



Conservation
Law Foundation

For a thriving New England

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June 27, 2024

Water Quality Standards Coordinator
Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333
TRComments.DEP@maine.gov

Re: WQS Change Proposal

Dear Meagan Sims,

Thank you for the opportunity to submit recommendations for proposed changes as part of the Triennial Review of the Maine Water Quality Standards (“WQS”). Conservation Law Foundation, Inc. (“CLF”), on behalf of its members, protects New England’s environment for the benefit of all people. CLF’s advocates use law, policy, economics, and science to design and implement strategies that conserve natural resources, protect public health, and promote vital communities in our region.

CLF respectfully submits the following comments and changes to Maine’s WQS. CLF recommends changes that will improve the clarity of Maine’s WQS and improve the health of Maine’s waterbodies. The addition of standards relating to odor, oil and grease, and nutrient pollution, and clearer dissolved oxygen standards will better protect Maine’s waters for all of its water users.

I. 38 M.R.S. § 464.4.A(4) SHOULD INCLUDE A PROHIBITION ON DISCHARGES THAT IMPART ODOR.

A. Citation for standard or rule to be changed:

38 M.R.S. § 464.4.A(4)

B. Details of proposed change in standard or rule (proposed changes marked in red):

Notwithstanding section 414-A, the department may not issue a water discharge license for any of the following discharges: . . . (4) Discharge of pollutants to waters of the State that imparts color, taste, odor, turbidity, toxicity, radioactivity or other properties that cause those waters to be unsuitable for the designated uses and characteristics ascribed to their class;

C. Justification for why the standard or rule should be changed as proposed:

Odor, like color, taste, and turbidity, is a water quality characteristic experienced firsthand with the senses. Odor alone can cause impairments to designated uses related to recreation, aquatic life, fishing, and drinking water. People are unwilling to swim, wade, or boat in foul-smelling waters, and many marine animals cannot thrive when natural scents are masked by strong unnatural odors. Odors can also be dangerous to humans. Some odors, particular those associated with volatile organic compounds (VOCs) or hydrogen sulfide, can cause respiratory irritation, while others can indicate the presence of harmful pollutants.¹

Odor is therefore a widely accepted criterion for evaluating water quality. All other New England states include odor in their water quality standards, and EPA publishes a list of organoleptic effect criteria (the amount of a pollutant that causes undesirable taste and odor) in its national recommended water quality criteria.²

Most marine species have an acute sense of smell and rely on odor plumes to locate food, hide from predators, find mates, and select habitat.³ Salmon imprint on the specific odors of the stream where they hatched and use retained scent memories to navigate back to spawn.⁴ Lobsters have a finely tuned sense of smell thanks to the chemoreceptors that cover their bodies and antennae, which they can use to distinguish between mussels of different species and recognize a specific fellow lobster's urine.⁵

Plumes of unnatural odor disrupt the essential processes and life stages of marine animals, threatening their health and survival. One common source of strong unnatural underwater odors in Maine is decaying organic pollution, such as occur under finfish aquaculture net pens. Piles of fish waste and uneaten food produce foul-smelling hydrogen sulfide gas plumes as it is digested by microbes. These plumes of unnatural odor can disperse over large areas and interfere with the

¹ *Hydrogen Sulfide*, NAT'L INST. FOR OCCUPATIONAL SAFETY AND HEALTH, <https://www.cdc.gov/niosh/topics/hydrogensulfide/default.html>; *Volatile Organic Compounds' Impact on Indoor Air Quality*, U.S. EPA, (Aug. 15, 2023), https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality#Health_Effects.

² *Quality Criteria for Water*, U.S. EPA, (May 1, 1986), <https://www.epa.gov/sites/default/files/2018-10/documents/quality-criteria-water-1986.pdf>; *National Recommended Water Quality Criteria - Organoleptic Effects*, U.S. EPA, <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-organoleptic-effects>.

³ Toshiaki J. Hara, *Olfaction in Fish*, 5 PROG. NEUROBIOL. 271, 335 (1975), [https://doi.org/10.1016/0301-0082\(75\)90014-3](https://doi.org/10.1016/0301-0082(75)90014-3).

