UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF MISSOURI CENTRAL DIVISION

MISSOURI COALITION FOR THE ENVIRONMENT FOUNDATION, Plaintiff, v. ANDREW R. WHEELER, in his official capacity as the Administrator of the United States Environmental Protection Agency, Defendant.	Civil Action No. 2:19-cv-4215-NKL

MOTION TO INTERVENE OF ASSOCIATION OF MISSOURI CLEANWATER AGENCIES, ASSOCIATION OF OHIO METROPOLITAN WASTEWATER AGENCIES CALIFORNIA ASSOCIATION OF SANITATION AGENCIES NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES NORTH CAROLINA WATER QUALITY ASSOCIATION, SOUTH CAROLINAWATER QUALITY ASSOCIATION, VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AGENCIES, WEST VIRGINIA MUNICIPAL WATER QUALITY ASSOCIATION

For the reasons set forth in the accompanying Suggestion in Support, the Association of Missouri Cleanwater Agencies, the Association of Ohio Metropolitan Wastewater Agencies, California Association of Sanitation Agencies, the National Association of Clean Water Agencies, the North Carolina Water Quality Association, the South Carolina Water Quality Association, the Virginia Association of Municipal Wastewater Agencies, and the West Virginia Municipal Water Quality Association respectfully move to intervene as defendant in the above-styled action pursuant to Rule 24(a) of the Federal Rules of Civil Procedure, or in the alternative pursuant to Rule 24(b).

Respectfully submitted,

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Dated: February 12, 2020

CERTIFICATE OF SERVICE

I hereby certify that on this 12th day of February, 2020, I electronically filed the foregoing Motion and the attached Certificate of Interest, and Proposed Answer with the Clerk of Court using the CM/ECF system which will automatically send email notification of such filing to the attorneys of record listed below:

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LOCAL RULE 7.1 CERTIFICATE OF INTEREST

I, the undersigned counsel of record for Proposed Intervenor-Defendants Association of Missouri Cleanwater Agencies, the Association of Ohio Metropolitan Wastewater Agencies, the National Association of Clean Water Agencies, the North Carolina Water Quality Association, the South Carolina Water Quality Association, the Virginia Association of Municipal Wastewater Agencies, and the West Virginia Municipal Water Quality Association certify, to the best of my knowledge and belief, the following:

1. The parent companies of the corporations: NONE
2. Subsidiaries not wholly owned by the corporations: NONE
3. Affiliates that have issued shares to the public: NONE

s/F. Paul Calamita
F. Paul Calamita
Counsel for Intervenor-Defendant
Association of Missouri Cleanwater Agencies

Dated: February 12, 2020

UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF MISSOURI CENTRAL DIVISION

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SUGGESTION IN SUPPORT OF ASSOCIATION OF MISSOURI CLEANWATER AGENCIES ASSOCIATION OF OHIO METROPOLITAN WASTEWATER AGENCIES CALIFORNIA ASSOCIATION OF SANITATION AGENCIES NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES NORTH CAROLINA WATER QUALITY ASSOCIATION SOUTH CAROLINAWATER QUALITY ASSOCIATION VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AGENCIES WEST VIRGINIA WATER QUALITY ASSOCIATION MOTION TO INTERVENE

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This Suggestion is in support of the Motion of the Association of Missouri Cleanwater Agencies ("AMCA"), Association of Ohio Metropolitan Wastewater Agencies ("AOMWA"), California Association of Sanitation Agencies, National Association of Clean Water Agencies ("NACWA"), North Carolina Water Quality Association, South Carolina Water Quality Association, Virginia Association of Municipal Wastewater Agencies, and the West Virginia Municipal Water Quality Association (the "Water Quality Associations" or the "Associations") to intervene as defendants in this action pursuant to Rule 24(a) of the Rules of Civil Procedure.

I. BACKGROUND

A. *Proposed Intervenor Water Quality Associations*

AMCA is an association of owners and operators of public water, sewer, and stormwater utilities in Missouri. Its primary purpose is to ensure that federal and Missouri water quality programs are based on sound science and regulatory policy, so that its members can protect public health and the environment in the most cost-effective manner possible. The other state Associations have comparable membership purposes. The vast majority of the Associations' public agency members hold Clean Water Act ("CWA") National Pollutant Discharge Elimination System ("NPDES") permits to discharge wastewater, stormwater, or both. A membership list for each of the Associations is attached hereto. Exhibit 1.

Among the Associations' priorities is the enhancement of the interests of their members, citizens and ratepayers. Principal among such interests are water quality standards, which establish the basis for certain requirements in NPDES permits and may necessitate the imposition of certain design, construction and operational obligations at wastewater treatment facilities.

AMCA has participated in the Missouri Department of Natural Resources ("DNR")

development of the nutrients standards. To the extent that proper nutrient standards are adopted, AMCA, its members and the citizens are benefited by high quality surface waters, protection of aquatic life and other beneficial uses. If such standards are ineffective, impose unnecessary obligations, or otherwise do not economically address water quality, they are harmed. The other Associations, their members and citizens are similarly affected because their states and U.S. Environmental Protection Agency ("EPA") Regional Offices must also develop and approve nutrient standards, and this Court's ruling on the process employed by Missouri could impact those tasks.

The Associations' members are managed and staffed by environmental professionals who make engineering and scientific determinations and take actions to address the application of standards and the protection of water quality. The members' technical expertise in executing NPDES permit requirements allows them to provide input on standards implementation, NPDES permit compliance, and funding which is distinct from DNR's and EPA's perspective as regulators. If the Court grants the Motion, the Associations will therefore provide an important perspective that none of the current parties will provide. In particular, the Associations are uniquely situated to outline to the Court the benefits of DNR's "screening criteria" approach to nutrient standards, including how such an approach provides the flexibility necessary to ensure that the NPDES permit requirements derived from state standards are stringent enough to protect water quality, but not so overly proscriptive as to have unintended impacts.

Unlike most pollutant parameters for which states adopt standards, nutrients do not exhibit a specific, consistent toxicity threshold; and the complex nature of nutrient standards development requires a high level of expertise concerning the impacts of nutrients on local watersheds. The Associations are also uniquely able to address the importance of preserving the

states' CWA role in the development and adoption of water quality standards that protect local waterways.

B. *Plaintiff's Claim for Relief*

1. *Contrary to Assertions, the DNR-Adopted Nutrient Standards Are Proper*

a. *How the Missouri DNR Standards Work*

The standards at issue are simpler than they appear, and more logically achieve the intent of CWA section 303 standards (protection of waters) than the Missouri Coalition for the Environment ("MCE") would have the Court believe. They include a set of numeric chlorophyll concentrations, above which the waters are deemed to be impaired. These "Impairment Thresholds" are analogous to the traditional toxicity thresholds noted in section I.A for pollutants that display a consistent threshold. But because of the complexities of nutrient biology and toxicity, it is not possible to define such generic, broadly applicable numbers for nutrients without being severely overly inclusive. "There is no clear point [of] algal biomass, measured as chlorophyll-a, where adverse ecological effects would occur universally for all waters." EPA Region 7 letter to DNR, Decision Document Enclosure (Dec. 14, 2018). Exhibit 2. So, rather than try to define such numbers with an "off ramp" for the many cases in which the numbers will not produce accurate assessments, DNR has chosen (and EPA has approved) a procedure wherein DNR will perform a site-specific assessment of aquatic life and other relevant impacts for waters below the set Impairment Threshold and above the conservatively set "Screening Threshold." Although this increases the DNR workload, it is necessary to properly assess and protect water quality. At least 22 states have come to this scientific conclusion and taken comparable approaches, with EPA Regional Office approval. *See infra* section I.B.1.b.

Simply put, a single numeric standard such as MCE wants would necessarily be either under-inclusive (missing waters that are impaired), or over-inclusive (classifying high quality waters as impaired). The DNR standards at issue avoid both of these undesirable outcomes. DNR has properly exercised its state CWA authority in evaluating these matters of priorities and resources.

b. The DNR Standards Are Consistent With Law and Similar to Standards Adopted By Many Other States

MCE argues that EPA acted arbitrarily and capriciously in approving DNR's aquatic life water quality standards for nutrients for lakes and asserts that those standards fail to protect other instream beneficial uses besides aquatic life. It requests that this Court set aside EPA's approval of the Missouri standards, thereby negating their use for NPDES permitting and addressing water quality impairments. Such a holding would frustrate the significant progress made by DNR and stakeholders in implementing proper nutrient standards. And because similar progress has been made in other states using similar methodologies, MCE's legally and factually incorrect allegations of legal error threaten to unjustifiably frustrate similar progress nationwide.

The states have developed and adopted water quality standards under the federal CWA since the 1970s. Although the standards process is highly technical, for some pollutant parameters EPA publishes water quality criteria "guidance" for the states to consider under CWA section 304(a), 33 U.S.C. § 1314(a). Some EPA criteria are accepted by some states as identifying appropriate numeric pollutant thresholds, for e.g. with respect to toxicity to aquatic life, and are therefore adopted by the states as their standards. However, much of this low-hanging environmental fruit has been harvested, and many of the more easily-defined criteria have been adopted, leaving states and EPA to now have to develop the more technically difficult criteria. For example, EPA's nutrient (nitrogen and phosphorus) criteria guidance, rather than

being discrete nationwide numbers calculated on a scientific toxicity basis, are geographical region-based "reference criteria" based on ambient concentrations in high quality streams. *See* https://www.epa.gov/nutrient-policy-data/numeric-nutrient-water-quality-criteria.

Because of the imprecise nature of EPA's guidance, states have been reluctant to use EPA's reference criteria for nutrients. Many have instead used an effects-based approach like the DNR chlorophyll standards. In fact, at least 22 states have adopted one or more standards based on chlorophyll, and at least 21 have adopted lake chlorophyll standards. https://www.epa.gov/nutrient-policy-data/state-progress-toward-developing-numeric-nutrient-water-quality-criteria#tb3 In doing so, a number of states, like Missouri, have used a "screening criteria" approach akin to the one objected to here. EPA has on a national level concluded that such chlorophyll-based nutrient standards – including those utilizing a "screening criteria" approach – are fully protective of water quality. *Id*.

> [C]hlorophyll-a criteria can be used to determine if waters are impaired due to nitrogen and phosphorus pollution. Chlorophyll-a is a response variable that measures biotic productivity and activity . . .Chlorophyll-a concentrations are a direct response to causal variables - total nitrogen and total phosphorus.

Indeed, EPA's "Guiding Principles" on nutrient criteria support screening criteria, chlorophyll-based standards. EPA-820-F-039 (2013). https://www.epa.gov/sites/production/files/2013-09/documents/guiding-principles.pdf

c. The DNR Standards Are Now Helping Achieve Water Quality Goals

Any concerns about the effectiveness of the new DNR standards are undercut by the fact that DNR's 2020 proposed CWA section 303(d) listing of nutrient impaired waters includes a number of lakes. https://dnr.mo.gov/env/wpp/waterquality/303d/303d.htm. Such impairment listings result in the development of Total Maximum Daily Loads and other regulatory actions leading to the correction of the impairment.

Nitrogen and phosphorus are essential nutrients for the development and growth of single-cell plant life that serve as food for lower level aquatic life. Without those nutrients plant life, fish, and other aquatic life will not develop. Moreover, the effect of nutrients on a waterbody is a function of multiple waterbody-specific variables, including geology, land use, climate, water chemistry, hydrology, ecosystem, and lake age. *See* EPA, *Nutrient Criteria Technical Guidance Manual* at 1-1, 2-2 to 2-8 (EPA 822-B-00-001, Apr. 2000). In light of these site-specific factors, EPA recommends a unique five-step process for developing numeric nutrient standards for lakes: (1) evaluate historical information on the lake and watershed; (2) determine the optimal reference condition of the lake; (3) employ modeling to project nutrient levels in the lake; (4) evaluate all gathered data with a team of experts of various disciplines to develop draft standards; and (5) predict the impact of the draft standards on downstream waters. *Id*. at 7-1-7-2.

Because of these factors, states cannot apply a one-size-fits-all approach to nutrient standards development. Rather, developing scientifically defensible lake nutrient standards is a complex task that can involve years of data collection, modeling, and evaluation. *See generally Fla. Wildlife Fed'n Inc. v. McCarthy*, 2014 U.S. Dist. LEXIS 1343 (N.D. Fla. 2014) (13-years).

DNR and key stakeholders worked for several years to develop numeric standards that account for the unique conditions of waters, where there are no uniform, discrete toxicity levels for nutrients applicable to all Missouri lakes. While MCE is suing for such discrete numbers, DNR properly determined that such numbers do not exist, and EPA agreed that DNR's adopted standards are protective. The standards should stand.

