I. DNR HAS A MANDATORY DUTY UNDER THE CLEAN WATER ACT TO ADOPT CRITERIA NECESSARY TO PROTECT THE DESIGNATED USE OF IOWA'S WATERS

The goal of the Clean Water Act (CWA) and its associated regulations is to eliminate the discharge of pollutants into our nation's navigable waters[1] with the objective of restoring and maintaining their "chemical, physical, and biological integrity."[2] In order to achieve this broad national goal, Congress established specific roles for states, articulating their discretionary and mandatory duties under the statute.[3]

States have a mandatory duty under the CWA to establish their own water quality goals (i.e., *water quality standards*) for their intrastate waters.[4] This includes 1) the mandatory duty to designate uses for all waterbodies[5] and 2) the mandatory duty to adopt *criteria* necessary to protect those uses.[6] When multiple uses are designated for a waterbody, the state must ensure that criteria protect the most sensitive use:

> States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.[7]

Iowa has designated more than a hundred lakes for recreational use.[8] Many of those recreational lakes have also been designated for drinking water and/or aquatic life use.[9] Despite the following substantial evidence that nutrient (i.e., nitrogen & phosphorus) pollution threatens these uses, the Iowa Department of Natural Resources (DNR) has failed to establish criteria necessary to protect recreational lakes from these pollutants.

II. NUTRIENT POLLUTION THREATENS THE USE OF IOWA'S RECREATIONAL LAKES

A. Iowa Lakes Have High Levels of Nutrient Pollution

Phosphorus Pollution

A majority of Iowa's lakes have high levels of phosphorus pollution relative to benchmark values acknowledged by DNR (of approximately 50 ppb).[10]

In 2015, half of Iowa's 138 monitored lakes had phosphorus levels of 79.5 ppb or higher.[11] Average phosphorus levels in Iowa lakes were 104.5 ppb in 2015 (more than double the benchmark of 50 ppb).[12]

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[1] 33 U.S.C. § 1251(a)(1)
[2] 33 U.S.C. § 1251(a)
[3] *See* 40 C.F.R. § 131.4; 40.C.F.R. §131.5; *See also, PUD NO. 1 of Jefferson Cty. v. Washington Dept. of Ecology*, 511 U.S. 700, 704 (1994)
[4] *See* 40 C.F.R. §131
[5] *See* 40 C.F.R. § 131.10(a) (2018)
[6] 40 C.F.R. § 131.11(a)(1) (2018)
[7] 40 C.F.R. § 131.11(a)(1) (2018)
[8] *See* Iowa Department of Natural Resources, *Surface Water Classification* (June 17, 2015), *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Quality-Standards
[9] *Id.*
[10] Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 162 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016
[11] Iowa Department of Natural Resources, *2015 Lake Water Quality Summary*, at 2 (May 4, 2016) *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Ambient-Lake-Monitoring
[12] *Id.*

Some Iowa lakes significantly exceed benchmarks for phosphorus pollution: In 2015, the maximum amount of phosphorus pollution reported in one Iowa lake was 614.1 ppb (more than twelve times the recommended benchmark of 50 ppb).[13]

Nitrogen Pollution

Levels of nitrogen in Iowa lakes are also high relative to benchmarks acknowledged by DNR (of approximately 1 ppm).[14]

In 2015, the average concentration of nitrate + nitrite in Iowa's 138 monitored lakes was 1.34 ppm.[15] The maximum value of nitrate + nitrite reported in a lake that year was 22.55 ppm (significantly beyond the benchmark of 1 ppm).[16]

Such excessive levels of nitrogen and phosphorus pollution threaten public health and the multiple designated uses of Iowa's recreational lakes (e.g., aquatic life, drinking water use), as described below.

B. Nutrient Pollution Threatens Recreational Use

Excess nutrient pollution can impair recreational lake use by causing dense layers of algae/scum (sometimes several inches thick) to form on the surface of lake water.[17] These conditions are both unsightly and often smell bad,[18] diminishing recreational experiences and deterring lake uses such as swimming, boating, and fishing.

Excess nutrient pollution can also threaten the safety of recreational lake users. In addition to degrading surface water conditions, excess nutrient pollution "typically promotes higher densities of phytoplankton, which can reduce the clarity of the water column to the detriment of swimmer safety."[19]

Excess nutrient pollution can also threaten the health of recreational users by promoting the growth of cyanobacteria species.[20] Under certain conditions, cyanobacteria (also known as "blue-green algae") can release dangerous toxins in water, such as microcystin.[21] Microcystin can cause significant health threats in both humans and animals.[22] According to the Iowa Department of Public Health:

> People who accidentally swallow water or breathe in water droplets containing microcystin can develop gastrointestinal symptoms, such as nausea, vomiting, and diarrhea. Other symptoms can include cough, runny eyes and nose, sore throat, and asthma-like symptoms. Skin rashes can also develop. In severe cases, liver failure can occur.[23]
>
> Pets and other animals that drink from the water's edge, where scum layers accumulate, can be exposed to deadly levels of microcystins. Pets can get sick if they have been

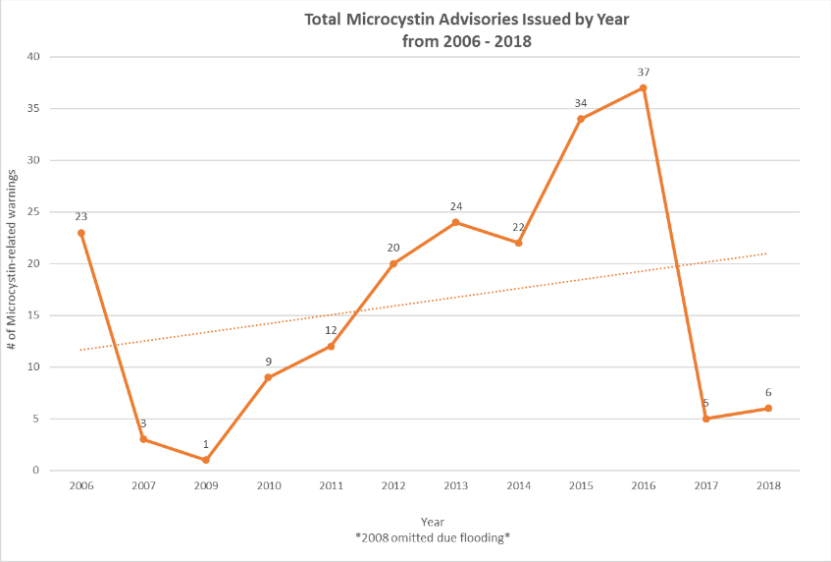
[13] *Id.*
[14] Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 158 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016
[15] Iowa Department of Natural Resources, *2015 Lake Water Quality Summary*, at 2 (May 4, 2016) *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Ambient-Lake-Monitoring
[16] *Id.*
[17] *See* Iowa Department of Public Health, *Harmful Algal Blooms*, https://idph.iowa.gov/Environmental-Health-Services/Reportable-Conditions/Harmful-Algal-Blooms (last visited Oct. 31, 2018).
[18] *Id.*
[19] *Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017)
[20] *See* Iowa Department of Public Health, *Harmful Algal Blooms*, https://idph.iowa.gov/Environmental-Health-Services/Reportable-Conditions/Harmful-Algal-Blooms (last visited Oct. 31, 2018).
[21] *Id.*
[22] *Id.*
[23] Iowa Department of Public Health, *Harmful Algal Blooms*, https://idph.iowa.gov/Environmental-Health-Services/Reportable-Conditions/Harmful-Algal-Blooms (last visited Oct. 31, 2018).