⁴ Steffen S. Madsen et al, *Differential Expression of Olfactory Genes in Atlantic Salmon During the Parr-Smolt Transformation*, 9(24) ECOL. EVOL. 14085-14100 (2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6953650/>; see also NOAA Fisheries, *Fish Olfaction and Homing Research*, <https://www.fisheries.noaa.gov/west-coast/science-data/fish-olfaction-and-homing-research>.

⁵ Inka Milewski et al., *Interactions Between Finfish Aquaculture and American Lobster in Atlantic Canada*, 210 OCEAN & COASTAL MGMT. 105664 (2021), <https://www.sciencedirect.com/science/article/abs/pii/S0964569121001484?via%3Dihub>.

ability of marine animals to detect natural odor plumes—resulting in changes to animal behavior and physiology (such as gill irritation). When lobsters smell sulfides, they respond by moving less to conserve energy and retreat to areas with higher levels of dissolved oxygen.⁶ One 2018 study examining lobster populations near a Nova Scotia finfish net pen site over 11 years found that 42% fewer lobsters and 56% fewer fertilized female lobsters were caught near the site while the pens were full of fish compared with periods when the site was fallow.⁷ Given the high levels of sulfides measured in the sediment near the Nova Scotia net pens, the study’s authors hypothesized that the sulfides odor plumes caused the lobsters to reduce movement or relocate—decreasing their catchability.⁸

Unnatural odors can also act as a warning sign and signal the presence of harmful pollutants. For example, as harmful algal blooms decay, they release hydrogen sulfide – and a strong rotten egg smell.⁹ Heavy metal pollution can be detected by a metallic smell.¹⁰ And the smell of turpentine can indicate the presence of dangerous industrial chemicals like xylenes and methyl tertiary butyl ether.¹¹

All New England states except for Maine have language in their water quality standards relating to odor:

- Massachusetts: “All surface waters shall be free from pollutants in concentrations or combinations that . . . produce objectionable **odor**;”¹²
- New Hampshire: “All surface waters shall be free from substances in kind or quantity which . . . produce **odor** . . . which is not naturally occurring and would render it unsuitable for its designated uses;”¹³

⁶ RJ Diaz et al. *Marine Benthic Hypoxia: A Review of its Ecological Effects and the Behavioral Responses of Benthic Macrofauna*, 33 OCEANOGRAPHY AND MARINE BIOLOGICAL: AN ANN. REV. 245–303 (1995); KG Butterworth et al., *Behavioral and Physiological Responses of the Norway Lobster to Sulphide Exposure*, 144 MARINE BIOLOGY 1087–1095 (2004), <https://doi.org/10.1007/s00227-003-1276-4>; B. Riedel et al., *Effect of Hypoxia and Anoxia on Invertebrate Behaviour: Ecological Perspectives from Species to Community Level*, 11 Biogeosciences 1491–1518 (2014), <https://doi.org/10.5194/bg-11-1491-2014>.

⁷ Inka Milewski et al., *Sea-cage Aquaculture Impacts Market and Berried Lobster Catches*, 598 Marine Ecology Progress Series 85–97 (2018), <https://www.int-res.com/abstracts/meps/v598/p85-97/>.

⁸ *Id.*

⁹ *Harmful Algal Blooms: Contributing Factors and Impacts*, U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION (Apr. 18, 2024), <https://www.cdc.gov/harmful-algal-blooms/about/harmful-algal-blooms-contributing-factors-and-impacts.html>.

¹⁰ *Color, taste and odor problems in drinking water*, WASH. STATE DEPAR’T OF HEALTH (Feb. 2018), <https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-286.pdf>.

¹¹ *Id.*

¹² 314 CMR 4.05(5)(a) (emphasis added).

¹³ N.H. Code Admin. R. Env-Wq 1703.03 (c)(1) (emphasis added).