2. *It is Critical That the States' Standards Authority be Preserved*

The CWA provides EPA with substantial authority to oversee state NPDES programs in those cases where states (including those represented by the state Associations) have been

delegated authority to implement the program. However, CWA section 303, 33 U.S.C. § 1313, gives states the clear authority to adopt water quality standards. States are free to depart from EPA's suggested criteria as long as the state's standards are scientifically defensible. 80 Fed. Reg. 51020, 51028-29 (Aug. 21, 2015) (rulemaking). A state's standards may address specific situations and may involve consideration of priorities and resources. *Id*. at 51029.

Importantly, states are in a better position than EPA to know the needs of their waters; and where there is a need for balancing interests and the impacts of standards options, Congress kept that authority in the states. As noted by EPA Region 3 in approving chlorophyll-based nutrient standards for specified Virginia waters, "states have the primary responsibility for reviewing, establishing, and revising water quality standards." EPA Region 3 letter & Enclosure Action Rationale (Jan. 6, 2020) at p.1. Exhibit 3.

These factors are nowhere more at issue than in situations where the science is not exact, such as is the case with nutrient standards. In this case, EPA properly reviewed DNR actions and allowed Missouri to have the last say with respect to the most appropriate way to ensure the protection of its local waterways consistent with well-developed scientific evidence. It is important for CWA implementation and water quality protection that state authority is preserved. However, at times EPA's Regional Offices have been reticent to afford the states the full water quality standards authority that the CWA specifies.

The Associations will explain to the Court why these standards are proper and effective, and why site-specific expertise brought to bear by the states is critical to their development and implementation.

II. THE ASSOCIATIONS ARE ENTITLED TO INTERVENE AS OF RIGHT

Pursuant to Rule of Civil Procedure 24(a), the Water Quality Associations are entitled to intervene as of right in this matter. The Court of Appeals has noted three necessary criteria under Rule 24(a). A timely application must demonstrate that the intervenor "(1) ha[s] a recognized interest in the subject matter . . . that (2) might be impaired by the disposition . . . and that (3) will not be adequately protected by the existing parties." *North Dakota ex rel. Stenehjem v. United States*, 787 F.3d 918, 921 (8th Cir. 2015) (internal quotations omitted). An intervenor must also show Article III standing. *Id*. at 920. Courts are directed to "construe Rule 24 liberally and resolve any doubts in favor of the proposed intervenors." *United States v. Ritchie Special Credit Invs., Ltd*., 620 F.3d 824, 831 (8th Cir. 2010) (internal quotations omitted).

A. *This Motion Is Timely*

Timeliness of a motion is based on a consideration of all the circumstances. *Id*. at 832. The relevant factors to be considered include how far the litigation has progressed and whether intervention at this point of the litigation will prejudice any of the parties to the action. *Id*.

Here, there are no circumstances that would make the Associations' Motion untimely. The Motion is filed shortly after the February 3 responsive pleading of EPA. At this preliminary stage, no party could be prejudiced by intervention. *See, e.g., Akiachak Native Cmty. V. U.S. Dept. of Interior*, 584 F. Supp. 2d 1, 5–6 (D.D.C. 2008).

B. *The Associations Have Legally Recognized Interests in the Subject Matter of this Litigation that Will Be Impaired by an Unfavorable Outcome*

1. *The Associations and Their Members Are Particularly Affected*

The Water Quality Associations' members operate publicly owned wastewater treatment plants ("POTWs") discharging nutrient-containing wastewater. Many AMCA members discharge to lakes that are subject to the DNR standards, and many of the other Associations' members discharge to lakes that are or will be subject to state nutrient standards. There is no

doubt that the single-number standards MCE seeks would unjustifiably compel AMCA and the other Associations' members to make significant investments in upgrading facilities to reduce their nutrient discharges.

The sources of nutrients in waters are divided into two general categories: (1) nonpoint sources (*e.g*. agricultural runoff, non-municipal stormwater), and (2) point sources from municipal storm sewers, animal feeding operations, industrial operations, and POTWs. Although the first category generally contributes the majority of nutrients to most waters, the standards MCE seeks will not result in reductions from such sources because nonpoint sources are not regulated by the NPDES permitting program, *see e.g*., 33 U.S.C. § 1342(l) Among the latter category, municipal storm sewers and animal feeding operations, 40 C.F.R. § 122.42(e), do not typically receive numeric limits in their NPDES permits. That leaves a relatively small class of industrial dischargers and the POTWs to bear the primary burden of MCE's unjustifiable standard. Indeed, if MCE's success in this action would not compel nutrient reductions from AMCA and the Associations' members, MCE's claimed injury (nutrient levels in lakes) would not be redressable and MCE would not have standing.

2. *This Case Seeks to Compel a Specific Standard*

The Associations' interests in the EPA-approved nutrient standards here are greater than the prior interests of AMCA and its members that this Court found speculative in the 2016 MCE challenge of EPA action on prior DNR standards. *See Missouri Coalition for the Env't Found. v. McCarthy*, 2016 U.S. Dist. LEXIS 82936. Here MCE makes it clear that its principal complaint is that the nutrient standards do not consist of a single set of numeric instream concentrations for total nitrogen and total phosphorus. Complaint ¶ 5 (not a "numeric criterion for nutrient pollutants"). Its argument focuses on what it calls a "gray zone," in which DNR must evaluate

any impacts and defined "Assessment Endpoints." Rather than this expert assessment by DNR, MCE wants hard-and-fast TN and TP concentrations, above which water quality is deemed unacceptable and below which it is deemed acceptable. *See Id*. at ¶¶ 74-77. Unlike the prior case where the Court noted that "MCE's complaint does not ask the Court to enforce any particular nutrient criteria," *Missouri Coalition for the Env't* at 9, MCE's consistent intent is single number TN and TP standards. DNR's Regulatory Impact Report cost estimates, *infra* section II.B.3, illustrate the severe adverse cost impacts this would entail for the Associations' members. POTWs would bear the brunt of any costly compliance measures which would include increased capital (treatment plant upgrades), operations and maintenance costs.

Therefore, a holding in favor of MCE will directly impact the Associations' members. The majority of POTWs in Missouri are not currently designed to remove nutrients because they have not historically been subject to NPDES permit limits for nutrients. However, the CWA requires that NPDES permit limits be imposed whenever necessary to comply with water quality standards, 33 U.S.C. § 1311(b)(1)(C), and the threshold to trigger permit limits is low: a facility's discharge need only have a "reasonable potential to cause" pollutant levels that exceed the standards. 40 C.F.R. § 122.44(d)(1). Member POTWs discharging to lakes predictably will be found to contribute to any nutrient levels above those specified in the numeric standards, which will trigger permit limits requiring costly upgrades.

3. *The Relief Sought by MCE Would Unjustifiably Require Costly POTW Upgrades*

Under the DNR-approved standards, many AMCA members will already have to upgrade their POTWs. These are major capital projects costing millions or tens of millions of dollars

depending on the size of the facility and the type of upgrades required.[1] These costs would increase significantly if POTWs were required to meet the standards sought by MCE.

Upgrade costs are highly sensitive to the level of nutrient reductions that must be achieved. For example a study by the Utah Water Quality Board estimated the cost of upgrading POTWs if they were required to comply with numeric nutrient limits. CH2Mhill, *Statewide Nutrient Removal Cost Impact Study* (2010).[2] Because potential limits were unknown, the study looked at a reasonable range of POTW nutrient reduction levels. For 30 POTWs, the capital and additional operation costs ranged from nearly $3.8 million to over $45 million per facility. *Id*. at 4-2. As the Utah study demonstrates, nutrient removal upgrade costs can vary by *more than an order of magnitude* based on the level of reductions. Consequently, it is vitally important that nutrient reduction targets be set at levels no more stringent than necessary to protect water quality. Illustrating this point, DNR compared the costs of compliance with its standards at issue here and more stringent standards. The substantial financial impacts of nutrient standards are illustrated for different scenarios. Draft Regulatory Impact Report, 10 CSR 20-7.031 Water Quality Standards (DNR 2017) ("RIR"). https://dnr.mo.gov/env/wpp/rules/docs/draft-wqs-rir-9-25-17.pdf. One scenario shows impacts to POTWs in all lake watersheds using the more stringent standards that MCE seeks. Capital costs are estimated to be between approximately $476 and $833 million, and annual operations and maintenance costs between $39 and $65 million *Id*. Table 3.9 at p. 28.

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[1] For example, the District of Columbia's Blue Plains wastewater treatment plant completed a biological nutrient removal upgrade in 2015 costing nearly *$1 billion*. DC Water, Board of Directors Meeting Minutes 8 (July 16, 2015), *available at* https://www.dcwater.com/news/publications/Environmental%20Quality%20and%20Sewerage%20Service%2007-16-15.pdf.

[2] *Available at* http://www.deq.utah.gov/Pollutants/N/nutrients/docs/2010/10Oct/Statewide NutrientRemoval CostImpactStudyRptFINAL.pdf.

The stringency of the DNR standards will determine which facilities need to be upgraded and to what extent. While MCE's broad brush and overly stringent approach would make permitting, compliance monitoring and enforcement easier on DNR, for the aforementioned reasons DNR has not taken that route.

4. *All of the Associations Are Impacted*

A large number of states have adopted EPA-approved nutrient standards for lakes and reservoirs based at least in part on chlorophyll, some using elements of a "screening criteria" approach such as the approach of the Missouri DNR nutrient standards. https://www.epa.gov/nutrient-policy-data/state-progress-toward-developing-numeric-nutrient-water-quality-criteria#tb3. Similarly, many states—such as Ohio—are in the process of developing nutrient criteria based on the same science-based approach underlying Missouri's approved nutrient criteria. Any holding that brings into question the legality of standards based on chlorophyll or a screening criteria approach, and any holding that might impair the states' unique CWA section 303 responsibilities, therefore would have effects on the Associations and their members comparable to the effects noted on AMCA. Accordingly, the Associations and their members will be impacted by the results of this litigation challenging the legality of such approaches, and they have operational and financial interests in ensuring that the standards that form the basis of permitting requirements are tailored and appropriate for the designated uses and physical characteristics of the lakes and reservoirs in question. In *National Parks Conservation Association v. EPA*, 759 F.3d 969 (8th Cir. 2014), the Eighth Circuit stated that if the plaintiff groups obtained the relief they sought, the proposed intervenor "may" be required to install additional pollution control equipment at great expense. *Id*. This case is no different. The Associations and their members have protectable financial interests in the outcome, their

interests will be impaired if the relief sought by MCE is granted; therefore intervention under Rule 24(a) is warranted.

C. *EPA Does Not Adequately Represent the Associations' Interests*

EPA does not adequately represent AMCA's, the other Associations' or regulated NPDES permittees' interests in ensuring that numeric nutrient standards are adopted and maintained in a manner that will result in appropriately tailored permitting requirements which can be achieved in a cost-effective manner. EPA has a general interest in ensuring that the requirements of the CWA are satisfied, 40 C.F.R. § 131.11(a)(1), while the Associations and their members, as the entities that will be directly affected by these and other comparable state standards, have a direct interest in ensuring that nutrient standards are narrowly tailored and no more stringent than necessary. The Associations have moved to intervene to protect their and their members' particularized interests in standards that are tailored to the highly varied designated uses and physical characteristics of lakes across Missouri and the other states, and which are cost-effective. As regulators, EPA does not and cannot adequately represent the regulated NPDES-permittees' interests in this matter. *See Nat'l Parks Conservation Ass'n v,* 759 F.3d at 977.

D. *The Associations Have Standing to Be a Party to this Action*

1. *The Associations' Members Would Have Standing*

In order to have standing, a party must demonstrate that (1) it will suffer an actual or imminent injury; (2) there is a causal connection between the injury and the case; and (3) there is a likelihood that the injury may be redressed by the court. *Sierra Club v. Kimbell*, 623 F.3d 549, 556 (8th Cir. 2010). AMCA and the other Associations have members that satisfy the Article III standing requirements.

As discussed above, nutrient standards other than those adopted by DNR would likely be financially disastrous for AMCA members that operate POTWs discharging to lakes, as such standards may well trigger unnecessary nutrient permit limits and costly facility upgrades. *See South Dakota v. Ubbelohde*, 330 F.3d 1014, 1024–25 (8th Cir. 2003) (holding that a "threatened injury" is sufficient if it is highly likely to result from an adverse decision of the court).