> swimming in water where algal blooms have been and ingest significant amounts of microcystins by licking themselves after leaving the water.[24]

DNR conducts weekly monitoring for microcystin at 39 state park beaches during the summer recreation season (i.e., Memorial Day - Labor Day).[25] If sample monitoring results are greater than 20 micrograms/liter,[26] a warning similar to the following is issued, discouraging visitors from engaging in certain recreational uses:

> Concentrations of […] toxins produced by blue-green algae currently exceed acceptable guidelines for recreational use.
> Until further notice:
> - Swimming is strongly discouraged.
> - Do not drink lake water
> - Keep children and pets away from the water.
> - Clean fish well and discard guts.
> - Avoid areas of concentrated algae when boating.
>
> Contact your doctor or veterinarian if you, a family member, or a pet experience sudden or unexplained illness that may be a sign of exposure to harmful algae.[27]

Since 2006, there has been an overall increasing trend in the annual number of microcystin-related warnings issued at Iowa's 39 monitored state park beaches. A total of 196 microcystin-related warnings were issued at these beaches from 2006-2018.[28] However, this number would most certainly be higher if 1) the scope of microcystin monitoring included all of the 100+ Iowa lakes designated for recreational use, 2) if the frequency of monitoring was increased, or 3) if monitoring samples were taken at locations beyond the surrounding beach vicinity.



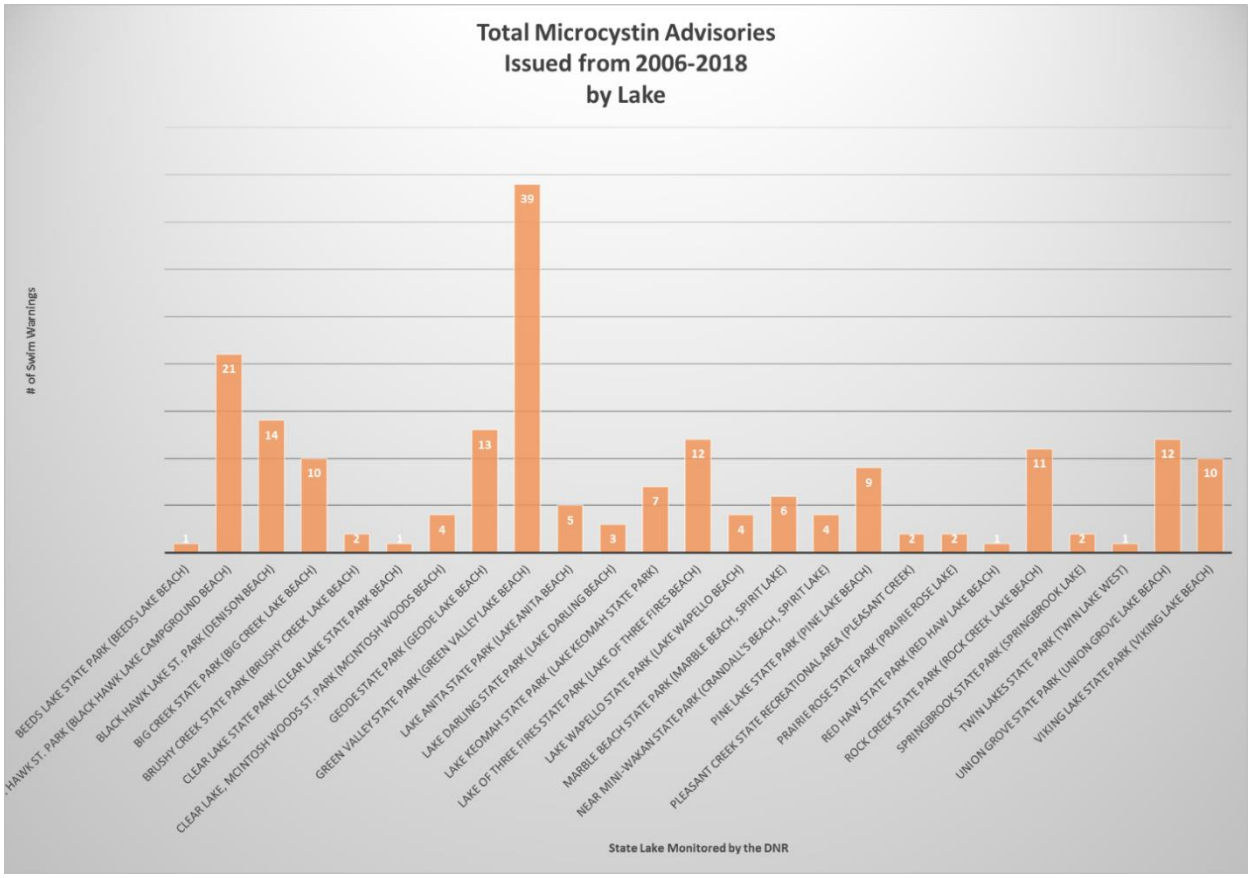
Data Source: DNR Beach Monitoring Data, AQuIA

Recurring cyanobacterial blooms and associated toxins resulting from excess nutrient pollution are a frequently recurring problem for some Iowa lakes, significantly impairing their safe recreational use:

For example, DNR has issued microcystin-related warnings at Green Valley State Park 39 times

[24] Iowa Department of Public Health, *Frequently Asked Questions: Blue Green Alagae (Cyanobacteria) and Microcystin Toxin* at 2, https://www.idph.iowa.gov/Portals/1/Files/EHS/algae_faq.pdf (last visited October 31, 2018).
[25] *See* Iowa Department of Natural Resources, *State Park Beach Monitoring*, http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Beaches (last visited October 31, 2018).
[26] U.S. Environmental Protection Agency, *Guidelines and Recommendations*, https://www.epa.gov/nutrient-policy-data/guidelines-and-recommendations (last visited October 31, 2018)
[27] Scott Vicker, Creston News Authority, *Green Valley Lake testing high for microcystins* (August 16, 2017) https://www.crestonnews.com/2017/08/15/green-valley-lake-testing-high-for-microcystins/af553ka/?page=2 (last visited October 31, 2018).
[28] *See* Iowa Department of Natural Resources, *Beach Monitoring at State Owned Beaches*, AQuIA, *available at* https://programs.iowadnr.gov/aquia/search

from 2006 to 2018.[29] That amounts to a warning deterring recreational use during 28% of the Park's total beach season over 13 years (assuming an average 15 week season for 13 years).



Data Source: DNR Beach Monitoring Data, AQuIA

C. Nutrient Pollution Threatens Drinking Water Use

Excess nutrient pollution resulting in cyanobacteria blooms and associated toxins (e.g., microcystin) poses significant public health threats in recreational lakes that are also designated for drinking water use. This is because dangerous cyanobacterial toxins can pass through standard treatment practices for drinking water.[30]

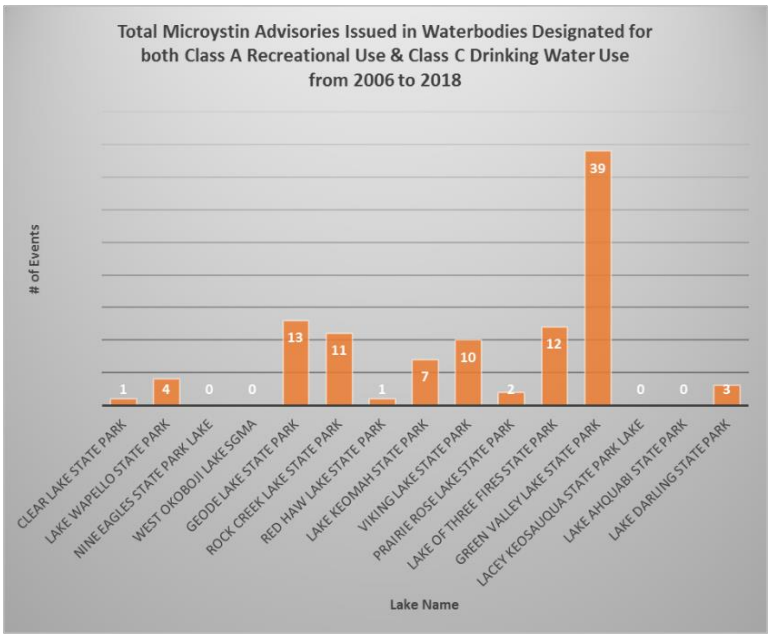
Currently, 37 Iowa lakes/reservoirs are designated for both Class A recreational and Class C drinking water use.[31]

[29] *See* Iowa Department of Natural Resources, *Beach Monitoring at State Owned Beaches,* AQuIA, *available at* https://programs.iowadnr.gov/aquia/search

[30] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), citing Carmichael, W.W. 2000. *Assessment of Blue-Green Algal Toxins in Raw and Finished Drinking Water*. AWWA Research Foundation, Denver, CO.