- Vermont: “Taste and **Odor**. None that would prevent the full support of uses or have an adverse effect on the taste or **odor** of fish;”¹⁴
- Rhode Island: “all waters shall be free from pollutants in concentrations or combinations that . . . Produce **odor** . . . to such a degree as to create a nuisance or interfere with the existing or designated uses;”¹⁵ and
- Connecticut: (class specific) “Taste and **Odor**: None other than of natural origin” (Class AA and A), “Taste and **Odor**: None that would impair any uses specifically assigned to this Class” (Class B), “Taste and **Odor**: As naturally occurs” (Class SA), “Taste and **Odor**: As naturally occurs. None that would impair any uses specifically assigned to this Class” (Class SB).¹⁶

D. How the proposed change will affect stakeholders:

The proposed change would add odor to the list of factors which DEP must consider before issuing a water discharge license. DEP would be required to consider whether a proposed discharger would discharge pollutants that will impart odor that would cause the receiving waters to be unsuitable for their designated uses and characteristics ascribed to their class. The resulting pre-permit analysis would be more robust, more consistent with designated uses, and more in-line with the analyses conducted by EPA and neighboring states prior to permit issuance.

At the margins, this change could result in DEP not issuing or adding odor-related conditions to a discharge permit for a potential discharger seeking to add odorous pollutants to the water. This outcome would benefit Maine’s recreational water users, as well as those who rely on thriving aquatic life for their livelihoods.

II. 38 M.R.S. § 464.4.B SHOULD BE EXPANDED TO INCLUDE ADDITIONAL STANDARDS INCLUDING THOSE RELATED TO OIL AND GREASE, AESTHETIC CRITERIA, TASTE, ODOR, TOXICITY, AND NUTRIENTS.

A. Citation for standard or rule to be changed:

38 M.R.S. §464.4.B

¹⁴ Vt. Admin. Code 16-3-703 §29A-303(3) (emphasis added).

¹⁵ 250-150-05 R.I. Code R. §1.10B(2)(c) (emphasis added).

¹⁶ Regs. Conn. State Agencies §22a-426-9(a)(1) (emphasis added).

B. Details of proposed change in standard or rule (proposed changes marked in red):

B. All surface waters of the State shall be free of settled substances which alter the physical or chemical nature of bottom material; ~~and~~ of floating substances, except as naturally occur ~~which impair the characteristics and designated uses ascribed to their class; of oil and grease; and of pollutants that impart color, taste, odor, turbidity, toxicity, radioactivity or other properties that cause those waters to be unsuitable for the designated uses and characteristics ascribed to their class. Unless naturally occurring, all surface waters shall be free from nutrients, including but not limited to nitrogen and phosphorus, in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed any site-specific numeric criteria developed in a TMDL or as otherwise established by the Department pursuant to rule.~~

C. Justification for why the standard or rule should be changed as proposed:

1. *Justification for adding a prohibition on oil and grease in all waters of the state:*

Prohibitions on oil and grease petrochemicals should be included in Maine's water quality standards to protect Maine water users from related impairments. Oil (whether derived from petroleum, vegetables, or animals) is acutely toxic to plants and animals,¹⁷ destroys wetland and oyster reef habitats,¹⁸ fouls shorelines, forms products that linger in the environment for many years, and can physically coat and suffocate animals.¹⁹

Oil quickly spreads in a thin film across large expanses of water: just one quart of oil can contaminate more than 100,000 gallons of water.²⁰ The spreading oil can have impacts on recreation and local economies, resulting in closures of beaches, parks, waterways, and

¹⁷ *Focus on: Environmental Harm from Oil Spills*, WASH. STATE DEP'T OF ECOLOGY (Sept. 2019), <https://apps.ecology.wa.gov/publications/documents/1008001.pdf>.

¹⁸ *Id.*

¹⁹ *Oil spills*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN. (Aug. 1, 2020), <https://www.noaa.gov/education/resource-collections/ocean-coasts/oil-spills>; *Vegetable Oils and Animal Fats*, U.S. EPA (Feb. 15, 2024), <https://www.epa.gov/emergency-response/vegetable-oils-and-animal-fats>.

²⁰ *Oil spill on SR-520*, WASH. STATE DEP'T OF ECOLOGY (Feb. 22, 2012), <https://ecology.wa.gov/spills-cleanup/spills/spill-preparedness-response/responding-to-spill-incidents/spill-incidents/sr-520-spill>.

recreational and commercial fisheries.²¹ Fishing in oil sheen-covered waters can result in fishing catch becoming coated with a thin layer of oil as it is brought on board.²²

Aquaculture feed is a common source of oil and grease contamination in Maine waters. The farmed salmon that crowd net pens along Maine’s coast are fed an oily fish feed rich in either fish oil or vegetable oil.²³ It is common to see an oily sheen spreading across the surface of the water from salmon net pens.