AMCA members' threatened injuries are directly traceable to this action. DNR would be compelled to base the limitations of NPDES permits on any alternate standards, which would in turn mandate additional POTW nutrient removal upgrades. MCE has long sought for the Court to require EPA to issue nutrient standards for Missouri. Any EPA-issued numeric nutrient standards would trigger nutrient permit limits based on those standards by operation of law. *See* 40 C.F.R. § 122.44(d)(1). Because any such alternate numeric nutrient standards would have a determinative effect on DNR's actions, the injury to AMCA's members is fairly traceable to this action. *See Bennett v. Spear*, 520 U.S. 154, 169 (1997). Likewise, science-based nutrient criteria subject to U.S. EPA approval in other states would be called into question were MCE were successful in its bid to overturn U.S. EPA's approval of Missouri's nutrient screening approach. This action therefore directly threatens the interests of the Associations.

AMCA and the Associations' injuries would be redressed by a favorable decision of this Court upholding EPA's approval of the DNR nutrient standards.

2. *Associations Have Standing to Bring This Action on Behalf of Members*

The Associations may intervene in this matter on behalf of their members because (1) their members would be able to maintain the action on their own behalf; (2) the interests are germane to the Associations' purposes; and (3) the participation of individual members is not required. *Red River Freethinkers v. City of Fargo*, 679 F.3d 1015, 1022 (8th Cir. 2012). As

noted, the Associations' members could individually intervene. As described, AMCA represents the interests of its members in environmental regulatory matters that impact them. The other Associations represent the interests of their members in environmental regulatory matters impacting their local governments and public utilities. None of AMCA's or the other Associations' members are necessary parties individually because the issues before the Court are generic factual issues and questions of law involving the interpretation of the CWA.

III. IN THE ALTERNATIVE, THE COURT SHOULD GRANT PERMISSIVE INTERVENTION

If the Court determines that the Associations are not entitled to intervention as of right, it should grant permissive intervention. The rule provides "the court may permit anyone to intervene who: . . (B) has a claim or defense that shares with the main action a common question of law or fact." Fed. R. Civ. P. 24(b)(1). "A decision on this question is wholly discretionary, [based on] whether the proposed intervention would unduly delay or prejudice the adjudication of the parties' rights." *Stenehjem*, 787 F.3d at 923 (internal quotations omitted).

There is no risk of undue delay or prejudice if the Associations are permitted to intervene at this preliminary stage. No other party to this action represents the interests and experience of public utility permittees that are subject to the regulatory action at issue here. *See Nat'l Parks Conservation Ass'n v*, 759 F.3d at 977 (expertise a factor in granting intervention).

IV. CONCLUSION

For the reasons set forth, the Associations respectfully request that the Court enter an Order granting their request to intervene as defendants in this action.

Respectfully submitted,

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Dated: February 12, 2020

CERTIFICATE OF SERVICE

I hereby certify that on this 12th day of February 2020, I electronically filed the foregoing Suggestion in Support with the Clerk of Court using the CM/ECF system which will automatically send email notification of such filing to the attorney of record listed below:

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EXHIBIT 1

Association of Missouri Cleanwater Agencies

Agency Members
City of Branson
City of Cape Girardeau
City of Carl Junction
City of Columbia
Duckett Creek Sanitary District
City of Farmington
City of Harrisonville
City of Independence
City of Jefferson City
City of Joplin
City of Kansas City
Little Blue Valley Sewer District
City of Moberly
St. Charles County, PWSD #2
City of St. Joseph
St. Louis MSD
City of St. Peters
City of Sedalia
City of Springfield
City of Wentzville

Consultant Members
Allgeier, Martin & Associates, Inc.
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Burns & McDonnell
Carollo Engineers, Inc.
HDR, Inc.
Olsson
Stantec Consulting Services, Inc.

Affiliate Members
Alliance Water Resources, Inc.

Association of Ohio Metropolitan Wastewater Agencies

Agency Members
Akron
Avon Lake
Bowling Green
Butler County
Canton
Cincinnati MSD
Columbus
Dayton
Fairfield
Hamilton
Lancaster
Lima
Middleton

Newark
Northeast Ohio Regional Sewer District
Portsmouth
Solon
Springfield
Summit County
Wadsworth
Warren

California Association of Sanitation Agencies

Agency Members
Bayshore Sanitary District
Bear Valley Water District
Burbank Sanitary District
Byron Sanitary District
Calaveras County Water District
Camarillo Sanitary District
Camrosa Water District
Carmel Area Wastewater District
Carpinteria Sanitary District
Castro Valley Sanitary District
Central Contra Costa Sanitary District
Central Marin Sanitation Agency
Channel Islands Beach Community Services District
City of Bakersfield
City of Burbank
City of Corona
City of Davis
City of Folsom
City of Fresno, Fresno-Clovis Regional Wastewater Reclamation Facility
City of Los Angeles, Bureau of Sanitation
City of Merced
City of Milpitas
City of Modesto, Public Works
City of Oceanside
City of Palo Alto Regional Water Quality Control Plant
City of Petaluma
City of Richmond Wastewater Source Control Division
City of Riverside Regional Water Quality Control Plant
City of Roseville, Environmental Utilities – Wastewater
City of Sacramento Department of Utilities
City of San Diego Public Utilities
City of San Jose, Environmental Services Department
City of San Luis Obispo
City of San Mateo
City of Santa Barbara Public Works Dept.
City of Seaside
City of Stockton, Municipal Utilities Dept.
City of Sunnyvale
City of Thousand Oaks – Hill Canyon WWTP
City of Vacaville

Crestline Sanitation District
Crockett Community Services District
Cupertino Sanitary District
Delta Diablo
Dublin San Ramon Services District
East Bay Dischargers Authority
East Bay Municipal Utility District
East Palo Alto Sanitary District
Eastern Municipal Water District
El Dorado Irrigation District
El Toro Water District
Elsinore Valley Municipal Water District
Emerald Bay Community Services District
Encina Wastewater Authority
Fairfield-Suisun Sewer District
Fallbrook Public Utility District
Goleta Sanitary District
Goleta West Sanitary District
Granada Community Services District
Hi Desert Water District
Idyllwild Water District
Inland Empire Utilities Agency
Ironhouse Sanitary District
Irvine Ranch Water District
Lake Arrowhead Community Services District
Lake County Sanitation District
Las Gallinas Valley Sanitary District
Las Virgenes Municipal Water District
Leucadia Wastewater District
Sanitation Districts of Los Angeles County
Los Angeles County Dept. of Public Works Sewer Maintenance Districts
Mammoth Community Water District
Montecito Sanitary District
Monterey One Water
Moulton Niguel Water District
Mt. View Sanitary District
Napa Sanitation District
North of River Sanitary District No. 1
North San Mateo County Sanitation District
Novato Sanitary District
Ojai Valley Sanitary District
Olivenhain Municipal Water District
Orange County Sanitation District
Oro Loma Sanitary District
Pebble Beach Community Services District
Rancho California Water District
Rincon del Diablo Municipal Water District
Rodeo Sanitary District
Rosamond Community Services District
Ross Valley Sanitary District
Sacramento Regional County Sanitation District
San Elijo Joint Powers Authority

San Francisco Public Utilities Commission
San Rafael Sanitation District
Sanitary District No. 5 of Marin County
Santa Ana Watershed Project Authority
Santa Clara County Sanitation District No. 2-3
Santa Lucia Community Services District
Santa Margarita Water District
Santa Rosa Water
Santa Ynez Community Services District
Saticoy Sanitary District
Sausalito-Marin City Sanitary District
Selma-Kingsburg-Fowler County Sanitation District
Sewer Authority Mid-Coastside
Sewerage Agency of Southern Marin, City of Mill Valley
Silicon Valley Clean Water
Sonoma County Water Agency
South Coast Water District
South Orange County Wastewater Authority
South Tahoe Public Utility District
Stege Sanitary District
Summerland Sanitary District
Tahoe-Truckee Sanitation Agency
Triunfo Water & Sanitation District
Truckee Sanitary District
Union Sanitary District
Vallecitos Water District
Vallejo Flood & Wastewater District
Valley Sanitary District
Ventura Regional Sanitation District
Victor Valley Wastewater Reclamation Authority
West Basin Municipal Water District
West Bay Sanitary District
West County Wastewater District
West Valley Sanitation District of Santa Clara County
Western Municipal Water District of Riverside County
Yorba Linda Water District
Yucaipa Valley Water District

National Association of Clean Water Agencies

Agency Members
Daphne Utilities, Daphne, AL
Jefferson County Commission, Birmingham, AL
Mobile Area Water & Sewer System, Mobile, AL
Montgomery Water Works & Sanitary Sewer Board, Montgomery, AL
Water Works and Sewer Board of the City of Prichard, Prichard, AL
Anchorage Water & Wastewater Utility, Anchorage, AK
City of Mesa Water Resources, Mesa, AZ
City of Phoenix Water Services Department, Phoenix, AZ
Pima County Regional Wastewater Reclamation Department, Tucson, AZ
Little Rock Water Reclamation Authority, Little Rock, AR
Pine Bluff Wastewater Utility, Pine Bluff, AR

Central Contra Costa Sanitary District, Martinez, CA
Central Marin Sanitation Agency, San Rafael, CA
City of Los Angeles - LA Sanitation, Los Angeles, CA
City of Palo Alto Regional Water Quality Control Plant, Palo Alto, CA
City of Richmond, CA, Richmond, CA
City of Roseville Environmental Utilities, Roseville, CA
City of Sacramento, Sacramento, CA
City of San Diego Public Utilities, San Diego, CA
City of Santa Barbara, Santa Barbara, CA
City of Santa Cruz Wastewater Treatment Facility, Santa Cruz, CA
City of Sunnyvale Water Pollution Control Plant, Sunnyvale, CA
Delta Diablo, Antioch, CA
East Bay Municipal Utility District, Oakland, CA
Encina Wastewater Authority, Carlsbad, CA
Fairfield-Suisun Sewer District, Fairfield, CA
Inland Empire Utilities Agency, Chino, CA
Lake County Special Districts, Lakeport, CA
Las Virgenes Municipal Water District, Calabasas, CA
Los Angeles County Department of Public Works, Alhambra, CA
Novato Sanitary District, Novato, CA
Orange County Sanitation District, Fountain Valley, CA
Rincon del Diablo Municipal Water District, Escondido, CA
Riverside Water Quality Control Plant, Riverside, CA
Sacramento Regional County Sanitation District, Sacramento, CA
San Francisco Public Utilities Commission, San Francisco, CA
Sanitation Districts of Los Angeles County, Whittier, CA
Santa Rosa Water, Santa Rosa, CA
South Orange County Wastewater Authority, Dana Point, CA
Sunnyslope County Water District, Hollister, CA
Union Sanitary District, Union City, CA
Vallejo Flood and Wastewater District, Vallejo, CA
Victor Valley Wastewater Reclamation Authority, Victorville, CA
West County Wastewater District, Richmond, CA
Boxelder Sanitation District, Fort Collins, CO
Centennial Water & Sanitation District, Highlands Ranch, CO
City of Aurora, Aurora, CO
City of Fort Collins Utilities, Fort Collins, CO
City of Greeley Water and Sewer Department, Greeley, CO
City of Pueblo Wastewater Department, Pueblo, CO
Colorado Springs Utilities, Colorado Springs, CO
Metro Wastewater Reclamation District, Denver, CO
Platte Canyon Water and Sanitation District, Littleton, CO
Pleasant View Water & Sanitation District, Golden, CO
Roxborough Water & Sanitation District, Littleton, CO
South Platte Water Renewal Partners, Englewood, CO
Greater New Haven Water Pollution Control Authority, New Haven, CT
Joint Facility/Colchester-East Hampton, East Hampton, CT
The Metropolitan District, Hartford, CT
The Town of Greenwich, Greenwich, CT
Water Pollution Control Authority for the City of Norwalk, Norwalk, CT
City of Wilmington Department of Public Works, Wilmington, DE
DC Water, Washington, DC