[31] Iowa Department of Natural Resources, *Surface Water Classification* at 92-112 (2018), *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Quality-Standards

Of those 37 lakes/reservoirs, only 15 have beaches that are monitored as part of DNR's beach monitoring program.[32] A majority of those monitored lakes (11 out of 15) had a microcystin-related advisory issued during 2006-2018.[33]



Data Source: DNR Beach Monitoring Data, AQuIA, DNR Surface Water Classification (2018).

In fact, over half (103 out of 196) of the total microcystin warnings issued at Iowa's state park beaches from 2006-2018, have been issued at lakes that are designated for both recreational use and drinking water use.[34]

Given the limited number of lakes monitored and the scope of sampling, cyanobacteria/cyanotoxin threats are likely much more prevalent than currently reported. For example, there are numerous types of cyanobacteria associated with varying types of cyanotoxins/compounds that may not be detected by current limited monitoring for microcystin.[35]

> Species of cyanobacteria commonly associated with freshwater algal blooms include: Microcystis aeruginosa, Anabaena circinalis, Anabaena flosaquae, Aphanizomenon flos-aquae, and Cylindrospermopsis raciborskii. Under certain conditions, some of these species can release neurotoxins (affect the nervous system), hepatotoxins (affect the liver), lipopolysaccharide compounds inimical to the human gastrointestinal system, and tumor promoting compounds.[36] One study showed that at least one type of cyanobacteria has been linked to cancer and tumor growth in animals.[37]

Beyond the dangers of cyanotoxins, excess nutrient pollution resulting in algae/cyanobacteria blooms can pose other significant threats to safe drinking water use in Iowa's lakes.

When disinfectants (e.g. chlorine) are used to treat drinking water, they can "react with organic carbon produced by algae in source waters" and form disinfection byproducts (DBPs) that can harm public health.[38]

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[32] *See* Iowa Department of Natural Resources, State Park Beach Monitoring, http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Beaches (last visited October 31, 2018). *See also*, Iowa Department of Natural Resources, *Surface Water Classification* at 92-112 (2018), *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Quality-Standards

[33] *See* Iowa Department of Natural Resources, *Beach Monitoring at State Owned Beaches*, AQuIA, *available at* https://programs.iowadnr.gov/aquia/search; *See also*, Iowa Department of Natural Resources, *Surface Water Classification* at 92-112 (2018), *available at* http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Quality-Standards

[34] *See* Iowa Department of Natural Resources, *Beach Monitoring at State Owned Beaches*, AQuIA, *available at* https://programs.iowadnr.gov/aquia/search

[35] *See Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), *citing* CDC. 2017. Harmful Algal Bloom (HAB)-Associated Illness, Centers for Disease Control and Prevention. <https://www.cdc.gov/habs/>. Accessed December 2017.

[36] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), *citing* CDC. 2017. Harmful Algal Bloom (HAB)-Associated Illness, Centers for Disease Control and Prevention. <https://www.cdc.gov/habs/>. Accessed December 2017.

[37] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), *citing* Falconer, I.R. & A.R. Humpage. 2005. Health risk assessment of cyanobacterial (blue-green algal) toxins in drinking water. International Journal of Research and Public Health 2(1):43–50.

[38] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017).

"Some DBPs have been linked to rectal, bladder, and colon cancers; reproductive health risks; and liver, kidney, and central nervous system problems."[39]

Algae and cyanobacterial blooms don't just impair the safe use of drinking water. They can impair taste and odor of drinking water, and/or result in costly deterrents of use:[40] The community of Greenfield, Iowa was forced to issue a drinking water ban temporarily this summer when its lake drinking water source experienced a harmful algal bloom.[41] Businesses and community members had to resort to finding alternative water sources, incurring both the cost and the burden of using bottled water for simple functions.[42]

D. Nutrient Pollution Threatens Aquatic Life Use

In addition to threatening recreational and drinking water use in Iowa lakes, excess nutrient pollution resulting in algae/cyanbacteria blooms can also threaten fish in recreational lakes that are also designated for aquatic life use:

> According to biologists in the IDNR Fisheries Bureau, algal blooms can also cause impairments to aquatic life uses of Iowa lakes through interference with some spawning activities of nest building species, e.g., Bluegill, Bullhead, crappie and Largemouth Bass) and lowered levels (sags) of dissolved oxygen that, in extreme cases, can cause fish mortality.[43]
>
> Excessive plant growth can also lead to oxygen depletion of lake water through respiration related to bacterial decomposition of plant material and other organic matter that accumulates on the lake bottom. Severe cases of oxygen depletion can lead to fish kills.[44]

Cyanotoxins released from cyanbacteria blooms can also threaten aquatic life in Iowa's recreational lakes. Studies have implicated these toxins in a number of fish (and bird) mortalities.[45]

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[39] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), *citing* USEPA. 2017. Drinking water Requirements for States and Public Water Systems, Public Water Systems, Disinfection Byproducts, and the Use of Monochloramine. U.S. Environmental Protection Agency. Accessed <https://www.epa.gov/dwreginfo/public-water-systems-disinfection-byproducts-anduse-monochloramine>.
December 2017; Also citing, National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule, 40 CFR parts 9, 141, and 142. U.S. Environmental Protection Agency, FR 71:2 (January 4, 2006). pp. 387–493. Available electronically at: http://www.epa.gov/fedrgstr/EPA-WATER/2006/January/Day-04/w03.htm. Accessed December 2009.

[40] *See* Walter K. Dodds, Wes W. Bouska, Jeffrey L Eitzmann, Tyler J. Pilger, Kristen L. Pitts, Alyssa J. Riley, Joshua T. Schloesser, and Darren J. Thornbrugh, *Eutrophication of U.S. Freshwaters: Analysis of Potential Economic Damages*, Environmental Science & Technology, Vol. 43, No.1 at 12-19 (2009)

[41] Danielle Gehr, *Greenfield Under Tap Water Drinking Ban Following Detection Potential Toxin*, Des Moines Register (July 17, 2018), available at https://www.desmoinesregister.com/story/news/2018/07/17/greenfield-under-tap-water-drinking-ban-following-detection-potential-toxin/793146002/

[42] *See Bottled Water Advisory Issued for Greenfield After Water System Potentially Contaminated*, WHO TV Channel 13 (July 17, 2018) https://whotv.com/2018/07/17/bottled-water-advisory-issued-for-greenfield-after-algae-found-in-citys-water-system/

[43] Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 100 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016

[44] *Id.* at 159

[45] *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017), *citing* Ibelings, B.W. & K.E. Havens. 2008. Chapter 32: Cyanobacterial toxins: A qualitative meta-analysis of concentrations, dosage and effects in freshwater, estuarine and marine biota. *In: Cyanobacterial Harmful Algal Blooms: State of the Science and Research Needs*. From the Monograph of the September 6–10, 2005 International Symposium on Cyanobacterial Harmful Algal Blooms (ISOC–HAB) in Durham, NC. <http://www.epa.gov/cyano_habs_ symposium/monograph/Ch32.pdf>. Accessed August 19, 2010.