Maine DEP already recognizes the potential for oil sheen caused by net pen aquaculture. The MEPDES General Permit for Net Pen Aquaculture includes prohibitions on the discharge of “pollutants that cause a visible oil sheen . . . at any time that would impair the uses designated by the classification of the receiving waters.”²⁴ Including even stronger language relating to oil and grease in the state’s water quality standards will reaffirm the state’s commitment to protecting waters from this impairment.

All New England states except for Maine have language in their water quality standards relating to oil and grease:

- Massachusetts: (class specific) “These [Classes A and SA] waters shall be free from oil and grease, petrochemicals and other volatile or synthetic organic pollutants”, “These [Classes B and SB] waters shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life;”²⁵
- New Hampshire: (class specific) “Class A waters shall contain no oil or grease, unless naturally occurring”, “Class B waters shall contain no oil or grease in such concentrations that would impair any existing or designated uses;”²⁶

²¹ *How can a spill affect your community?*, NAT’L OCEANIC AND ATMOSPHERIC ADMIN, <https://darrp.noaa.gov/oil-spills/how-can-spill-affect-your-community>.

²² *TIP 11: Effects of Oil Pollution on Fisheries and Mariculture*, INT’L TANKER OWNERS POLLUTION FED’N (2014), <https://www.itopf.org/knowledge-resources/documents-guides/tip-11-effects-of-oil-pollution-on-fisheries-and-mariculture/>.

²³ Beate Zlaugotne at al., *Advantages and disadvantages of using more sustainable ingredients in fish feed*. 8 *Heliyon* E10527 (2022), <https://doi.org/10.1016/j.heliyon.2022.e10527>.

²⁴ *General Permit – Net Pen Aquaculture*, ME. DEP (Apr. 10, 2014) at 13, <https://www.maine.gov/dep/water/wd/net-pen-aquaculture/MEG130000-2014permit.pdf>.

²⁵ 314 CMR 4.05(3)(a)(7); 314 CMR 4.05(4)(a)(7); 314 CMR 4.05(3)(b)(7); 314 CMR 4.05(4)(b)(7).

²⁶ N.H. Code Admin. R. Env-Wq 1703.09(a)(b).

- Vermont: “Settleable solids, floating solids, oil, grease, scum, or total suspended solids. None in such concentrations or combinations that would prevent the full support of uses;”²⁷
- Rhode Island: “all waters shall be free from pollutants in concentrations or combinations that . . . Float as debris, oil, grease, scum or other floating material attributable to wastes in amounts to such a degree as to create a nuisance or interfere with the existing or designated uses;”²⁸ and
- Connecticut: (class specific) “Sludge deposits – solid refuse – floating solids, oils and grease – scum: None other than of natural origin” (Classes AA, A, and SA), “None exceeding levels necessary to protect and maintain all designated uses” (Classes B and SB).²⁹

2. *Justification for including standards related to aesthetics, taste, odor, toxicity, and radioactivity in 38 M.R.S. § 464.4.B*

The proposed addition of standards relating to aesthetics, taste, odor, toxicity, and radioactivity to 38 M.R.S. § 464.4.B harmonizes with and strengthens the existing provision at 38 M.R.S. § 464.4.A(4) which prohibits DEP from issuing a water discharge license for any discharges which “imparts color, taste, turbidity, toxicity, radioactivity or other properties that cause those waters to be unsuitable for the designated uses and characteristics ascribed to their class.” Enshrining the above protections in the water quality standards as provisions applying to all waters provide ensure that impermissible discharges are kept out of Maine’s waters.

While DEP does include standards and requirements relating to color, taste, turbidity, toxicity, and oil and grease in MEPDES Permits, echoing those requirements in state water quality standards adds another layer of protection for Maine’s waters. Water quality standards provide a backstop, guaranteeing a minimum level of protection for all Maine waters—regardless of the permitting status of a particular facility or discharger.

All the other New England states water quality standards include criteria relating to color, odor, and taste which apply either to all surface waters or to waters of certain classes (see below). Most also include standards relating to turbidity, toxicity, and radioactivity that either apply to all surface waters or to waters of certain classes.