City of Boca Raton Utility Services Department, Boca Raton, FL
City of Riviera Beach, Riviera Beach, FL
Emerald Coast Utilities Authority, Pensacola, FL
Marion County Utilities, Belleview, FL
Miami-Dade County Water and Sewer Department, Miami, FL
Orange County Utilities, Orlando, FL
Toho Water Authority, Kissimmee, FL
City of Atlanta Department of Watershed Management, Atlanta, GA
City of Augusta Utilities Department, Augusta, GA
City of Cumming, Cumming, GA
Columbus Water Works, Columbus, GA
DeKalb County Department of Watershed Management, Stone Mountain, GA
DeKalb County Public Works - Roads and Drainage Division, Decatur, GA
Gwinnett County Department of Water Resources, Lawrenceville, GA
Macon Water Authority, Macon, GA
City and County of Honolulu, Honolulu, HI
Maui County, Department of Environmental Management, Wailuku, HI
City of Boise, Boise, ID
City of Post Falls, Post Falls, ID
City of Twin Falls, Twin Falls, ID
American Bottoms Regional Wastewater Treatment Facility, Sauget, IL
Bloomington & Normal Water Reclamation District, Bloomington, IL
City of Joliet, Department of Public Utilities, Joliet, IL
City of Lockport, Lockport, IL
Downers Grove Sanitary District, Downers Grove, IL
EJ Water Cooperative, Inc., Dieterich, IL
Flagg Creek Water Reclamation District, Burr Ridge, IL
Fox Metro Water Reclamation District, Oswego, IL
Fox River Water Reclamation District, South Elgin, IL
Glenbard Wastewater Authority, Glen Ellyn, IL
Greater Peoria Sanitary District, Peoria, IL
Kankakee River Metropolitan Agency, Kankakee, IL
Kishwaukee Water Reclamation District, Dekalb, IL
Metropolitan Water Reclamation District of Greater Chicago, Chicago, IL
North Shore Water Reclamation District, Gurnee, IL
Rock River Water Reclamation District, Rockford, IL
Sanitary District of Decatur, Decatur, IL
Thorn Creek Basin Sanitary District, Chicago Heights, IL
Urbana & Champaign Sanitary District, Urbana, IL
Village of Deerfield, Deerfield, IL
Wheaton Sanitary District, Wheaton, IL
Yorkville-Bristol Sanitary District, Yorkville, IL
Citizens Energy Group, Indianapolis, IN
City of Fort Wayne, Fort Wayne, IN
City of Jeffersonville Wastewater Department, Jeffersonville, IN
City of South Bend Wastewater Treatment Plant, South Bend, IN
City of Valparaiso Elden Kuehl Pollution Control Facility, Valparaiso, IN
Gary Sanitary District, Gary, IN
City of Ames Water & Pollution Control Department, Ames, IA
City of Cedar Rapids, Utilities Department, Cedar Rapids, IA
City of Des Moines, Des Moines, IA
City of Muscatine, Muscatine, IA

Iowa Lakes Regional Water, Spencer, IA
City of Lawrence Department of Utilities, Lawrence, KS
City of Olathe, Olathe, KS
City of Wichita, Wichita, KS
Johnson County Wastewater, Olathe, KS
Unified Government of Wyandotte County, Kansas City, KS
Bowling Green Municipal Utilities, Bowling Green, KY
Caveland Environmental Authority, Cave City, KY
Louisville & Jefferson County Metropolitan Sewer District, Louisville, KY
East Baton Rouge Sewerage Commission, Baton Rouge, LA
Sewerage & Water Board of New Orleans, New Orleans, LA
Caribou Utilities District, Caribou, ME
City of Bangor, Bangor, ME
City of Saco, Saco, ME
City of South Portland Water Resource Protection, South Portland, ME
Portland Water District, Portland, ME
Sanford Sewerage District, Springvale, ME
York Sewer District, York Beach, ME
Anne Arundel County Department of Public Works, Millersville, MD
Baltimore City Department of Public Works, Baltimore, MD
Howard County Department of Public Works, Columbia, MD
Washington Suburban Sanitary Commission, Laurel, MD
Boston Water & Sewer Commission, Boston, MA
City of Worcester, Worcester, MA
Lowell Regional Wastewater Utility, Lowell, MA
Massachusetts Water Resources Authority, Boston, MA
South Essex Sewerage District, Salem, MA
Springfield Water & Sewer Commission, Agawam, MA
Upper Blackstone Clean Water, Millbury, MA
City of Grand Rapids Environmental Services, Grand Rapids, MI
City of Saginaw, Saginaw, MI
Detroit Water & Sewerage Department, Detroit, MI
Genesee County Drain Commissioner Water & Waste Services, Flint, MI
Great Lakes Water Authority, Detroit, MI
Oakland County Water Resources Commissioner, Waterford, MI
Ypsilanti Community Utilities Authority, Ypsilanti, MI
City of Rochester, MN Water Reclamation Plant, Rochester, MN
Metropolitan Council Environmental Services, Saint Paul, MN
Western Lake Superior Sanitary District, Duluth, MN
City of Jackson, MS, Jackson, MS
City of Liberty, Liberty, MO
City of Moberly, Moberly, MO
City of Saint Charles, Missouri, Saint Charles, MO
City of Springfield, MO, Springfield, MO
City of St. Joseph Water Protection, Saint Joseph, MO
Hannibal Board of Public Works, Hannibal, MO
Independence Water Pollution Control Department, Independence, MO
Jefferson City Public Works Department, Jefferson City, MO
KC Water, Kansas City, MO
Little Blue Valley Sewer District, Independence, MO
Metropolitan St. Louis Sewer District, Saint Louis, MO
City of Billings, Billings, MT

City of Bozeman, Bozeman, MT
City of Great Falls, Great Falls, MT
City of Kalispell, Kalispell, MT
City of Livingston, Livingston, MT
City of Missoula, Missoula, MT
City of Whitefish, Whitefish, MT
City of Omaha Public Works Department, Omaha, NE
City of Henderson, Henderson, NV
City of Las Vegas Water Pollution Control Facility, Las Vegas, NV
Clark County Regional Flood Control District, Las Vegas, NV
Clark County Water Reclamation District, Las Vegas, NV
City of Manchester Public Works Department, Manchester, NH
Atlantic County Utilities Authority, Pleasantville, NJ
Bayshore Regional Sewerage Authority, Union Beach, NJ
Bergen County Utilities Authority, Little Ferry, NJ
Camden County Municipal Utilities Authority, Camden, NJ
Hanover Sewerage Authority, Whippany, NJ
Joint Meeting of Essex & Union Counties, Elizabeth, NJ
Linden Roselle Sewerage Authority, Linden, NJ
Middlesex County Utilities Authority, Sayreville, NJ
North Bergen Municipal Utilities Authority, North Bergen, NJ
Northwest Bergen County Utilities Authority, Waldwick, NJ
Ocean County Utilities Authority, Bayville, NJ
Passaic Valley Sewerage Commission, Newark, NJ
Plainfield Area Regional Sewerage Authority, Middlesex, NJ
Rahway Valley Sewerage Authority, Rahway, NJ
Secaucus Municipal Utilities Authority, Secaucus, NJ
Stony Brook Regional Sewerage Authority, Princeton, NJ
Western Monmouth Utilities Authority, Manalapan, NJ
Albuquerque Bernalillo County Water Utility Authority, Albuquerque, NM
City of Santa Fe, Santa Fe, NM
Albany County Water Purification District, Albany, NY
Buffalo Sewer Authority, Buffalo, NY
City of Ithaca Department of Public Works, Ithaca, NY
Erie County Division of Sewerage Management, Buffalo, NY
Monroe County Department of Environmental Services, Rochester, NY
New York City Department of Environmental Protection, Elmhurst, NY
Onondaga County Department of Water Environment Protection, Syracuse, NY
Rockland County Sewer District #1, Orangeburg, NY
Charlotte Water, Charlotte, NC
City of Clinton POTW, Clinton, NC
City of Greensboro Water Resources Department, Greensboro, NC
Metropolitan Sewerage District of Buncombe County, Asheville, NC
Orange Water & Sewer Authority, Carrboro, NC
Raleigh Water, Raleigh, NC
Town of Cary, Cary, NC
Akron Water Reclamation Services, Akron, OH
Avon Lake Regional Water, Avon Lake, OH
City of Canton Water Reclamation Facility, Canton, OH
City of Columbus Department of Public Utilities, Columbus, OH
City of Dayton Department of Water, Dayton, OH
City of Defiance, Defiance, OH

City of Elyria Wastewater Pollution Control, Elyria, OH
City of Lakewood, Lakewood, OH
City of Lebanon, OH, Lebanon, OH
City of Lima Utilities Department, Lima, OH
City of Sidney, Sidney, OH
City of Toledo Department of Public Utilities, Toledo, OH
Metropolitan Sewer District of Greater Cincinnati, Cincinnati, OH
Montgomery County Environmental Services, Kettering, OH
North Royalton Consolidated Sanitary Sewer District, North Royalton, OH
Northeast Ohio Regional Sewer District, Cleveland, OH
City of Tulsa Water and Sewer Department, Tulsa, OK
City of Albany, OR, Albany, OR
City of Bend, Bend, OR
City of Corvallis Public Works Department, Corvallis, OR
City of Eugene Wastewater Division, Eugene, OR
City of Florence, Florence, OR
City of Gresham Department of Environmental Services, Gresham, OR
City of Portland Bureau of Environmental Services, Portland, OR
City of Prineville, Prineville, OR
City of Springfield, Springfield, OR
Clean Water Services, Hillsboro, OR
Metropolitan Wastewater Management Commission, Springfield, OR
Oak Lodge Water Services District, Milwaukie, OR
Water Environment Services of Clackamas County, Oregon City, OR
Allegheny County Sanitary Authority, Pittsburgh, PA
Capital Region Water, Harrisburg, PA
City of Lancaster, Lancaster, PA
Delaware County Regional Water Quality Control Authority, Chester, PA
Derry Township Municipal Authority, Hershey, PA
Philadelphia Water Department, Philadelphia, PA
Pittsburgh Water & Sewer Authority, Pittsburgh, PA
Puerto Rico Aqueduct and Sewer Authority, San Juan, PR
Narragansett Bay Commission, Providence, RI
Beaufort Jasper Water & Sewer Authority, Okatie, SC
Charleston Water System, Charleston, SC
Greenwood Metropolitan District, Greenwood, SC
Mount Pleasant Waterworks, Mount Pleasant, SC
Renewable Water Resources, Greenville, SC
Spartanburg Water, Spartanburg, SC
Summerville Commissioners of Public Works, Summerville, SC
Taylors Fire & Sewer District, Taylors, SC
City of Johnson City, Johnson City, TN
City of Kingsport, Kingsport, TN
City of Memphis Division of Public Works, Memphis, TN
Hallsdale Powell Utility District, Knoxville, TN
Knoxville Utilities Board, Knoxville, TN
Metropolitan Government of Nashville & Davidson County, Nashville, TN
Murfreesboro Water Resources Department, Murfreesboro, TN
Austin Water, Austin, TX
Benbrook Water Authority, Benbrook, TX
City of Corpus Christi - Water Utilities, Corpus Christi, TX
City of Dallas Water Utilities, Dallas, TX

City of Denison, Denison, TX
City of Garland, Garland, TX
City of Grapevine, Grapevine, TX
City of Houston Public Works & Engineering/Public Utilities Division, Houston, TX
El Paso Water, El Paso, TX
Fort Worth Water Department, Fort Worth, TX
Guadalupe-Blanco River Authority, Seguin, TX
Gulf Coast Authority, Houston, TX
North Texas Municipal Water District, Wylie, TX
San Antonio Water System, San Antonio, TX
San Jacinto River Authority, The Woodlands, TX
Trinity River Authority of Texas, Arlington, TX
Upper Trinity Regional Water District, Lewisville, TX
Central Davis Sewer District, Kaysville, UT
Salt Lake City Corporation, Salt Lake City, UT
Snyderville Basin Water Reclamation District, Park City, UT
Timpanogos Special Service District, American Fork, UT
City of South Burlington Water Quality Department, South Burlington, VT
Alexandria Renew Enterprises, Alexandria, VA
Arlington County Department of Environmental Services - Water Pollution Control Bureau, Arlington, VA
Chesterfield County Utilities, Chesterfield, VA
City of Lynchburg Department of Water Resources, Lynchburg, VA
City of Richmond Department of Public Utilities, Richmond, VA
City of Virginia Beach Department of Public Utilities, Virginia Beach, VA
County of Stafford Department of Utilities, Stafford, VA
Fairfax County Wastewater Management Program, Lorton, VA
Hampton Roads Sanitation District, Virginia Beach, VA
Hanover County Department of Public Utilities, Hanover, VA
Henrico County Public Utilities, Henrico, VA
Hopewell Water Renewal, Hopewell, VA
Loudoun Water, Ashburn, VA
Prince William County Service Authority, Woodbridge, VA
Upper Occoquan Service Authority, Centreville, VA
Western Virginia Water Authority, Roanoke, VA
City of Everett Public Works Department, Everett, WA
City of Lynnwood, Lynnwood, WA
City of Tacoma, Environmental Services Department, Tacoma, WA
City of Vancouver, Vancouver, WA
Clark Regional Wastewater District, Vancouver, WA
King County Wastewater Treatment Division, Seattle, WA
Lakehaven Water & Sewer District, Federal Way, WA
LOTT Clean Water Alliance, Olympia, WA
Pierce County, Planning and Public Works, Surface Water Management, Tacoma, WA
Seattle Public Utilities, Seattle, WA
Southwest Suburban Sewer District, Burien, WA
Beckley Sanitary Board, Beckley, WV
Charles Town Utility Board, Charles Town, WV
City of Fairmont, Fairmont, WV
Huntington Water Quality Board, Huntington, WV
Morgantown Utility Board, Morgantown, WV
Parkersburg Utility Board, Parkersburg, WV
City of Beloit Water Resources Division, Beloit, WI