III. GENERAL NARRATIVE CRITERIA FAIL TO PROTECT THE USE OF IOWA'S RECREATIONAL LAKES FROM THE IMPACTS OF NUTRIENT POLLUTION

Despite the significant threats that nutrient pollution poses to the safe use and enjoyment of Iowa's recreational lakes, DNR has failed to establish numeric nutrient criteria *necessary to protect* the multiple uses of Iowa's recreational lakes.

DNR currently addresses nutrient pollution via the following general narrative criteria that are applicable to all waterbodies:

> Such waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor or other aesthetically objectionable conditions.[46]

> Such waters shall be free from substances, attributable to wastewater discharges or agricultural practices, in quantities which would produce undesirable or nuisance aquatic life.[47]

General narrative criteria describe the desired conditions of Iowa's waters in a qualitative context.[48] DNR uses these general narrative criteria in conjunction with the Carlson's Trophic State Index (TSI) as the basis for *assessing* nutrient pollution's impacts on water quality.[49] Carlson's TSI provides a method for identifying symptoms of algae (e.g., increased chlorophyll a, decreased water transparency) caused by excess nutrient pollution or "eutrophication."[50] According to DNR, use of the TSI assists DNR in determining whether lakes are impacted (or impaired) by algae -- a response to excess nutrient pollution:

> Carlson's (1977) trophic state index is a numeric indicator of the continuum of the biomass of suspended algae in lakes and thus reflects a lake's nutrient condition and water transparency.[51]

> Carlson's trophic state index provides a convenient and well-established method for identifying turbidity-related impacts to Iowa lakes.[52]

A. General Narrative Criteria Do Not Establish Sufficient Parameters for the Nutrient Pollutants that Cause Harm to Iowa's Recreational Lakes

General narrative criteria and Carlson's TSI do not *protect* recreational lakes from nutrient pollution and fail to meet CWA requirements because they do not establish *sufficient parameters* for nitrogen and phosphorus pollutants at levels necessary to prevent these pollutants from causing eutrophication and recurring algae/cyanobacterial blooms in the first place:

> States must adopt those water quality criteria that protect the designated use. Such criteria […] must contain sufficient parameters or constituents to protect the designated use.**[53]**

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[46] 567 IAC 61.3(2)(c)
[47] 567 IAC 61.3(2)(e)
[48] *See generally* U.S. Environmental Protection Agency, Numeric and Narrative Criteria, https://www.epa.gov/wqs-tech/key-concepts-module-3-criteria (last visited October 31, 2018)
[49] *See* Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 97-109 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016 (emphasis added).
[50] *See* Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 97-109 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016 (emphasis added).
[51] Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 99 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016 (emphasis added).
[52] *Id.* at *113* (emphasis added).
[53] 40 C.F.R. § 131.11(a)(1) (2018) (emphasis added).

DNR itself has acknowledged the inadequacy of using TSI/general narrative criteria as appropriate water quality standards for nutrients:

> The use of TSI values for chlorophyll and Secchi depth serves as an interim method of assessing lake water quality in Iowa until numeric criteria for nutrient parameters (phosphorus and nitrogen) and their response variables (chlorophyll and turbidity) are adopted into the Iowa Water Quality Standards.[54]

B. General Narrative Criteria Are Not Supported By Sound Scientific Rationale

Relying on general narrative criteria and Carlson's TSI values for chlorophyll-a (Chl-a) and Secchi depth not only fails to protect the use of Iowa's recreational lakes from nutrient pollution, it is also not supported by sound scientific rationale as required by the CWA:

> States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale […].[55]

In a recent study of 139 lakes in Iowa, scientists assessed over 13 years of data from Iowa's Lake Monitoring Program and found that high nutrient concentrations in Iowa lakes can cause algae growth to be killed off, once nitrogen concentrations exceed a certain point.[56] As a result, some Iowa lakes with extremely high nutrient concentrations are surprisingly clear,[57] giving a false impression of water quality:

> Such extreme nutrient levels appear to destroy existing algae and cyanobacteria resulting in an increase in water clarity. The concept is similar to the way applying too much fertilizer on land can damage, if not kill, plants and render soil barren.[58]

This high nutrient, low Chl-a phenomenon was observed 271 times in 64 different lakes throughout the study period,[59] suggesting that "monitoring Cl-a or Secchi depth may fail to indicate water quality degradation by extreme nutrient concentrations."[60]

This research not only highlights the inadequacy of using general narrative criteria/Carlson's TSI to address nutrient pollution, but also suggests that concentrations of *both* nitrogen and phosphorus pollutants need to be managed and monitored via the establishment of numeric nutrient criteria.[61]

DNR has a mandatory duty under state law to review and revise its water quality standards (including criteria) based on this new scientific data:

> [T]he water quality standards shall be reviewed and revised by the department as new scientific data becomes available to support revision.[62]

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[54] Iowa Department of Natural Resources, *Methodology for Iowa's 2016 Water Quality Assessment, Listing, and Reporting Pursuant to Sections 305(b) and 303(d) of the Federal Clean Water Act* at 98 (March 28, 2017), *available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2016 (emphasis added).
[55] 40 C.F.R. § 131.11(a)(1) (2018) (emphasis added).
[56] *See* Christopher T. Filstrup and John Downing, *Relationship Of Chlorophyll To Phosphorus And Nitrogen In Nutrient-Rich Lakes*, Inland Waters, 7:4 at 385-400, (2017) available at, https://doi.org/10.1080/20442041.2017.1375176; *See also*, Kimberly M.S. Cartier, *Polluted Lakes in Disguise*, EOS (October 20, 2017) https://eos.org/articles/polluted-lakes-in-disguise
[57] *See* University of Minnesota Duluth, *Looks Can Be Deceiving* (October 9, 2017) https://news.d.umn.edu/news-center/news/clear-water
[58] University of Minnesota Duluth, *Looks Can Be Deceiving* (October 9, 2017) https://news.d.umn.edu/news-center/news/clear-water
[59] Christopher T. Filstrup and John Downing, *Relationship Of Chlorophyll To Phosphorus And Nitrogen In Nutrient-Rich Lakes*, Inland Waters, 7:4 at 388, (2017) available at, https://doi.org/10.1080/20442041.2017.1375176
[60] Christopher T. Filstrup and John Downing, *Relationship Of Chlorophyll To Phosphorus And Nitrogen In Nutrient-Rich Lakes*, Inland Waters, 7:4 at 385, (2017) available at, https://doi.org/10.1080/20442041.2017.1375176
[61] *See* Kimberly M.S. Cartier, *Polluted Lakes in Disguise*, EOS (October 20, 2017) https://eos.org/articles/polluted-lakes-in-disguise
[62] Iowa Code §455B.176A(5)

C. General Narrative Criteria are Insufficient when Numeric Criteria can be Established

Relying solely on general narrative criteria/Carlson's TSI is not only inadequate to address nutrient pollution, but it is also counter to both state and federal law when it is possible to establish numeric nutrient criteria:

> Numerical standards shall have a preference over narrative standards. A narrative standard shall not constitute the basis for determining an impairment unless the department identifies specific factors as to why a numeric standard is not sufficient to assure adequate water quality.[63]

Under the CWA, narrative criteria are meant to be backstops[64] to protecting designated uses and are not meant to be a substitute for establishing numeric criteria. Narrative criteria should be established "to supplement numerical criteria" or established where "numerical criteria cannot be established":

> In establishing criteria, States should:
> (1) Establish numerical values based on:
> (i) 304(a) Guidance; or
> (ii) 304(a) Guidance modified to reflect site-specific conditions; or
> (iii) Other scientifically defensible methods;
> (2) Establish narrative criteria or criteria based upon biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria.[65]

As demonstrated below, it is clear that numeric nutrient criteria *can* be established to protect the use of Iowa's recreational lakes.