²⁷ Vt. Admin. Code 16-3-703 §29A-303(2).

²⁸ 250-150-05 R.I. Code R. §1.10B(2)(b).

²⁹ Regs. Conn. State Agencies §22a-426-9(a)(1).

- Massachusetts: “All surface waters shall be free from pollutants in concentrations or combinations that . . . produce objectionable odor, color, taste or turbidity;”³⁰
- New Hampshire: “All surface waters shall be free from substances in kind or quantity which . . . Produce odor, color, taste or turbidity which is not naturally occurring and would render it unsuitable for its designated uses;”³¹
- Vermont: “Taste and Odor. None that would prevent the full support of uses or have an adverse effect on the taste or odor of fish,” “Color. No change from the natural condition that would prevent the full support of uses;”³²
- Rhode Island: “all waters shall be free from pollutants in concentrations or combinations that . . . Produce odor or taste or change the color or physical, chemical or biological conditions to such a degree as to create a nuisance or interfere with the existing or designated uses;”³³ and
- Connecticut: (class specific) Taste and Odor and Color: “None other than of natural origin” (Class AA and A), “Taste and Odor: None that would impair any uses specifically assigned to this Class” (Class B), “Color: None which causes visible discoloration of the surface water outside of any designated zone of influence” (Class B), “Taste and Odor: As naturally occurs” (Class SA), “Color: None other than of natural origin” (Class SA), “Taste and Odor: As naturally occurs. None that would impair any uses specifically assigned to this Class” (Class SB).³⁴

3. *Justification for including standards related to nutrients in 38 M.R.S. § 464.4.B*

Maine DEP should add nutrients pollution standards to 38 M.R.S. § 464.4.B to better protect Maine’s surface waters. The current surface water classifications and the freshwater standards waters, as described in 38 M.R.S. § 464.4.B and 38 M.R.S. § 465 do not discuss nutrient pollution directly. In fact, throughout the entirety of 38 M.R.S. § 465.1’s text, the word nutrient is not found once.

Nutrient pollution is a serious and increasing threat to the health of Maine waters. Excess nitrogen in marine waters and phosphorus in freshwater feed nuisance plants, plankton, and algae—resulting in out-of-control growth that can trigger outbreaks of toxic algae and red tides, smother waterways, cloud the water column, and reduce dissolved oxygen levels. Outbreaks of

³⁰ 314 CMR 4.05(5)(a) (emphasis added).

³¹ N.H. Code Admin. R. Env-Wq 1703.03 (c)(1) (emphasis added).

³² Vt. Admin. Code 16-3-703 §29A-303(3)(4) (emphasis added).

³³ 250-150-05 R.I. Code R. §1.10B(2)(c) (emphasis added).

³⁴ Regs. Conn. State Agencies §22a-426-9(a)(1) (emphasis added).

toxic algae (including cyanobacteria) can poison animals, including fish and shellfish. This creates a domino effect, poisoning humans who consume the contaminated organisms. Humans exposed to the contaminated water or who consume contaminated organisms. Waterways overgrown with nuisance plants and algae impair recreational and aesthetic uses – catching boat motors, entangling the arms of swimmers, and reducing the appearance of waterbodies. Nutrient pollution is also devastating to aquatic ecosystems. Increased turbidity or cloudiness in the water column blocks sunlight from reaching crucial underwater plants like eelgrass, while reduced oxygen levels threaten the survival of all marine life, especially shellfish, bottom-dwelling plants, and cold-water fish.

The severity of nutrient pollution impacts on Maine’s waters will only increase as the climate crisis intensifies. In a dangerous cycle, ever-warming waters mean ever-more outbreaks of harmful algae and cyanobacteria, and outbreaks of harmful algae will warm waters as the algae release heat. Harmful algae thrive in the warm acidic waters caused by the climate crisis, which will allow them to outcompete benign algae.³⁵

All New England states except for Maine and Connecticut have language in their water quality standards relating to nutrient pollution:

- Massachusetts: “Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site-specific criteria developed in a TMDL or as otherwise established by the Department”³⁶
- New Hampshire: (class specific) “Class A waters shall contain no phosphorous or nitrogen, unless naturally occurring”, “Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring;”³⁷
- Vermont: “In all waters, total phosphorus loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses.”³⁸ and
- Rhode Island: “Bodies of water shall not cause exceedance of this phosphorous criteria, except as naturally occurs” For all Class waters, “no[ne] [nutrient discharges] in such

³⁵ *Climate Change and Freshwater Harmful Algal Blooms*, EPA, <https://www.epa.gov/habs/climate-change-and-freshwater-harmful-algal-blooms> (last visited June 27, 2024).