City of Fond du Lac Wastewater Treatment & Resource Recovery Facility, Fond Du Lac, WI
City of Superior, Environmental Services Division, Superior, WI
Madison Metropolitan Sewerage District, Madison, WI
Milwaukee Metropolitan Sewerage District, Milwaukee, WI
NEW Water, Green Bay, WI
Racine Wastewater Utility, Racine, WI
Board of Public Utilities - City of Cheyenne, Cheyenne, WY
City of Laramie, Laramie, WY
Town of Jackson, Jackson, WY
Corporate Affiliates
Advantek Waste Management Services/GeoEnvironment Technologies
AECOM
Alan Plummer Associates, Inc.
American Infrastructure Holdings
Aqua-Aerobic Systems, Inc.
Aquasight
Arcadis
Atkins
Black & Veatch Corporation
Blue Cypress Consulting, LLC
Brown and Caldwell
Burns & McDonnell Engineering Company, Inc.
Carollo Engineers, Inc.
Causey Consulting
CDM Smith
Clyde Wilber LLC
Core Consulting Group, LLC
D&B Engineers and Architects, P.C.
EMA, Inc.
EPC Consultants, Inc.
Galardi Rothstein Group
Geosyntec Consultants
Greeley and Hansen LLC
Gresham Smith
HATCH
Hazen and Sawyer
HDR Engineering, Inc.
InSinkErator
Isle Utilities
Jacobs
Jones & Henry Engineers Ltd.
KAI Designs & Build
Kennedy/Jenks Consultants
Larry Walker Associates, Inc.
LimnoTech
LMK Technologies, Inc.
Lystek International Limited
MMO Consulting
Moonshot, LLC
Ostara Technologies, Inc.
Ovivo USA, LLC
R2O Consulting

Raftelis
Resource Environmental Solutions
Shield Engineering, Inc.
SmartCover Systems
Stantec
Stepwell Water Consulting
Suez
Synagro Technologies, Inc.
Tetra Tech, Inc.
Veolia North America
Wade-Trim Associates, Inc.
Waste Management
Westin Technology Solutions, LLC
XPV Water Partners
Xylem, Inc.

North Carolina Water Quality Association

Agency Members
AQUA North Carolina
City of Asheboro
Brunswick County Public Utilities
City of Burlington
Cape Fear Public Utility Authority
Town of Cary
Cabarrus County Water & Sewer Authority
Charlotte Water
City of Durham
Durham County
Elizabeth City
City of Fayetteville Public Works Commission
City of Graham
City of Greensboro
Greenville Utilities
Harnett County Public Utilities
City of Hickory
City of High Point
Town of Hillsborough
Town of Holly Springs
Johnston County Department of Utilities
City of Lexington
City of Mebane
City of Monroe
Town of Mooresville
MSD of Buncombe County
Neuse Basin Association, Lower
Neuse Basin Association, Upper
Orange Water & Sewer Authority
City of Raleigh
City of Reidsville
Roanoke Rapids Sanitary District
City of Rocky Mount

City of Roxboro
Salisbury-Rowan Utilities
City of Shelby
South Granville Water & Sewer Authority
Gastonia-Two Rivers Utilities
Union County
City of Wilson
City of Winston Salem

Consultant Members
Black & Veatch
Brown and Caldwell
CDM Smith
Freese and Nichols, Inc.
GHD, Inc.
Hazen & Sawyer, P.C.
HDR Engineering, Inc.
Jacobs

Associate Consultant Members
Dewberry Engineers, Inc.
McKim & Creed
WK Dickson & Co., Inc.

South Carolina Water Quality Association

Agency Members
Abbeville, City of
Bamberg Board of Public Works
Beaufort Jasper Water & Sewer Authority
Berkeley County Water & Sanitation
Broad Creek Public Service District
Camden, City of
Charleston Water System
Chester County Wastewater Recovery
Columbia, City of
Dorchester County Water & Sewer
Easley Combined Utilities
Florence, City of
Georgetown County Water and Sewer District
Grand Strand Water & Sewer Authority
Greer CPW
Hilton Head Public Service District
Isle of Palms Water and Sewer Commission
Kiawah Island Utility Inc.
Lancaster County Water & Sewer District
Laurens County Water & Sewer Commission
Moncks Corner Water Works
Mount Pleasant Waterworks
Newberry, City of
North Charleston Sewer District

North Myrtle Beach, City of
Renewable Water Resources
Richland County Utilities
Rock Hill Public Utilities
Saluda County Water & Sewer Authority
South Island Public Service District
Spartanburg Water
Sullivan's Island, Town of
Summerville Commissioners of Public Works
T.J. Barnwell Utility, Inc.
York, City of

Consultant Members
AECOM
Black & Veatch
Brown and Caldwell
CDM Smith
Davis & Brown
Davis & Floyd, Inc.
Goodwyn, Mills and Cawood, Inc.
Hazen and Sawyer
HDR, Inc.
Hulsey McCormick & Wallace, Inc.
Jacobs
Keck & Wood, Inc.
Synagro
Thomas & Hutton Engineering
Water Environment Consultants, LLC
Weston & Sampson Engineers, Inc.
Wiedeman & Singleton, Inc.
WK Dickson & Co., Inc.

Affiliate Members
Anderson Regional Water
Chesterfield County Rural Water Co., Inc.
Greenville Water
Joint Municipal Water & Sewer Commission
South Carolina Rural Water Association

Virginia Association of Municipal Wastewater Agencies

Agency Members
Alexandria Renew Enterprises
Arlington County
Augusta County Service Authority
Blacksburg-VPI Sanitation Authority
Chesterfield County
Christiansburg, Town of
Coeburn-Norton-Wise Regional Wastewater Treatment Authority
Culpeper, Town of

Danville, City of
Fairfax County
Frederick Water
Frederick-Winchester Service Authority
Front Royal, Town of
Hampton Roads Sanitation District
Hanover County
Harrisonburg-Rockingham Regional Sewer Authority
Henrico County
Hopewell Water Renewal
Leesburg, Town of
Loudoun Water
Lynchburg, City of
Martinsville, City of
Pepper's Ferry Regional Wastewater Treatment Authority
Prince William County Service Authority
Richmond, City of
Rivanna Water and Sewer Authority
South Central Wastewater Authority
Spotsylvania County
Stafford County
Upper Occoquan Service Authority
Waynesboro, City of
Western Virginia Water Authority
Winchester, City of

Associate Agency Members
Amherst County Service Authority
Amherst, Town of
Bedford Regional Water Authority
Bowling Green, Town of
Buena Vista, City of
Campbell County
Caroline County
Colonial Beach, Town of
Culpeper County
D.C. Water
Dinwiddie County Water Authority
Fauquier County Water and Sanitation Authority
Fredericksburg, City of
Goochland County
Halifax County Service Authority
Henry County Public Service Authority
Kilmarnock, Town of
Louisa County Water Authority
Maury Service Authority
Montgomery County Public Service Authority
New Kent County
Onancock, Town of
Powhatan County
Purcellville, Town of
Rapidan Service Authority

Shenandoah County
Strasburg, Town of
Sussex Service Authority
Tappahannock, Town of
Warsaw, Town of
Wise County PSA
Woodstock, Town of

Consultant Members
ARCADIS
Black & Veatch
CDM Smith
Dewberry Engineers
Greeley and Hansen
Hazen and Sawyer
Jacobs
O'Brien & Gere Engineers, Inc.

Associate Consultant Members
AECOM
Brown and Caldwell
CHA Consulting, Inc.
Clyde Wilber LLC
Draper Aden Associates
Energy Systems Group
GHD
HDR Engineering, Inc.
Johnson, Mirmiran & Thompson
Kimley-Horn & Associates, Inc.
Mangrum Consulting & Design
McGill Associates, P. A.
Pennoni Associates, Inc.
Perrow Consulting Services
Ramboll
RK&K
Stantec
Thrasher Group, Inc.
Timmons Group
Trane
Whitman, Requardt & Associates, LLP
Wiley|Wilson
WW Associates, Inc.

West Virginia Municipal Water Quality Association

Agency Members
Barboursville, Village of
Beckley Sanitary Board
Bluefield Sanitary Board
Bluewell PSD
Boone County PSD

Bridgeport, City of
Buckhannon Sanitary Board
Charleston Sanitary Board
Clarksburg Sanitary Board
Fairmont, City of
Fayetteville, Town of
Follansbee, City of
Greater Harrison County PSD
Huntington Water Quality Board
Hurricane, City of
Kenova, City of
Martinsburg, City of
Morgantown Utility Board
Moundsville Sanitary Board
New Martinsville, City of
Parkersburg Utility Board
Philippi, City of
Princeton Sanitary Board
Sun Valley PSD
Vienna, City of
Weston Sanitary Board
Wheeling Water Department
Wheeling Water Pollution Control Division
Williamstown Public Works
Town of Worthington

Consultant Members

Burgess & Niple
Civil & Environmental Consultants, Inc.
CT Consultants, Inc.
Potesta & Associates
Strand Associates, Inc.
The Thrasher Group

Associate Consultant Members

CENTEC Engineering, PLLC

EXHIBIT 2

DECISION DOCUMENT ENCLOSURE

BACKGROUND

Statutory and Regulatory Background

Section 303(c) of the Clean Water Act (CWA, 33 U.S.C. 1313(c)) directs states to adopt WQS for their navigable waters. Section 303(c)(2)(A) and the EPA's implementing regulations at 40 C.F.R. § 131 require, among other things, that state WQS include the designated use or uses to be made of the waters and criteria that protect those uses. Water quality criteria "are elements of state WQS, expressed as constituent concentrations, levels or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use." 40 C.F.R. § 131.3(b).

States have a primary role in adopting WQSs. The EPA has an oversight role. In this role, the EPA must determine whether the state's WQS are consistent with the Act's requirements. CWA Section 303(c)(3). The EPA's review is based on "the requirements of Act as described in 40 C.F.R. §§ 131.5 and 131.6." 40 C.F.R. §131.21(b).

For water quality criteria, the EPA's review involves a determination of whether the state-adopted criteria are consistent with 40 C.F.R. § 131.11. 40 C.F.R. § 131.5(a)(2). Section 131.11(a)(1) provides that states shall "adopt those water quality criteria that protect the designated use" and that 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. "When adopting criteria, a state must "take into consideration the WQSs of downstream waters and shall ensure that its WQSs provide for the attainment and maintenance of the WQSs of downstream waters." 40 C.F.R. § 131.10(b).

The EPA also considers whether the state "followed applicable legal procedures for revisiting or adopting standards." 40 C.F.R. § 131.5(a)(6). This includes consideration of whether the state held a public hearing consistent with 40 C.F.R. § 131.20(b).

The EPA's regulations provide that the state must submit for review the new or revised water quality criteria, methods used and analyses conducted to support such criteria, and a certification that such criteria were duly adopted pursuant to state law. 40 C.F.R. § 131.6(b), (c), and (e).

If the EPA determines that the state's new or revised WQS is not consistent with the Act's requirements, it shall notify the state of the disapproval and "specify the changes to meet such requirements." CWA Section 303(c)(3).

Nutrient Criteria

Under CWA Section 304(a), the EPA periodically publishes criteria recommendations for use by states in setting water quality criteria for particular parameters to protect the designated uses for their surface

waters. States have the option of adopting water quality criteria based on the EPA's CWA Section 304(a) criteria guidance, section 304(a) criteria guidance modified to reflect site-specific conditions, or other scientifically defensible methods. (*See* 40 C.F.R. § 131.11(b)(1)). For nitrogen and phosphorus pollution, the EPA finalized in 2001-2002 numeric nutrient criteria recommendations (*i.e.*, total nitrogen, total phosphorus, chlorophyll *a*, and turbidity) for lakes and reservoirs, and for rivers and streams, for most of the aggregated Level III Ecoregions in the United States. These were based on the EPA's previously published series of peer-reviewed, water body specific technical guidance manuals regarding the development of numeric criteria for lakes and reservoirs (USEPA 2000a) and rivers and streams (USEPA 2000b). States are not required by the CWA to adopt numeric nutrient criteria, although many states have done so to address nutrient pollution.