IV. ESTABLISHING NUMERIC NUTRIENT CRITERIA TO PROTECT RECRETIONAL LAKES IS FEASIBLE

A. EPA Has Established §304(a) Numeric Nutrient Criteria Recommendations for Lakes

Under Section 304(a) of the CWA, EPA is required to develop "scientific information on pollutants" and to publish "criteria guidance" that will "result in attainment of a designated use of the waterbody (e.g. fishing, swimming)."[66] EPA has already developed §304(a) numeric nutrient criteria recommendations that are appropriate for Iowa's lakes/reservoirs, geographic regions, and that support designated uses of recreational lakes.[67]

In April 2000, EPA published a technical guidance manual (*Nutrient Criteria Technical Guidance Manual for Lakes and Reservoirs)*[68] to provide states with guidance and methods for establishing scientifically defensible nutrient criteria for lakes and reservoirs.[69] Using State databases, "supplemented with new regional case studies and demonstration projects to provide additional information,"[70] EPA also created

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[63] Iowa Code § 455B.195(1)(h) (emphasis added).
[64] U.S. Environmental Protection Agency, *Criteria Development Guidance: Lakes and Reservoirs*, Chapter 8 at 3 (April 2000) *available at* https://www.epa.gov/nutrient-policy-data/criteria-development-guidance-lakes-and-reservoirs
[65] 40 C.F.R. § 131.11(b) (2018) (emphasis added).
[66] *See* U.S. Environmental Protection Agency, *National Strategy for the Development of Regional Nutrient Criteria* at iv (June 1998) *available at* https://www.epa.gov/sites/production/files/documents/nutrient_strategy_1998.pdf
[67] *See* U.S. Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VI* (December 2000) https://www.epa.gov/sites/production/files/documents/lakes6.pdf
[68] U.S. Environmental Protection Agency, *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* (April 2000) *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/20003COV.PDF?Dockey=20003COV.PDF
[69] U.S. Environmental Protection Agency, *Criteria Development Guidance for Lakes & Reservoirs Fact Sheet* (April 2000) https://www.epa.gov/nutrient-policy-data/criteria-development-guidance-lakes-reservoirs-fact-sheet
[70] U.S. Environmental Protection Agency, *National Strategy for the Development of Regional Nutrient Criteria* at iv (June 1998) *available at* https://www.epa.gov/sites/production/files/documents/nutrient_strategy_1998.pdf

criteria recommendations for nutrients, which are "intended to provide for the protection and propagation of aquatic life and recreation."[71]

EPA published these §304(a) nutrient criteria recommendations in 2000-2001 (*Ambient Water Quality Criteria Recommendations for Lakes & Reservoirs*) for 12 ecoregions across the country, including three ecoregions that encompass the state of Iowa (Ecoregions VI, VII and IX).[72]

Noting that, "State and Tribal water quality standards need to include quantified endpoints for causal and response variables to provide sufficient protection of uses and to maintain downstream uses,"[73] EPA's recommended §304(a) criteria established values for causal variables (e.g., total nitrogen and total phosphorus) and response variables (e.g., turbidity and chlorophyll-a).[74]

The following tables include EPA's recommended Lake/Reservoir criteria for Total Phosphorus, Total Nitrogen, Chlorophyll a, and Turbidity or Secchi parameters for each of the aggregate nutrient ecoregions in Iowa (VI, VII, and IX) as well as EPA's recommendations for Level III, subecoregions in Iowa (47, 40, 52).

EPA has indicated that it expects states to use these nutrient target ranges "as a guide in developing and adopting numeric levels for nutrients that support the designated uses of the waterbody as part of State water quality standards."[75]

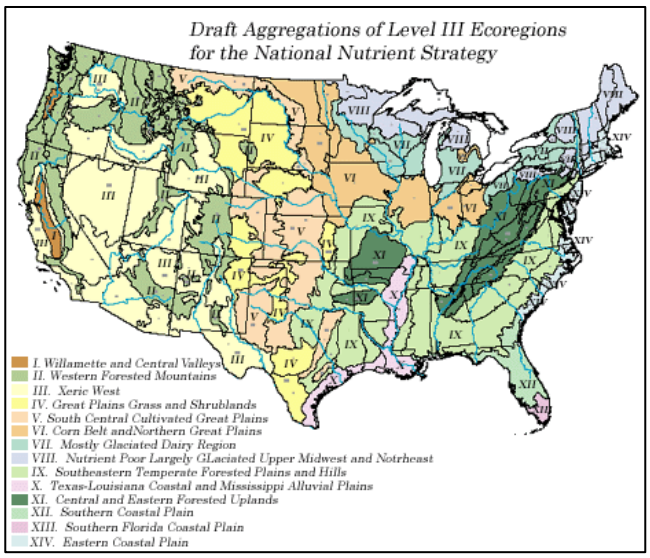


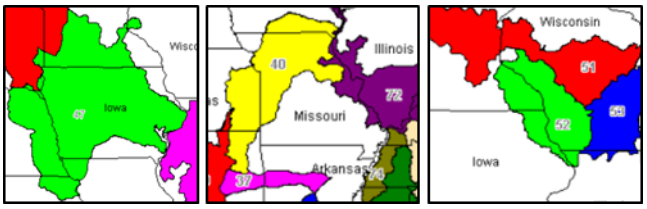
Image & Data Sources (above/below): EPA, Ecoregional Criteria for Lakes & Reservoirs, https://www.epa.gov/nutrient-policy-data/ecoregional-criteria

AGGREGATE NUTRIENT ECOREGION REF. CONDITIONS (LAKES/RES.)

Parameter	ECOREGION VI	ECOREGION VII	ECOREGION IX
TP µg/L	37.5	14.75	20
TN mg/L	.78	.66	.36
Chl a µg/L*	8.59 S	2.63 S	4.93
Secchi (m)	1.36	3.33	1.53

LEVEL III SUBECOREGION REFERENCE CONDITIONS (LAKES/RESERVOIRS)

Parameter	ECOREGION 47	ECOREGION 40	ECOREGION 52
TP µg/L	55	40	37.5
TN mg/L	.9635	.661	1.18
Chl a µg/L*	14.6 S/18.8 F	5.588 S	6.84 S
Secchi (m)	1.23	.988	2.1



[71] U.S. Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VI* at ii (December 2000) https://www.epa.gov/sites/production/files/documents/lakes6.pdf

[72] *See* U.S. Environmental Protection Agency, *Criteria Development Guidance for Lakes & Reservoirs Fact Sheet* (April 2000) https://www.epa.gov/nutrient-policy-data/criteria-development-guidance-lakes-reservoirs-fact-sheet; See also, Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VI* (December 2000) https://www.epa.gov/sites/production/files/documents/lakes6.pdf; Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VII* (December 2000) https://www.epa.gov/sites/production/files/documents/lakes7.pdf; Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion IX* (December 2000) https://www.epa.gov/sites/production/files/documents/lakes9.pdf

[73] U.S. Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VI* at ii (December 2000) https://www.epa.gov/sites/production/files/documents/lakes6.pdf

[74] *See* U.S. Environmental Protection Agency, *Ambient Water Quality Criteria Recommendations: Lakes and Reservoirs in Nutrient Ecoregion VI* (December 2000)

[75] U.S. Environmental Protection Agency, *National Strategy for the Development of Regional Nutrient Criteria* at iv (June 1998) *available at*, https://www.epa.gov/sites/production/files/documents/nutrient_strategy_1998.pdf

While states may choose to 1) adopt EPA's recommended 304(a) criteria, 2) adopt criteria to reflect unique site specific conditions, or 3) use other scientifically-defensible methods to develop their own criteria,[76] states *must* establish numeric criteria necessary to protect the designated uses of their waters.[77]

According to EPA, numerous states have already done so.