³⁶ 314 CMR 4.05(5)(c).

³⁷ N.H. Code Admin. R. Env-Wq 1703.14(a)(b).

³⁸ Vt. Admin. Code 16-3-703 §29A-302(2)(A).

concentrations that would ... cause undesirable or nuisance aquatic species associated with cultural eutrophication.”³⁹

D. How the proposed change will affect stakeholders:

Adding requirements related to oil and grease, aesthetic standards, taste, odor, turbidity, toxicity, and nutrient pollution for all waters to section 38 M.R.S. § 464.4.B would make it easier for Maine water users to use water quality standards to protect waters from impairments. The above changes will also bring Maine’s standards in line with those of neighboring states.

At the margins, the above changes will better protect Maine’s waters for the benefit of all water users. Both people who swim, wade, birdwatch, and boat and people who rely on Maine’s waters for fishing and lobstering will benefit from cleaner, healthier water.

III. MAINE DEP SHOULD IMPROVE DISSOLVE OXYGEN STANDARDS THROUGH INCREASED SPECIFICITY.

A. Citation for the Rule or Standard to be Changed

38 M.R.S. § 465.1.B and 38 M.R.S. § 465.B.

B. Details of proposed change in standard or rule (proposed changes marked in red):

The aquatic life, ~~dissolved oxygen~~ and bacteria content of Class AA waters must be as naturally occurs, except that the number of Escherichia coli bacteria in these waters may not exceed a geometric mean of 64 CFU or MPN per 100 milliliters over a 90-day interval or 236 CFU or MPN per 100 milliliters in more than 10% of the samples in any 90-day interval. The dissolved oxygen content of Class AA waters may not be less than [].

The estuarine and marine life, ~~dissolved oxygen~~ and bacteria content of Class SA waters must be as naturally occurs, except that the number of enterococcus bacteria in these waters may not exceed a geometric mean of 8 CFU or MPN per 100 milliliters in any 90-day interval or 54 CFU or MPN per 100 milliliters in more than 10% of the samples in any 90-day interval. The dissolved oxygen content of Class SA waters may not be less than []. The number of total coliform bacteria or other specified indicator organisms in samples representative of the waters in shellfish harvesting areas may not exceed the criteria recommended under the National Shellfish Sanitation Program, United States Food and Drug Administration as set forth in its

³⁹ 250-150-05 R.I. Code R. §1.10B(4) (emphasis added). 250-150-05 R.I. CODE R. § 1.10D(1); 250-150-05 R.I. Code R. §1.10E(1).

publication "Guide for the Control of Molluscan Shellfish" (2019 revision) or any successor publication. [PL 2021, c. 551, §14 (AMD).]

C. Justification

Through monitoring and modeling, Maine DEP should develop a numeric dissolved oxygen standard for Classes AA and SA waters. "Naturally occurring" is an insufficient limit on dissolved oxygen because natural levels change over time. Class AA waters are meant to be the "highest classification" due to their status as "outstanding natural resources."⁴⁰ Therefore, these waters should have the strictest protections to keep them pristine. Standards that are open to interpretation and relaxation over time do not achieve this goal.

The climate crisis is already significantly impacting Maine's waters and communities. Increased rainfall results in increased sediment and nutrients in runoff, degrading freshwater by encouraging the growth of harmful algal blooms and reducing oxygen levels.⁴¹ Increased hypoxia damages aquatic communities as discussed *supra* in Section II(C)(3).

The vagueness of the current Class AA and Class SA dissolved oxygen standards creates confusion, especially given naturally decreasing dissolved oxygen levels over time. What was "natural" a few ago is not what is "natural" to waterbodies now and will not be their "natural" state in twenty years. Does "naturally occurring" refer to dissolved oxygen levels at a fixed dated in the past, or does the standard slip as the climate crisis degrades the waters, allowing for ever-lower levels? Dissolved oxygen is a direct indicator of a waterbody's ability to support aquatic life.⁴² As the climate crisis reduces dissolved oxygen and threatens aquatic communities, will DEP consider the reduced level the waterbody's new "natural" state?