The EPA has long recommended that states adopt numeric criteria for total nitrogen (TN) and total phosphorus (TP), nutrients that in excess can ultimately cause adverse effects on designated uses (USEPA 2000a and USEPA 2000b). For this reason, TN and TP are often referred to as "causal" parameters. However, the EPA recognizes that the specific levels of TN and TP that adversely affect designated uses, including harm to aquatic life as indicated by various measures of ecological responses, may vary from waterbody to waterbody, depending on many factors, including geomorphology and hydrology among others. As a result, the EPA has worked with several states as they developed a combined criterion approach that allows a state to further consider whether a waterbody is meeting designated uses when elevated TN and TP levels are detected. Under this approach, an exceedance of a causal variable acts as a trigger to consider additional physical, chemical and biological parameters that serve as indicators to determine protection or impairment of designated uses; these additional parameters are collectively termed "response" parameters. The EPA's articulation of this combined criterion approach[1] is intended to apply when states wish to rely on response parameters to determine whether a designated use is impaired (USEPA 2013). A combined criterion can include both numeric and narrative components, as long as they collectively protect the designated use.

Missouri 2009 Submission and the EPA's 2011 Disapproval

On November 5, 2009, the EPA received Missouri Department of Natural Resources' (MDNR) WQS submission for review. On August 16, 2011, the EPA disapproved most of the State's total phosphorus (TP), total nitrogen (TN) and chlorophyll *a* criteria for lakes and reservoirs because the criteria were not based on sound scientific rationale and failed to demonstrate how the criteria would protect the designated uses. The EPA's decision document specified the following changes pursuant to CWA Section 303(c)(3): "The state must revise the criteria to clearly indicate which designated uses the criteria is intended to protect as well as supporting documentation to indicate that the criteria in fact will fully support the associated use. Additionally, supporting documentation needs to include the raw data and resulting statistical analyses so that the EPA may evaluate the soundness of the scientific rationale and protectiveness of the criteria pursuant to the requirement found at 40 CFR 131.11(a)(1)." The EPA's 2011 disapproval also provided additional guidance to MDNR as it considered how to address the EPA's specified changes and recognized that the state may want to modify the criteria beyond the original framework that may require different supporting analyses (USEPA 2011, *See* page 28). In an

[1] This approach is sometimes referred to as a "bioconfirmation" approach despite the fact that response parameters may not all be "biological," although they typically do reflect biological activity.

April 18, 2014 letter to MDNR, the EPA noted a citation error in its August 16, 2011 disapproval letter. The EPA's April 18, 2014 letter explained that references in the August 16, 2011 letter to 10 CSR 20-7.031(**3**)(N) should have been 10 CSR 20-7.031(**4**)(N).

Lawsuit and Consent Decree

On February 24, 2016, the Missouri Coalition for the Environment (MCE) sued the EPA alleging that the EPA failed to perform its mandatory duty under the CWA Section 303(c) to propose criteria for Missouri following its disapproval. The EPA signed a consent decree with MCE setting deadlines for EPA to act. Under the terms of the consent decree entered by the court on December 1, 2016, the "EPA shall sign a notice of proposed rulemaking by December 15, 2017 that proposes new or revised WQSs addressing EPA's August 16, 2011 disapproval of 10 CSR 20-7.031(3) Specific Criteria (N) Nutrients and Chlorophyll (except for the lakes listed on Table M), as set forth in section 4.B found on pages 27-29 of the attachment to the August 16, 2011 Letter." The EPA signed a notice of proposed rulemaking on December 15, 2017, pursuant to the December 1, 2016 consent decree obligation. 82 Fed. Reg. 61,213 (December 27, 2017). Under Paragraph 6 of the consent decree, the EPA must sign a notice of final rulemaking on or before December 15, 2018, regarding its proposed rulemaking. The decree provides that "[t]he requirements of Paragraph 6 shall not apply if on or before December 15, 2018, the state of Missouri has submitted new or revised WQSs addressing EPA's August 16, 2011 disapproval of 10 CSR 20-7.031(4) Specific Criteria (N) Nutrients and Chlorophyll (except for the lakes listed on Table M), and EPA has approved such standards. Any such approval by EPA shall be in writing and signed by the EPA official with the authority to make such approval."

MDNR's Nutrient Criteria Submission

The State's rule was adopted by the Missouri Clean Water Commission on January 4, 2018. On April 13, 2018, MDNR submitted its WQS package to the EPA. The submission included: (1) memo from the Missouri Attorney General's Office certifying that the revised WQSs were duly adopted pursuant to State law, (2) copy of the October 16, 2017, Missouri Register containing the Proposed Rule amendment; (3) transcript of the public hearing held on November 21, 2017; (4) redline version of the proposed rule as adopted by the Missouri Clean Water Commission at its January 4, 2018, meeting; (5) copy of the March 15, 2018, Missouri Register containing the Order of Rulemaking; and (6) copies of the comments received during the public notice period of the proposed rule and additional data, information and reports in support of the WQS submittal. The EPA Region 7 office received the package on April 17, 2018, triggering review under CWA Section 303(c)(2)(A). The EPA also received supplemental information from the State after its initial submission. These items satisfy the requirements of 40 C.F.R. §§ 131.6(e), 131.20(b), 131.5(a)(6), 131.6(b), and 131.6(f) regarding certification by the State Attorney General that the WQS were duly adopted pursuant to State law, holding a public hearing when revising WQS, whether the State has followed applicable legal procedures, methods used and analyses conducted to support WQS revision, and information on general policies which may affect WQS application and implementation. The requirements of 40 C.F.R. § 131.6(c) regarding water quality criteria sufficient to protect the use are discussed below.

MDNR'S NUTRIENT CRITERIA APPROACH - 10 CSR 20-7.031(5)(N)

The state of Missouri's nutrient criteria applies to lakes and reservoirs that have an area of at least ten acres during normal pool conditions and are located outside the Big River Floodplain ecoregion. Missouri also submitted GIS shape files that define exactly where the nutrient criteria apply. These files show that the tributary arms and their polygons have the same waterbody identification number and waterbody name as the main lake and refer to Table G. Because the Lake of Ozarks and Table Rock Lake appear on Table G, MDNR's the nutrient criteria extend to the tributary arms Grand Glaze, Gravois and Niangua of the Lake of the Ozarks and tributary arms James River, Kings River and Long Creek of Table Rock Lake as provided by 10 CSR 20-7.031(5).

The state's lakes and reservoirs are impounded and have been assigned an aquatic life use of either: warm water habitat, cool-water habitat or cold-water habitat. Each subcategory is defined as "waters in which naturally-occurring water quality and habitat conditions allow [for] the maintenance of a wide variety of [warm, cool or cold water] biota."[2] Missouri's rule establishes three ecoregions and sets forth for each ecoregion chlorophyll *a* "response impairment thresholds" (which serve essentially as stand-alone criteria) above which waters would be deemed impaired, and a combination of TN, TP, and chlorophyll *a* "nutrient screening values" and five "response assessment endpoints" (*i.e.*, response parameters) where a waterbody would be deemed impaired if at least one nutrient screening value and at least one response assessment endpoint are exceeded in the same year. In pertinent part, the State's submission includes the following rule language (State rule language in italics; EPA commentary in regular text):

> *1. Definitions.*
>
> *A. For the purposes of these criteria, all lakes and reservoirs shall be referred to as "lakes."*
> *B. Lake ecoregions—Due to differences in watershed topography, soils, and geology, nutrient criteria for lakes and reservoirs will be determined by the use of four (4) major ecoregions based upon dominant watershed ecoregion. These regions were delineated by grouping the ecological subsections described in Nigh and Schroeder, 2002, Atlas of Missouri Ecoregions, as follows: (I) Plains: OP1 – Scarped Osage Plains; OP2 – Cherokee Plains; TP2—Deep Loess Hills; TP3—Loess Hills; TP4— Grand River Hills; TP5—Chariton River Hills; TP6—Claypan Till Plains; TP7—Wyaconda River Dissected Till Plains; TP8— Mississippi River Hills; (II) Ozark Border: MB2a—Crowley's Ridge Loess Woodland/Forest Hills; OZ11—Prairie Ozark Border; OZ12—Outer Ozark Border; OZ13—Inner Ozark Border; (III) Ozark Highland: OZ1—Springfield Plain; OZ2—Springfield Plateau; OZ3— Elk River Hills; OZ4—White River Hills; OZ5—Central Plateau; OZ6—Osage River Hills; OZ7—Gasconade River Hills; OZ8— Meramec River Hills; OZ9—Current River Hills; OZ10—St. Francois Knobs and Basins; OZ14—Black River Ozark Border; and (IV) Big River Floodplain: MB1—Black River Alluvial Plain; MB2b—Crowley's Ridge Footslopes and Alluvial Plains; MB3—St. Francis River Alluvial Plain; MB4, OZ16, TP9—Mississippi River Alluvial Plain; OZ15, TP1—Missouri River Alluvial Plain.*

[2] 10 CSR 20-7.031(1)(C)1.A.VI, B.V and C.V.

MDNR should consider a regulatory revision to Table G that would reflect the ecoregion to which each lake is classified so citizens of the state can easily determine which criteria applies to particular lakes. Online access to Nigh and Schroeder's Atlas of Missouri Ecoregions appears to require downloading a large zip file and may not be possible with a standard personal computer.

> *C. Nutrient Criteria—Nutrient criteria represent the desired condition for a water body necessary to protect the designated uses assigned in rule.*
> *(I) Lake Ecoregion Criteria—A decision framework that integrates causal and response parameters into one WQS that accounts for uncertainty in linkages between causal and response parameters.*
> *(a) Response Impairment Thresholds—Maximum ambient concentrations of chlorophyll-a (Chl-a) that are based on annual geometric means of samples collected May through September with an allowable exceedance frequency of one in three (1-in-3) years for lakes that have not been assigned site-specific criteria.*
> *(b) Nutrient Screening Thresholds—Maximum ambient concentrations of total phosphorus (TP), total nitrogen (TN), and Chl-a that are based on the annual geometric mean of samples collected May through September. Nutrient screening thresholds represent causal and response parameter concentrations, above which an exceedance in any one year warrants further evaluation of Response Assessment Endpoints.*
> *(c) Response Assessment Endpoints—Narrative and numeric biological response endpoints that link directly to designated use impairment.*
> *(II) Lake Site-Specific Criteria— Maximum Ambient Concentrations of TP, TN, or Chl-a that are based on the geometric mean of a minimum of three (3) years of data and the characteristics of the waterbody.*
>
> *2. This rule applies to all lakes that are waters of the state and have an area of at least ten (10) acres during normal pool condition. Big River Floodplain lakes shall not be subject to these criteria.*
>
> *3. Response Impairment Thresholds are listed in Table L. Nutrient Screening Thresholds are listed in Table M. Lake Site-Specific Criteria for TP, TN, and Chl-a are listed in Table N. Additional lake site-specific criteria may be developed in accordance with subsection (5)(S) to account for the unique characteristics of the waterbody that affect trophic status, such as lake morphology, hydraulic residence time, temperature, internal nutrient cycling, or watershed contribution from multiple ecoregions.*

Section (5)(S) referenced in the above provision is existing language within the state's WQS. The remainder of this provision references the location of the tables which contain the values for Response Impairment Thresholds and the Nutrient Screening Thresholds, as well as Site Specific Criteria which the EPA previously approved in 2011. The EPA previously approved the Site-Specific Criteria found in Table N which has simply been renamed from the version the EPA previously approved in 2011 as 10 CSR 20-7.031 (4) Specific Criteria (N) Nutrients (3), Table M. The EPA is approving the renaming of this table as a non-substantive change (USEPA 2012a).

> *4. All TP, TN, and Chl-a concentrations must be calculated as the geometric mean of a minimum of four (4) representative samples per year for one (1) year for purposes of*

comparison to lake ecoregion criteria thresholds. All samples must be collected from the lake surface, near the outflow of the lake, and during the period May 1 – September 30.

The above provision (4) refers to a geometric mean calculation and a seasonality component, both of which are attributes of a WQS as duration and frequency components of a water quality criterion. However, these aspects are already described in the definitions above in provision (1)(C)[3]. What's left in provision (4) is a requirement for four representative samples per year and sample collection location specification, neither of which is a component of a water quality criterion that describes the desired condition or instream level of protection (see USEPA 2012a for a discussion of how the EPA generally evaluates whether provisions of State law are new or revised WQS requiring EPA review under the CWA). As such, provision (4) is not a WQS applicable for CWA purposes. It may apply for State law purposes.

5. Lakes with water quality that exceed Response Impairment Thresholds or Lake Site-Specific Criteria identified in Tables L and N are to be deemed impaired for excess nutrients.

6. Lakes are to be deemed impaired for excess nutrients if any of the following Response Assessment Endpoints are documented to occur within the same year as an exceedances of Nutrient Screening Thresholds in Table M. The department shall collect information on Response Assessment Endpoints concurrently with collection of Nutrient Screening Threshold parameters. The department shall determine attainment of Nutrient Criteria during the biennial assessment of Missouri waters.