B. Many Other States Have Established Numeric Nutrient Criteria for Lakes

To date, "28 states, territories and one tribe have adopted numeric criteria into their water quality standards for nitrogen and/or phosphorus for one or more water bodies," according to EPA.[78]

Approximately 21 of those states have established at least partial Nitrogen and/or Phosphorus criteria for their lakes/reservoirs.[79]

C. DNR Has Developed, but Failed to Adopt Numeric Nutrient Criteria to Protect Iowa's Recreational Lakes

Iowa itself has already developed numeric nutrient criteria necessary to protect its recreational lakes, but has simply failed to adopt them.

In 2007-2008, the DNR directed a science advisory panel (i.e., Nutrient Science Advisors) to be convened to research and recommend nutrient water quality standards for Iowa waters.[80] The Nutrient Science Advisors (NSA) formally recommended that both causal (nitrogen and phosphorus) and response variables (Secchi disc visibility and Chlorophyll-a) be adopted into Iowa's water quality standards to adequately protect recreational use of Iowa's lakes from the impacts of nutrient pollution.[81] Their recommended criteria are as follows:

NSA RECOMMENDED CRITERIA FOR RECREATIONAL USE IN IOWA LAKES

Parameter	RECOMMENDED CRITERIA
TP µg/L	Less than or equal to 35 micrograms/liter at least 75% of the time
TN mg/L	Less than or equal to 900 micrograms/liter at least 75% of the time
Chl a µg/L*	Less than or equal to 25 micrograms/liter at least 75% of the time
Secchi (m)	Greater than or equal to 1m at least 75% of the time

Data Source (above): Nutrient Criteria for Iowa Lakes: Recommended Criteria for Class A Recreational Lakes, Report of the Nutrient Science Advisors (February 14, 2008)

[76] 40 C.F.R. § 131.11(b) (2018); *See also*, Environmental Protection Agency, *How Are Water Quality Standards Developed?* https://www.epa.gov/standards-water-body-health/how-are-water-quality-standards-developed
[77] 40 C.F.R. § 131.11(a)(1) (2018)
[78] Memorandum from John Beauvais, Environmental Protection Agency, to State Environmental Commissioners and State Water Directors, *Renewed Call to Action to Reduce Nutrient Pollution and Support for Incremental Actions to Protect Water Quality and Public Health* at 5 (September 22, 2016) *available at* https://www.epa.gov/sites/production/files/2016-09/documents/renewed-call-nutrient-memo-2016.pdf, citing U.S. Environmental Protection Agency U.S. Environmental Protection Agency, Office of Water, State Development of Numeric Criteria for Nitrogen and Phosphorus Pollution. Available at https://www.epa.gov nutrient -policy-data/state-development-numeric-criteria-nirrogenand-phosphorus-pollution [accessed June 23, 2016].
[79] *See* U.S. Environmental Protection Agency, *State Progress Toward Developing Numeric Nutrient Water Quality Criteria for Nitrogen and Phosphorus*, https://www.epa.gov/nutrient-policy-data/state-progress-toward-developing-numeric-nutrient-water-quality-criteria
[80] *See* Michael Burkart, Michael Birmingham, Edward Bottei, Edward Brown, John Downing, Christopher Jones, Joe Larscheid, John Olson, Michael Quist, Peter Weyer, Tom Wilton, *Nutrient Criteria for Iowa Lakes: Recommended Criteria for Class A Recreational Lakes*, Report of the Nutrient Science Advisors (February 14, 2008) *available at* https://www.researchgate.net/profile/Joseph_Larscheid/publication/237509482_Nutrient_Criteria_for_Iowa_Lakes_Recommended_Criteria_for_Class_A_Recreational_Uses_Report_of_the_Nutrient_Science_Advisors/links/5579ebf108ae752158717b7d/Nutrient-Criteria-for-Iowa-Lakes-Recommended-Criteria-for-Class-A-Recreational-Uses-Report-of-the-Nutrient-Science-Advisors.pdf?origin=publication_detail
[81] *Id.*

In making these recommendations, the NSA expressly noted that:

> Levels of TP and TN above these standards risk the health and safety of the people using these lakes for direct contact recreation uses and threaten the economic health of the communities surrounding the lakes that have significant recreational industries.[82]

Despite the recommendations of these experts, DNR did not include TN or TP criteria when it initiated a rulemaking in 2009 and again in 2011 to move forward with nutrient criteria for 159 Significant Publically Owned Lakes.[83] Though a formal public comment period was conducted in 2011, a formal response to public comments was not issued and the rulemaking subsequently expired due to inaction in September 2011.[84]

In 2013, the Iowa Environmental Council and Environmental Law and Policy Center submitted a petition for rulemaking to DNR's Environmental Protection Commission (EPC) asking the EPC to initiate a rulemaking to adopt the NSA's 2008 recommended criteria for 159 lakes identified in the 2011 rulemaking.[85] EPC denied the petition, emphasizing the state's focus on the Nutrient Reduction Strategy.[86]

For the following reasons, petitioners again request the EPC initiate a rulemaking to adopt the NSA's 2008 recommended criteria for 159 lakes identified in the 2011 rulemaking.

V. ESTABLISHING NUMERIC NUTRIENT CRITERIA TO PROTECT THE USE OF IOWA'S RECREATIONAL LAKES IS POSSIBLE, NECESSARY AND, THEREFORE, MANDATORY UNDER THE CWA

A. DNR Must Establish Numeric Nutrient Criteria Necessary to Protect Iowa's Lakes

The CWA provides that the state must adopt numeric criteria when: 1) it is necessary to protect a designated use of waterbody and 2) it is possible to establish.[87] As demonstrated above, numeric nutrient criteria are *necessary to protect* the use of Iowa's recreational lakes and are *possible to establish*. Narrative criteria and the use of Carlson's TSI do not protect recreational lakes from nutrient pollution and do not meet the requirements of the CWA. Federal law, therefore, does not afford the state discretion to refuse to establish these necessary numeric limits for nutrients.

B. Numeric Nutrient Criteria Are Fundamental for Achieving Pollution Control under the CWA

Establishing adequate water quality standards (including necessary numeric criteria) is mandatory for states under the CWA because it is the foundation of water-quality based pollution control[88] and critical to achieving the CWA's overall goal of eliminating pollution from our waters.