Instead, Maine DEP should look toward numeric standards like it has in the Class A classification. Numeric standards remove any uncertainty and would help prevent climate change's impact on Class AA and Class SA waters.

D. Stakeholder Impact

Clearer and more protective limits for dissolved oxygen benefit all water users by protecting the health of Maine's waterbodies. Aquatic life that cannot tolerate low dissolved oxygen levels will move to other areas where dissolved oxygen levels are within range. Plants and animals unable to move to oxygen-rich areas can die. Low dissolved oxygen concentrations stress aquatic animals, leading to poor appetite, slow growth, greater susceptibility to disease, and, at worst, mass fish kills.

⁴⁰ Me. Stat. tit 38 § 465-1.

⁴¹ *Climate Change Impacts on Freshwater Resources*, U.S. EPA (Nov. 16, 2023), <https://www.epa.gov/climateimpacts/climate-change-impacts-freshwater-resources>.

⁴² *Indicators: Dissolved Oxygen*, U.S. EPA, (Sept. 8, 2023), <https://www.epa.gov/national-aquatic-resource-surveys/indicators-dissolved-oxygen>.

Low dissolved oxygen levels can lead to severe economic losses for the commercial fishing industry, as well as negative impacts to recreational fishing, boating, and human health. A strong numeric standard will help mitigate these economic impacts and concerns from decreased dissolved oxygen that a malleable “naturally occurring” standard would not.

IV. MAINE DEP SHOULD ADJUST DISSOLVED OXYGEN STANDARDS ACCORDANCE WITH THE AVAILABLE SCIENCE

A. Citation for Rule to be Changed

38 M.R.S. § 465.2.B and 38 M.R.S. § 465.3.B

B. Proposed Change

“The dissolved oxygen content of Class A waters may not be less than 7 parts per million ~~or 75% of saturation, whichever is higher at any time or place, except as naturally occurs, or not less than 7ppm at least 20 hours of any 24-hour period[.]~~”

“The dissolved oxygen content of Class B waters may not be less than 7 parts per million ~~or 75% of saturation, whichever is higher at any time or place, except as naturally occurs, or not less than 7ppm at least 20 hours of any 24-hour period[.]~~”

C. Justification

Maine DEP should make the above-described changes to reflect the actual practices of the agency. Maine DEP currently evaluates dissolved-oxygen criteria for these classes of water solely based on the concentration limit, not the saturation. The new language will reflect that practice and provide clarity to what the actual standard is.

The current language does not account for the natural diurnal cycle of Class A and Class B waters and could potentially lower an existing waterbody’s class for the wrong reason. The additional language of as “naturally occurs” or “20 hours of any 24-hour period” will account for the natural slight deviations away from the 7ppm marker that occur in Class A and Class B waters for limited amounts of time. Maine DEP has already recognized these deviations as natural and likely due to low flow and not “attributable to excessive algal production associated with nutrient inputs.”⁴³ Allowing room for these slight natural deviations will help Maine waterbodies from being misclassified while maintaining a strict protection on its water quality.

⁴³ *Falmouth Study Steams Stressor Report*, ME. DEP, (2022) at 40.

D. Stakeholder Impact

Clearer standards positively impact all stakeholders. Stakeholders can more accurately predict how a waterbody's classification will be impacted by changing dissolved oxygen values when they know what the value Maine DEP is actually using. A standard that does not have the possibility to lower a waterbody's class because of natural cycles helps communities and users of those waterbodies maintain their relationship to and use of the water.

V. CONCLUSION

While Maine is a regional leader in some aspects of its water quality standards, when it comes to standards relating to odor, oil and grease, nutrients, and dissolved oxygen, it is lagging behind. CLF urges Maine to emulate language from neighboring New England states that are more protective of water quality to protect its marine and freshwater ecosystems for the benefit of all water users.

Thank you for the opportunity to comment.

Respectfully submitted,

/s/ Chelsea Kendall

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