1) there is the occurrence of a threatened or endangered species; and 2) sufficient data exist to suggest that higher DO concentrations are needed to support the growth and reproduction of aggregate fish communities.

MassDEP's review of aquatic communities present in the Taunton River Estuary and Mount Hope Bay identified that these waters provide foraging habitat for Atlantic sturgeon. Literature sources were reviewed to identify behavioral change thresholds for finfish and invertebrate species. Atlantic sturgeon is listed as a federal endangered species for the New York Bight and threatened for the Gulf of Maine, and is also listed as an endangered species by the State of Massachusetts. NMFS identifies all coastal waters from the Chesapeake Bay up to Northern Maine (including all Massachusetts coastal areas) as Atlantic sturgeon Distinct Population Segments.

As part of the criteria review, MassDEP's team evaluated numerous species with a broad range of sensitivity and habitat requirements, and looked at associated DO response information that is applicable for criteria development. The review identified Atlantic sturgeon as the most sensitive species for both acute and chronic impacts. Because of their sensitivity and endangered status, DO requirements for Atlantic sturgeon were carefully reviewed as they might affect criteria in the study area of the Taunton River Estuary and Mount Hope Bay, as well as in other Massachusetts coastal waters. In the review, the following key points related to Atlantic sturgeon were considered:

- The Taunton River and Narragansett Bay (including Mount Hope Bay) are considered foraging habitat for subadult and adult life stages.
- Multiple endpoints are available in the literature, and supportive DO concentrations range between 3.0 mg/L and 6.0 mg/L. Levels greater than 6.0 mg/l (chronic endpoint) support optimal growth for young-of-the-year and juveniles, whereas increased mortality of eggs, larvae, and juvenile and adult organisms is seen at concentrations less than 3.0 mg/L (acute endpoint).
- Sturgeon are included in the VPA, which was used to determine that a chronic exposure of ≥5.1 mg/L was protective of all species in the Taunton River Estuary and Mount Hope Bay study area.
- Additionally, a review of growth endpoints as a surrogate for avoidance behaviors suggested that other species (e.g., Winter Flounder, Sea Run Brook Trout) were also protected when DO is > 5.0 mg/L.

As part of EPA's review process for accepting state water quality criteria, EPA must consult with NMFS and the U.S. Fish and Wildlife Service (USFWS) about changes that may affect species listed under the Endangered Species Act (ESA). While MassDEP is not yet ready to formally submit the marine DO criteria to EPA, EPA has been viewing the potential criteria in expectation of future consultation with NMFS. Existing data and studies indicate that DO concentrations below 5.0 mg/L are documented to lead to avoidance behaviors and reduced metabolic and

feeding rates to Atlantic sturgeon[1]. NMFS currently considers DO levels of 5.0 mg/L and above as protective of sturgeon[2]. Therefore, a chronic DO criterion of 5.0 mg/L is likely the minimum criteria that would protect the Atlantic sturgeon. EPA approved the marine DO criteria in RI, CT, and NY prior to the listing of the Atlantic sturgeon in 2012, and consultation with NMFS and USFWS did not occur on those criteria with respect to the sturgeon.

While the criteria review process is not complete, based on the information presented above, preliminary results do not support changing chronic marine DO criteria values in MassDEP's current water quality standards (which currently are 5.0 mg/L for SB Waters, 6.0 mg/L for SA Waters). EPA confirmed during our discussion with the technical team on June 12, 2018 that DO chronic criteria below 5.0 mg/L are not likely protective of the federally-listed Atlantic sturgeon. Additionally, MassDEP anticipates that a future proposed revision to the marine DO criteria in 314 CMR 4.00 will include new acute marine DO criteria, lower than the current Massachusetts chronic criteria, as well as specificity on the acute and chronic criteria concentration duration and applicable seasonal application. MassDEP has initiated a third phase of our Marine DO review to analyze existing data in order to develop the frequency and duration associated with the criteria magnitude, assessment guidance, and monitoring guidance. We anticipate engaging stakeholders in 2019 with our findings and our proposed criteria, prior to publishing our draft criteria regulations for formal public comment.

We are aware that Taunton has funded some data collection efforts in the Estuary, so in addition to information about our marine DO criteria review process, we also thought it would be helpful to share information about our recent data collection efforts in the Taunton River and Mount Hope Bay. MassDEP has funded ongoing collection of water quality information from two monitoring buoys in the estuary, and we are partnering with USGS on the development of a monitoring strategy for the Taunton River Estuary and Mount Hope Bay. Water quality data collected from the two monitoring buoys over the last two years has provided the following information:

- Preliminary analysis of provisional data from the bottom sonde below the pycnocline shows that the current MassDEP DO chronic criterion of 5.0 mg/L and the current RIDEM chronic criterion of 4.8 mg/L were not met for weeks at a time during July and August of 2017.
- It is also likely that an acute DO threshold of 3 mg/l would not be achieved in Massachusetts for significant periods of time.
- These provisional data demonstrate that the receiving waters in the Taunton River Estuary/Mount Hope Bay are not currently meeting designated uses for fish and Aquatic Life support.

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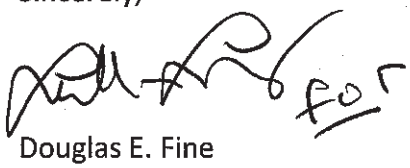
[1] The Nature Conservancy, 2016. Potential Impacts of Dissolved Oxygen, Salinity, and Flow on the Successful Recruitment of Atlantic Sturgeon in the Delaware River.

[2] Kahn, J. and M. Mohead. 2010. A Protocol for Use of Shortnose, Atlantic, Gulf, and Green Sturgeons. NOAA Technical Memorandum NMFS-OPR-45.

- Low DO was observed following events where chlorophyll-a peaks of 25 to 100 µg/L were observed, which demonstrates that the low DO resulted from algae blooms that were caused by excessive nutrients.

In summary, this letter is intended to communicate two important points; first that preliminary results do not support changes to our chronic DO criteria values, and second that based on preliminary data from our water quality buoys, current water quality criteria are not being met in the Taunton River Estuary to date. We hope that the information provided in this letter will assist the City of Taunton in understanding MassDEP's rationale for its future recommended water quality criteria, and we also hope this will be useful for planning for facility design and upgrades for your wastewater treatment plant. Please do not hesitate to contact me if you have any questions or would like to discuss these issues further.

Sincerely,



Douglas E. Fine
Assistant Commissioner for Water Resources

Cc: John Hall, Hall & Associates
Joe Federico, BETA Group
Ken Moraff, EPA Region 1