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[82] Burkart, *supra* at 4.
[83] *See* Department of Natural Resources, Notice of Intended Action (February 23, 2011) on file with the Department of Natural Resources.
[84] *See* Environmental Protection Commission, *Denial of Petition for Rulemaking* by Iowa Environmental Council and Environmental Law and Policy Center at 2 (October 14, 2013).
[85] Iowa Environmental Council and Environmental Policy Center, *Petition For Rulemaking For The Adoption Of Rules Relating To Numeric Water Quality Standards For Significant Public Recreational Lakes* (August 20, 2013)
[86] U.S. Environmental Protection Commission, *Denial of Petition for Rulemaking* by Iowa Environmental Council and Environmental Law and Policy Center at 4-5 (October 14, 2013).
[87] 40 C.F.R. § 131.11(a)(1) (2018); 40 C.F.R. § 131.11(b) (2018)
[88] *See* U.S. Environmental Protection Agency, *Water Quality Standards Handbook*, Chapter 1 at 1-2 (September 2014) *available at* https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter1.pdf

Establishing Protective Goals & Conducting Assessments

Numeric nutrient criteria provide quantitative limits for nitrogen and phosphorus that serve as bright lines for protection and assessment.[89] By comparing actual nutrient levels measured in lake water to established numeric goals, DNR can better assess current nutrient pollution problems and identify impairments.[90]

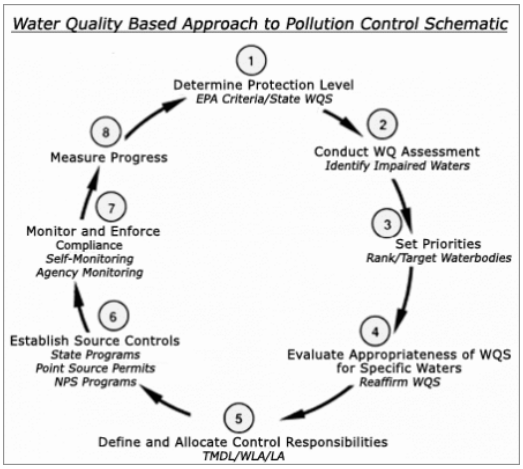

Image Source: EPA, https://www.epa.gov/wqs-tech/learn-more-topic-water-quality-standards-wqs-context

Using current narrative criteria and Carlson's TSI, DNR does not identify a lake as impaired until it is "aesthetically objectionable" or it contains "nuisance aquatic life" (i.e., algae). Using numeric nutrient criteria, however, DNR could identify impairments for nitrogen and/or phosphorus where levels of these pollutants have not yet resulted in chronic algae/cyanobacterial blooms – preventing problems before they occur.[91] DNR could also identify impairments in lakes that are so overly polluted with nitrogen and phosphorus that they are killing off plant life.[92] While these lakes appear clear because algae is killed off, they are also likely at risk of becoming incapable of supporting other aquatic life.[93] Using current narrative criteria/Carlson's TSI methods, these lakes with the worst nutrient pollution would likely not even be considered impaired.

Prioritizing Planning, Restoration and Resource Allocation

Assessing actual numeric nutrient levels in lakes compared to quantifiable criteria/benchmarks will also allow DNR to make more informed planning decisions:

Using this information, DNR can triage limited resources for planning, lake restoration, and conservation practices to: 1) ensure protection of high quality lakes, 2) restore lakes that are only moderately impaired by nitrogen/phosphorus pollution *before* they begin causing chronic algae/cyanobacteria blooms, and 3) make long-term plans to restore hypereutrophic lakes with the worst water quality.[94]

Establishing Regulatory Controls

Numeric criteria also provide a clear basis for establishing regulatory controls.[95] Quantitative limits for nitrogen and phosphorus can be utilized by DNR to develop water quality based effluent limits in National Pollution Elimination System (NPDES) permits for point sources, allowing permit writers to more easily calculate how much nitrogen/phosphorus a point source should be permitted to discharge based on optimum nutrient levels for lakes.[96]

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[89] *See Id.* at 2.
[90] U.S. Environmental Protection Agency, *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* at 1-3 (April 2000) *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/20003COV.PDF?Dockey=20003COV.PDF
[91] *See generally Id.* at 1-3.
[92] *See generally* Filstrup, supra.
[93] *See generally* University of Minnesota Duluth, *Looks Can Be Deceiving* (October 9, 2017) https://news.d.umn.edu/news-center/news/clear-water
[94] *See* U.S. Environmental Protection Agency, *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* at 1-3 (April 2000) *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/20003COV.PDF?Dockey=20003COV.PDF
[95] *Id.*
[96] *Id.*

When water quality standards have been exceeded and a lake is impaired for nutrients, numeric limits can also better assist in the creation of total maximum daily loads (TMDL), informing the division and allocation of remediation responsibility to point sources/nonpoint sources.[97]

Monitoring & Measuring Progress

Finally, numeric nutrient criteria provide DNR will clear benchmarks for 1) conducting continuous water quality monitoring, 2) measuring progress on remediation/restoration/conservation efforts, and 3) and ensuring ongoing regulatory compliance.[98]

C. Iowa's Nutrient Reduction Strategy Does Not Satisfy DNR's Mandatory Duty to Adopt Numeric Nutrient Criteria Necessary to Protect Iowa's Recreational Lakes

In denying petitioner's 2013 request for a rulemaking, EPC emphasized the state's Nutrient Reduction Strategy (NRS) as its primary means for addressing nutrient pollution:

> The recently-issued Iowa Nutrient Reduction Strategy represents the State of Iowa's primary effort to reduce statewide nutrient-related impacts and Gulf of Mexico hypoxia impacts, including the impacts described in the Petition.[99]
>
> The DNR and IDALs should be allowed the opportunity to review the impacts of the Iowa Nutrient Reduction Strategy on the water quality of Iowa prior to imposing additional water quality standards on those lakes.[100]
>
> The state of Iowa has undertaken actions to address nutrients and therefore a reinitiating of that rulemaking is not necessary at this time.[101]

The Iowa NRS is not a substitute for DNR's establishment of water quality standards and does not satisfy DNR's mandatory duty under the CWA to establish criteria necessary to protect the designated use of its waterbodies.

In fact, EPA has expressly called for states to develop numeric nutrient criteria as *part* of their Nutrient Reduction Strategies:

> Establish a work plan and phased schedule for N and P criteria development for classes of waters (e.g., lakes, and reservoirs, or rivers and streams). The work plan and schedule should contain interim milestones including but not limited to data collection, data analysis, criteria proposal, and criteria adoption consistent with the Clean Water Act. A reasonable timetable would include developing numeric N and P criteria for a least one class of waters within the state (e.g., lakes and reservoirs, or rivers and streams within 3-5 years (reflecting water quality and permit review cycles), and completion of criteria development in accordance with a robust, state specific workplan and phased schedule.[102]

Furthermore, the Iowa Nutrient Reduction Strategy suggests that the development of numeric nutrient criteria for lakes is a *high priority* for DNR:

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[97] *Id*.
[98] *See Id.* at 4.
[99] U.S. Environmental Protection Commission, *Denial of Petition for Rulemaking* by Iowa Environmental Council and Environmental Law and Policy Center at 4 (October 14, 2013).
[100] *Id.*
[101] *Id.*
[102] Memorandum from Nancy Stoner, U.S. Environmental Protection Agency, to Regional Administrators, Regions 1-10, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* at 6 (March 16, 2011) *available at* https://www.epa.gov/sites/production/files/documents/memo_nitrogen_framework.pdf

> DNR continues to collect and analyze lake nutrient data as part of the ambient lake monitoring and the lake restoration programs. The development of quantitative indicators of lake health, including nutrient status, remains a high priority within these programs.[103]

D. Variability in Iowa Lakes does not extinguish the DNR's Mandatory duty to Adopt Necessary Numeric Nutrient Criteria

In denying petitioner's 2013 rulemaking request, EPC also suggested that applying state-wide numeric nutrient criteria to the full list of lakes would be inappropriate and/or unattainable given variability in lakes naturally occurring nutrient levels, depths, correlations in nutrient levels and impairments.[104]

The CWA provides for mechanisms to address situations of variability or feasibility. For example, states may adopt site-specific criteria,[105] or "adopt subcategories of a use and set the appropriate criteria to reflect varying needs of such sub-categories […]".[106] States may also remove or revise a designated use (that is not an existing use) if it is not feasible because "naturally occurring pollutant concentrations prevent the attainment of the use."[107]

EPA has made it clear that variability can be managed and has not precluded other states from adopting numeric nutrient criteria:

> Variability can be managed in most instances by partitioning lakes into different descriptive categories early in the statistical analysis process and/or by applying other widely acceptable statistical procedures. We note that the variability cited by MDNR has not prevented many other states from developing and adopting scientifically supportable numeric criteria for total phosphorus and total nitrogen.[108]

EPA has also made it clear that when individual states fail to establish necessary NNC, it will use its federal authority under the CWA to do so.