The sentence, "The department shall collect information on Response Assessment Endpoints concurrently with collection of Nutrient Screening Threshold parameters" ensures that the combined nutrient criteria are designed so that a determination of attainment of WQS, the desired condition, will be based on a full set of information. The EPA thus concludes that this sentence is a component of the new WQS. (See USEPA 2012a for a discussion of how the EPA generally evaluates whether provisions of state law are new or revised WQS requiring EPA review under the CWA.) The following sentence, "The department shall determine attainment of Nutrient Criteria during the biennial assessment of Missouri waters" is merely an expression of the State's commitment to the biennial assessment and is not itself an expression of desired condition of level of protection, and thus is not considered a WQS under the CWA.

MDNR's rule also provides Response Assessment Endpoints, Response Impairment Threshold Values and Nutrient Screenings Threshold Values as follows:

1. Occurrence of eutrophication-related mortality or morbidity events for fish and other aquatic organisms;

2. Epilimnetic excursions from dissolved oxygen or pH criteria;

[3] For the Lake Ecoregion Criteria, the Response Impairment Thresholds have an annual duration, from which a seasonal geometric mean is calculated, and the frequency is no more than one exceedance of the magnitude and duration (which is annual) over a three-year period. The Nutrient Screening Thresholds likewise have an annual duration, above which an exceedance in any one year warrants further evaluation of Response Assessment Endpoints.

3. Cyanobacteria counts in excess of one hundred thousand (100,000) cells per milliliter (cells/mL);

4. Observed shifts in aquatic diversity attributed to eutrophication; and

5. Excessive levels of mineral turbidity that consistently limit algal productivity during the period May 1 – September 30.

Table L: Lake Ecoregion Chl-a Response Impairment Threshold Values (µg/L)

Lake Ecoregion	Chl-a Response Impairment Thresholds
Plains	30
Ozark Border	22
Ozark Highland	15

Table M: Lake Ecoregion Nutrient Screening Threshold Values (µg/L)

Lake Ecoregion	Nutrient Screening Thresholds		
	TP	TN	Chl-a
Plains	49	843	18
Ozark Border	40	733	13
Ozark Highland	16	401	6

BASIS FOR THE EPA'S APPROVAL OF THE WQS IN 10 CSR 20-7.031(5)(N)

The EPA's review of Missouri's nutrient criteria involved a unique circumstance where MDNR was engaged in its rulemaking process to adopt nutrient criteria and the EPA issued a proposed rule (pursuant to the consent decree) and sought public comments during the same period. The EPA's December 2017 proposal requested comments on two alternatives, including one alternative that reflected the Missouri's October 2017 proposal under consideration by MDNR at the time. 82 Fed. Reg. at 61,213. The EPA also included another alternative that used a different methodology to derive the criteria values and a few other distinguishing features. 82 Fed. Reg. at 61,220-25. Importantly, the EPA acknowledged that "the alternatives in the current proposal are not the only possible options that EPA could promulgate or Missouri could adopt to address the 2011 disapproval action" and took comments on additional alternative approaches that were considered. 82 Fed. Reg. at 61,225. The nutrient criteria MDNR ultimately adopted were similar to its October 2017 proposal with a few changes.

Given this unique circumstance, the EPA reviewed and considered the documents submitted by MDNR, including public comments submitted during its rulemaking and the public comments the EPA received in response to its December 27, 2017 proposed rule notice in making today's decision. The EPA's discussion below and attached appendix addresses the significant issues raised in these documents and

public comments and the basis for the EPA's determination that MDNR's nutrient criteria satisfy all applicable CWA requirements. MDNR submitted sufficient information to evaluate their criteria as required by 40 C.F.R. §§ 131.5 and 131.6. As described below, MDNR relied primarily on scientific literature and established correlations between chlorophyll *a* and TN and TP. Because MDNR elected not to use a reference condition or modeling approach in its final submittal, it was not required to address the request to submit raw data and resulting statistical analyses described in the EPA's 2011 disapproval letter. The Missouri's 2018 submission for its nutrient criteria satisfied the EPA's requirement to submit "methods used and analyses conducted" so that the EPA could ultimately determine whether the resulting criteria are based on a sound scientific rationale.

The EPA's 2011 disapproval specified that the "[s]tate must revise the criteria to clearly indicate which designated uses the criteria is intended to protect as well as supporting documentation to indicate that the criteria in fact will fully support the associated use." MDNR submitted nutrient criteria for all classified lakes and reservoirs (hereafter "lakes") in Missouri that (1) are listed in Table G of the state's WQS regulations and the Missouri Use Designation Dataset (10 CSR 20-7.031(2)(E)) with respect to use designations, (2) equal or exceed ten acres, (3) are located outside of the Big River Flood Plain Ecoregion, and (4) are not already listed in Table M of the state's WQS regulations. MDNR also submitted a supporting rationale document, entitled *Rationale for Missouri Lake Numeric Nutrient Criteria, December 2017* (hereafter "Rationale document").[4] MDNR structured its nutrient criteria as a combined criterion approach applied on an ecoregional basis to three ecoregions: the Plains, Ozark Border and Ozark Highland. In the Rationale document, Missouri explains that its criteria are intended to protect the aquatic life use, deciding "that the focus of the current effort would be AQL [aquatic life] criteria." This addresses the issue of which designated use Missouri is intending to protect. Although MDNR's WQSs indicate that nutrient criteria "represent the desired condition for a water body necessary to protect the designated uses assigned in rule," it is clear from MDNR's record of adoption that the specific derivation and protections provided are with respect to aquatic life uses. As described below, applicable general criteria in narrative format remain in place to protect drinking water supply and recreational designated uses.

All lakes in Missouri are designated for aquatic life protection and recreation, and a subset of lakes are also designated for drinking water supply. The EPA's regulations at 40 C.F.R. § 131.11(a) require that criteria support the most sensitive use. The EPA's regulations at 40 C.F.R. § 131.11(b) specify that states should establish criteria as 1) numerical values and 2) narrative criteria where numerical criteria cannot be established or to supplement numerical criteria.

MDNR's Criteria Support the Most Sensitive Use and Downstream WQSs

When evaluating whether a state's new or revised criteria protect the most sensitive use for purposes of 40 C.F.R. § 131.11(a), the EPA interprets and implements its regulation at 40 C.F.R. § 131.11(a) to consider whether "criteria" are holistically protective. In other words, the set of adopted criteria, which may include both numeric and narrative criteria, are taken as a whole to protect the most sensitive use.

[4] Missouri Department of Natural Resources. *Rationale for Missouri Lake Numeric Nutrient Criteria*. December 2017. Available at: https://dnr.mo.gov/env/wpp/rules/docs/mo-lake-nnc-rationale-dec-2017-final.pdf

For example, the EPA recommends that states adopt separate criteria for individual pollutants to protect aquatic life itself and to protect people when consuming the aquatic life (in operation, these endpoints may be encompassed in the same aquatic life use or, as Missouri does,[5] may be separated into distinct aquatic "habitat" and "human health protection" uses). Taken together, these criteria collectively protect the most sensitive use (either aquatic life itself or consumption of aquatic life by people), but their relative stringency may differ markedly. For many pollutants, there are insufficient data to derive criteria for both aquatic life and human health protection. The EPA does not consider the lack of consideration of one endpoint (*e.g.*, aquatic life or human health) in a numerical criterion to be a violation of 40 C.F.R. § 131.11(a) with respect to protecting the most sensitive use. Rather, the EPA would consider other elements of WQSs, such as narrative criteria, to provide the necessary protection of designated uses.

The Fourth Circuit in *Natural Resource Defense Council v. U.S. EPA* upheld the EPA's interpretation and implementation of its regulations to consider narrative and numeric criteria holistically when evaluating whether criteria together protect the most sensitive use. 16 F.3d 1395, 1404-05 (4th Cir. 1993). The court considered the term "criteria" in the statute and regulations and concluded that "where multiple uses are designated for a body of water, there may be multiple criteria applicable to it, as long as the criteria support the most sensitive use of that particular body of water." *Id.* at 1405. In that case, the court upheld the EPA's approval of numeric dioxin criteria for both Virginia and Maryland where the EPA evaluated whether the numeric criteria would protect the states' intended human health use, acknowledged that dioxin may have adverse effects on aquatic life, and concluded that the application of the states' "existing, separate narrative criteria protecting such aquatic life and wildlife could require more stringent controls in some cases than would be required through use of the human health criteria alone." *Id.* The court rejected the claim that "[s]tates have an obligation under the CWA or its accompanying regulations to adopt a single numeric criterion to protect against all identifiable effects to human health, aquatic life and wildlife." *Id.*

Consistent with its interpretation of 40 C.F.R. § 131.11(a), the EPA advised MDNR during its initial development of numeric nutrient criteria that "MDNR needs to consider all uses for which Missouri's lakes are designated and to develop criteria that are protective for all uses for which *adequate data and scientific information exist*" (USEPA 2016) (emphasis added). Under the EPA's regulations, a state's numeric criteria may be based on the EPA's 304(a) guidance or "other scientifically defensible methods." 40 C.F.R. § 131.11(b). For numeric nutrient criteria, the EPA recognizes that states have options when deciding what methodology to use and recognizes that a state's selected methodology may require different information and data. *See* 82 Fed. Reg. at 61,216-17.

Here, MDNR's drinking water supply use is defined as "Maintenance of a raw water supply which will yield potable water after treatment by public water treatment facilities." 10 CSR 20.7.031(1)(C)(6). The EPA advised MDNR during its initial development of numeric nutrient criteria that the department should evaluate "(a) available scientific reports addressing the effects of eutrophication on the prevalence of disinfection byproducts and taste/odor producing compounds in finished drinking water, and (b) the potential effects of algal toxins on sensitive human subpopulations (*e.g.*, children under six of age)" (USEPA 2016). This type of information is necessary for purposes of deriving criteria to protect Missouri's drinking water supply use because harmful algal blooms (*e.g.*, cyanobacteria that produce

[5] *See* Missouri Code of State Regulations 10 CSR 20-7.031(1)(c)

cyanotoxins) can endanger drinking water supply first by potentially contaminating improperly-treated drinking water with cyanotoxins and second, by increasing the amount of organic matter that can cause elevated levels of disinfection byproducts when treated in the drinking water facility (Falconer and Humpage 2005; Zamyadi et al. 2012).

In response, MDNR had considered developing a numerical criterion for protecting drinking water, provisionally considering a value of 25 µg/L for chlorophyll *a* based on analyses of available microcystin data in Missouri's lakes and a review of disinfection byproducts information from Missouri drinking water treatment plants. However, as explained in its Rationale document, MDNR considered the existing information relating to microcystin (a type of cyanotoxin) and determined that the existing information was inadequate for purposes of deriving nutrient criteria (MDNR 2017). MDNR is in the process of collecting additional data, including data for additional toxins other than microcystin, and believes that "additional data will help clarify the extent of algal toxins in Missouri's lakes, and combined with continued improvements in our understanding of both the factors that drive toxin production and the efficiencies of treatment in removing algal toxins from source water, will allow the state to better address drinking water protection during a future rulemaking." *Id.* Because EPA has not published 304(a) recommended criteria, nor provided specific guidance tailored to protect a drinking water supply use, the Agency supports Missouri's position that it needs to collect more data and conduct further analysis before establishing numeric expressions for nutrients in their WQSs. This is a matter of evolving science. As indicated in a recent document developed by the Interagency Working Group on the Harmful Algal Bloom and Hypoxia Research and Control Act, the EPA is itself "developing, in collaboration with states, Lake Numeric Nutrient Criteria that will inform how phosphorus and nitrogen concentrations contribute to HABs and drinking and recreational water criteria and swim advisories" (D'Anglada et al. 2018).

Missouri's whole-body contact use is defined as "[a]ctivities involving direct human contact with waters of the state to the point of complete body submergence. The water may be ingested accidentally and certain sensitive body organs, such as the eyes, ears, and the nose, will be exposed to the water. Although the water may be ingested accidentally, it is not intended to be used as a potable supply unless acceptable treatment is applied. Waters so designated are intended to be used for swimming, water skiing, or skin diving." 10 CSR 20.7.031(1)(C)(2)(A). The kind of information that are needed to derive numeric nutrient criteria specific to protect recreational uses may include studies on the effects of cyanotoxins on recreational uses. MDNR reviewed the existing information regarding recreational uses and determined that "[r]esearch and information continue to develop at the national level with respect to nutrient impacts and criteria for the protection of recreational uses. Missouri intends to pursue numeric nutrient criteria for recreational designated uses during a future rulemaking. This effort will allow studies currently underway by EPA and others on the effects of cyanotoxins on recreational uses to mature, and for the state to conduct user perception surveys of algae by the recreating public" (MDNR 2017).