VI. CONTINUED FAILURE TO ADOPT NUMERIC CRITERIA NECESSARY TO PROTECT IOWA'S RECREATINAL LAKES VIOLATES THE CLEAN WATER ACT & RENDERS THE STATE VULNERABLE TO HAVING FEDERAL CRITERIA IMPOSED

A. EPA has authority to promulgate numeric nutrient criteria for individual states, has used this authority before, and has indicated it will do so in the future when appropriate.

EPA has the authority under the CWA to establish numeric nutrient criteria for a state where the Administrator determines that a revised or new standard is necessary:

> The Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard for the navigable waters involved –
>
> (A) if a revised or new water quality standard submitted by such State under paragraph (3) of this subsection for such waters is determined by the Administrator not to be consistent with the applicable requirements of this chapter, or

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[103] Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, Iowa State University College of Agriculture and Life Sciences, *Iowa Nutrient Reduction Strategy Annual Progress Report* at 32 (July 2016) *available at* http://www.nutrientstrategy.iastate.edu/sites/default/files/documents/1516progress.pdf (emphasis added)

[104] *See* U.S. Environmental Protection Commission, *Denial of Petition for Rulemaking* by Iowa Environmental Council and Environmental Law and Policy Center at 5 (October 14, 2013).

[105] 40 C.F.R. § 131.11(b) (2018)

[106] 40 C.F.R. § 131.10(c)

[107] 40 C.F.R. § 131.10(g)

[108] Letter from Karen Flournoy, U.S. Environmental Protection Agency Region 7, to John Madras, Missouri Department of Natural Resources, at 2 (May 12, 2016).

> (B) in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this chapter.[109]

EPA has used this authority to propose numeric nutrient criteria for individual states (e.g., Florida,[110] and most recently, Missouri[111]).

When EPA declined to use its federal rulemaking authority in 2011 to promulgate numeric nutrient criteria for approximately 31 states (including Iowa) in the Mississippi-Atchafalaya River Basin and northern Gulf of Mexico, EPA noted that the proposed action was "unprecedented and complex," and that it would be "highly resource and time intensive and involve EPA staff across the entire agency, as well as support from technical experts outside the agency."[112] EPA also noted that "implementation of federal standards simultaneously in multiple states would likewise place sizable regulatory and oversight burdens on the EPA […]."[113]

EPA made it clear that it "retains its discretion" to use its authority "elsewhere, as appropriate."[114] The EPA also noted it "will periodically assess progress and, as provided in the Framework Memo, is not foreclosing the possibility that there may be circumstances where, despite the best efforts by all, Agency action may be appropriate and the EPA could exercise its CWA section 303(c)(4)(B) authority." [115]

B. It is clearly necessary and appropriate for EPA to exercise its 303(c)(4)(B) authority and establish numeric nutrient criteria for Iowa.

It has been 20 years since EPA first began calling on states to adopt numeric nutrient criteria and EPA has long expressed their necessity:

> It has long been EPA's position that numeric nutrient criteria targeted at different categories of water bodies and informed by scientific understanding of the relationship between nutrient loadings and water quality impairments are ultimately necessary for effective state programs. Our support for numeric standards has been expressed on several occasions, including a June 1998 National Strategy for Development of Regional Nutrient Criteria a November 2001 national action plan for the development and establishment of numeric nutrient criteria, and a May 2007 memo from the Assistant Administrator for Water calling for accelerated progress towards the development of numeric nutrient water quality standards. As explained in that memo, numeric standards will facilitate more effective program implementation and are more efficient than site-specific application of narrative water quality standards. We believe that a substantial body of scientific data, augmented by state-specific water quality information, can be brought to bear to develop such criteria in a technically sound and cost effective manner.[116]

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[109] 33 U.S.C. § 1313(c)(4)
[110] U.S. Environmental Protection Agency, *Proposed Water Quality Standards for the State of Florida's Estuaries, Coastal Waters, and South Florida Inland Flowing Waters*, 77 FR 74923 (December 18, 2012) available at https://www.gpo.gov/fdsys/pkg/FR-2012-12-18/pdf/2012-30117.pdf
[111] U.S. Environmental Protection Agency, *Proposed Water Quality Standards for the State of Missouri's Lakes and Reservoirs*, 82 FR 61213 at 61216 (December 27, 2017) available at https://www.gpo.gov/fdsys/pkg/FR-2017-12-27/pdf/2017-27621.pdf
[112] Letter from Michael Shapiro, U.S. Environmental Protection Agency, to Kevin Reuther, Minnesota Center for Environmental Advocacy and Albert Ettinger at 4 (July 29, 2011) available at https://www.epa.gov/sites/production/files/2015-01/documents/mississippi-river-petition-nutrients-letter.pdf
[113] *Id.*
[114] *Id.* at 5.
[115] *Id.* at 6.
[116] Memorandum from Nancy Stoner, U.S. Environmental Protection Agency, to Regional Administrators, Regions 1-10, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* at 2-3 (March 16, 2011) *available at* https://www.epa.gov/sites/production/files/documents/memo_nitrogen_framework.pdf (emphasis in original)

Nearly a decade has passed since Iowa failed to adopt recommended numeric nutrient criteria for recreational lakes. Iowa is clearly failing to make suggested progress toward adopting numeric nutrient criteria per the EPA's suggested timetable:

> A reasonable timetable would include developing numeric N and P criteria for a least one class of waters within the state (e.g., lakes and reservoirs, or rivers and streams within 3-5 years (reflecting water quality and permit review cycles), and completion of criteria development in accordance with a robust, state specific workplan and phased schedule.[117]

By failing to establish standards/criteria to protect Iowa's own waterbodies from nutrient pollution, DNR is also failing to protect downstream waters, as required by the CWA:

> In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.[118]

Recent studies show that Iowa's nitrate loads to the Gulf of Mexico have increased approximately 47% from 2003-2016 based on five-year running annual averages, indicating that Iowa continues to be a significant contributor to gulf hypoxia problems.[119]

VII. CONCLUSION

Iowa must establish numeric nutrient criteria necessary to protect the designated use of its waterbodies, including recreational lakes, per the requirements of the CWA.

The Iowa Environmental Council and Environmental Law & Policy Center request EPC adopt the NSA's 2008 nutrient criteria recommendations for TP, TN, Chlorophyll-a and Secchi Disc Transparency (see attachment B) for 159 significant public recreational lakes identified in the 2011 NOIA (see attachment C).

[117] Memorandum from Nancy Stoner, U.S. Environmental Protection Agency, to Regional Administrators, Regions 1-10, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions, Recommended Elements of a State Framework for Managing Nitrogen and Phosphorus* at 2 (March 16, 2011) *available at* https://www.epa.gov/sites/production/files/documents/memo_nitrogen_framework.pdf

[118] 40 C.F.R. § 131.10(b) (emphasis added).

[119] *See* Chistopher S. Jones, Jacob K. Nielsen, Keith E. Schilling, Larry J. Weber, *Iowa Stream Nitrate and the Gulf of Mexico*, PLOS ONE (April 12, 2018), available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0195930; *See also*, Donnelle Eller, Iowa Nitrate Pollution in the Water is Getting Worse, Despite hundreds of millions of dollars in spending, study shows, Des Moines Register (July 9, 2018) *available at* https://www.desmoinesregister.com/story/money/agriculture/2018/06/22/iowa-water-pollution-gulf-mexico-dead-zone-nitrogren-missouri-mississippi-river-quality-nirtate/697370002/