After considering the relevant data and its record, the EPA has determined that MDNR's decision to focus its numeric nutrient criteria on the protection of applicable aquatic life uses at this time and defer development of numeric criteria specifically tailored to protect recreation and drinking water supply is reasonable. Given the circumstances here (*i.e.*, that the nutrient criteria are intended to implement what a "wide variety of biota" means for manmade lakes, and the lack of data and information relating to other

designated uses), it is difficult to definitively identify the most sensitive use. That said, the EPA has determined that to the extent aquatic life uses are the most sensitive use, the numeric nutrient criteria will provide sufficient protection, and to the extent it becomes evident that water supply or recreational uses are the most sensitive use, MDNR can rely on their existing general criteria.

Importantly, Missouri has existing general criteria in narrative form that can be interpreted to prevent harm to the drinking water supply and whole body contact recreational uses should conditions warrant in the interim. Scum, floating surface debris, unsightly color, turbidity and offensive odor are characteristics associated with blooms of cyanobacteria, which are a response to elevated levels of nutrients. As described above, the presence of cyanobacterial blooms can endanger the drinking water supply designated use first by producing cyanotoxins that may potentially contaminate improperly-treated drinking water, and second, by increasing the amount of organic matter that can cause elevated levels of disinfection byproducts when treated in the drinking water facility. The presence of cyanobacterial blooms may also pose a threat to recreational designated uses, as the cyanotoxins that can be produced by cyanobacteria can have serious human health impacts.

Missouri's adopted specific narrative criterion to protect lakes with a drinking water use provides that "the taste- and odor-producing substances shall be limited to concentrations that will not interfere with the production of potable water by reasonable water treatment processes." 10 CSR 20-7.031(5)(E). In addition, Missouri has numerous general narrative criteria that can be interpreted to protect either the applicable drinking water use and recreational use to prevent the potential harms discussed above. In particular, Missouri's General Criteria at 10 CSR 20-7.031(4) states [emphasis added]:

> *(A) [W]aters shall be free from substances in sufficient amounts to . . . prevent full maintenance of beneficial uses;*
> *(B) Waters shall be free from oil, **scum**, and **floating debris** in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses; and*
> *(C) Waters shall be free from substances in sufficient amounts to cause **unsightly color** or **turbidity**, **offensive odor**, or prevent full maintenance of beneficial uses.*
> *(D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life; and*
> *(E) There shall be no significant human health hazard from incidental contact with the water.*

For these reasons, MDNR's existing narratives sufficiently address the types of harm excess nutrients may present to lakes designated for drinking water supply and recreational uses and are available to MDNR if site-specific numeric translations become necessary to protect such uses beyond the protection provided by 10 CSR 20-7.031(5)(N). As is the case with all states, the EPA is available to work with Missouri, as additional data and information become available, to support state efforts to develop numeric nutrient criteria for recreation and drinking water supply uses.

Missouri WQSs also include a general criterion addressing protection of downstream waters: "Waters shall maintain a level of water quality at their confluences to downstream waters that provides for the attainment and maintenance of the WQSs of those downstream waters, including waters of another state." 10 CSR 20-7.031(4)(E). This provision is available to MDNR if site-specific numeric translations

become necessary to protect downstream standards beyond the protection provided by 10 CSR 20-7.031(5)(N). This provision addresses the requirements of 40 C.F.R. § 131.10(b) regarding downstream protection. It is comparable to the narrative provisions the EPA suggests states use for this purpose (*See* https://www.epa.gov/wqs-tech/templates-narrative-downstream-protection-criteria-state-water-quality-standards).

MDNR's Nutrient Criteria Protect the Aquatic Life Uses and are based on Sound Scientific Rationale

The EPA's regulations at 40 C.F.R. § 131.11(a) specify that criteria must be based on a sound scientific rationale and must protect the designated use. In establishing designated uses, states are directed to consider the use and value of water for, among others, aquatic life uses consistent with "protection and propagation of fish, shellfish, and wildlife." 40 C.F.R. § 131.10; 80 Fed. Reg. 51020, 51024 (August 21, 2015). States have significant latitude in how they may specify and describe their designated uses (USEPA 2012b). Through its criteria development methodologies, EPA generally recommends that states consider protection of a broad spectrum of species that are expected to occur in their waters (USEPA 2017a).

MDNR's Aquatic Life Uses Defined

Missouri defines its applicable aquatic life uses as "waters in which naturally-occurring water quality and habitat conditions allow the maintenance of a wide variety of [warm, cool or cold water] biota," depending on the specific habitat use.[6] There are no lakes designated as cool water habitat and only four designated as cold water habitat, all in the Ozark Highlands ecoregion: Lake Taneycomo, Bull Shoals Lake, East Arrowhead Lake and West Arrowhead Lake. The rest of the lakes covered by MDNR's nutrient criteria are designated for warm water habitat aquatic life use. Missouri WQSs describe warm water habitat as "waters in which naturally-occurring water quality and habitat conditions allow the maintenance of a wide variety of warm-water biota" and cold-water habitat as "waters in which naturally-occurring water quality and habitat conditions allow the maintenance of a wide variety of cold-water biota. These waters can support a naturally reproducing or stocked trout fishery and populations of other cold-water species." 10 CSR 20-7.031(1)(C)1.C. Missouri WQSs also contain special protections for Lake Taneycomo: "An especially stringent antidegradation policy will be observed in the development of effluent rules, discharge permits, and nonpoint-source management plans and permits to assure that the high visual quality and aquatic resources are maintained." 10 CSR 20-7.031(10).

Neither Missouri in their rulemaking nor EPA in its proposed rule made a distinction in the expression of nutrient criteria among warm, cool and cold-water habitat designated uses for aquatic life protection. Both MDNR and EPA lack specific data to evaluate whether different or additional protections are needed to protect cold water species in these Missouri lakes. The EPA does not have data that would indicate that Missouri's nutrient criteria would not protect cold water habitat.

[6] Missouri Department of Natural Resources. WQSs Regulations. 10 CSR 20-7.031(1)(C)1.A.VI, B.V and C.V.

MDNR's Nutrient Criteria Approach for Manmade Reservoirs Aligns with the Applicable Aquatic Life Use Definitions

In Missouri, all lakes are manmade reservoirs created by dams on river channels. In past correspondence with MDNR, the EPA has recommended a "reference condition" approach to developing nutrient criteria for Missouri's lakes and EPA proposed an alternative that used that approach. In its Rationale document, MDNR explains that "use of reference conditions is better suited for natural lakes than man-made reservoirs because Missouri's reservoirs were built long after large scale land-cover changes occurred on the landscape." MDNR further says: "Reservoirs are highly managed for purposes that may or may not be well aligned with expectations for a pristine, natural lake" and "[f]urthermore, nutrients in reservoirs are driven by human decisions such as dam height and watershed size, which depend on where the dam is built within the river valley."

Reservoirs that are created by damming rivers tend to have larger watersheds than natural lakes of comparable water surface area (Chapman 1996; Thornton et al. 1981). Because a reservoir typically has one major river inflow, and may also experience periodic withdrawals, the variable water levels may impede the development of a littoral zone (transition zone between open water and land where rooted aquatic plants tend to grow and provide habitat for fish and other aquatic animals) (Chapman 1996; Wetzel 1990 as cited in USGS 2018). As a result, reservoirs generally experience greater nutrient and sediment loading, and greater rates of sedimentation (Thornton et al. 1981; Maavara et al. 2016). These factors may lead reservoirs to have less biological diversity than natural lakes of the same region and comparable size (Wetzel 1990 as cited in USGS 2018; Logez et al. 2016; Schallenberg et al. 2013; Northcote and Atagi 1997).

Although the EPA has recommended a reference condition approach for lakes and reservoirs (USEPA 2000a) and proposed such an approach for Missouri's lakes and reservoirs, the Agency has also recommended other approaches (USEPA 2010a) and acknowledged that Missouri may pursue other approaches. USEPA 2011; 82 Fed. Reg. at 61,225. Missouri has discretion to choose an alternative sound scientific rationale for developing protective criteria, and it is reasonable for Missouri to consider an alternative to a reference condition approach. 40 C.F.R. § 131.11(b).

In its submission and supporting rationale, MDNR made clear it "considers the status of the recreational fishery as an indicator of the reservoir's suitability for aquatic life" for manmade lakes and that its "findings show the health of sport fish populations can be interpreted as an indicator of overall ecosystem health and the presence of a 'wide variety' of aquatic biota, as defined in the existing regulation."[7] After considering the relevant science, MDNR determined that the protection of a healthy sport fish population is an appropriate management endpoint for Missouri's manmade lakes for the protection of aquatic life uses from excess nutrients. MDNR reasoned that sport fish are apex predators, and that water quality and habitat conditions that maintain a healthy sport fish population in manmade lakes would necessarily maintain a wide-variety of warm water, cool, or cold-water biota that serve as a food web community for those fish populations. This reasoning would hold regardless of habitat type, warm or cold.

[7] *See* Missouri Department of Natural Resources, Rationale for Missouri Reservoir Nutrient Criteria Development, November 2016, Section 6.1, pages 33 – 39.

Scientific literature abounds with studies indicating that increased levels of nutrients and primary production (algal growth) measured by chlorophyll *a* are associated with increased biomass of fish, with different levels of productivity favoring certain types of species over others in many cases depending on many other factors affecting habitat (Allen et al. 1988; Bachmann et al. 1996; Bayne et al. 1994; Brucet et al. 2013; Downing et al. 1990; Elliott et al. 1996; Hoyer and Canfield 1996; Maceina & Bayne 2001; Persson et al. 1991; Plante and Downing 1993; Randall et al. 1996; Walker et al. 2007). In its Rationale document, MDNR indicated it considered many of these studies. Both natural and manmade lakes are considered in these studies, but the general findings with respect to productivity are applicable to manmade lakes. Researchers have also described that there are likely limits to lake productivity (meaning algal growth that leads to increased fish biomass), and that at some point increased enrichment (nutrient loading or eutrophication) may lead to loss of productivity as water quality conditions such as dissolved oxygen levels deteriorate[8]; however, these levels appear to be quite high, higher than the levels Missouri has established for either their Response Impairment Thresholds or Nutrient Screening Thresholds (Allen et al. 1999; Bachmann et al. 1996; Bayne et al. 1994; Egertson and Downing 2004; Michaletz et al. 2012; Ney 1996). The upper end of the chlorophyll *a* range in the first five studies cited above were 40, 241, 34, >100, and 114 µg/L, respectively, with no reported limit of productivity reached. Less certain is the effect of increased productivity on species diversity. In general, the literature includes many studies that point to a different mix of species present at different levels of overall productivity.

- Bachmann et al. (1996) studied the growth of fish in 65 Florida lakes that ranged from oligotrophic through hypereutrophic lakes (chlorophyll *a* concentrations 1–241 µg/L). The authors found total standing fish crops of fish positively correlated with chlorophyll *a*, TN, and TP. In this study, increases in trophic state did not result in a decrease in the number of fish species per lake. The recreationally important centrarchids (*e.g.*, largemouth bass, bluegill, crappies) as a group increased in biomass, with only a couple individual species exhibiting lower standing crops or lower proportions with higher trophic states. The authors characterize the results as "centrarchids did not show important changes with trophic state."

- Allen et al. (1998) studied the relationship of increasing productivity and largemouth bass populations in Alabama reservoirs (chlorophyll *a* concentrations ranging 8–40 µg/L). Increased chlorophyll *a* was positively correlated with an increase in juvenile shad (the prey fish) and juvenile largemouth bass.

- Downing et al. (1990) synthesized previously published literature on fish biomass in lakes covering a wide range of geographic areas and trophic status. They found fish production to be closely correlated with phytoplankton production and TP. The authors did not find any break point in chlorophyll *a* or TP where fish production dramatically increases or decreases.

- Bayne at al. (1994) studied the response of fish and zooplankton to trophic gradient in reservoirs in the southeastern U.S., with chlorophyll *a* ranging from 2-34 µg/L. Rotifer and zooplankton increase

[8] Increased nutrient loading (*i.e.*, eutrophication) leads to algal growth that could eventually exceed the needs of a growing fish population and then decay and use up available dissolved oxygen, which in turn could adversely affect sport fish to the point that a healthy population could not be maintained.

with increasing trophic status, but crustacean zooplankton did not. Fish abundance and biomass was positivity correlated to trophic state. Species composition varied by lake (*e.g.*, mesotrophic lakes had mostly sunfish, minnows, shad; eutrophic lakes had mostly shad).

- Elliott et al. (1996) examined fish population density in a natural lake that had experienced nutrient enrichment both before and after phosphorus effluent concentrations were reduced. When there was increasing eutrophication, charr populations declined and brown trout became more abundant. The abundance of each species varied by lake depth and time of day (possibly related to temperature and dissolved oxygen concentrations).

- Ney (1996) examined published literature and concludes that available evidence indicates that maximum sport fish biomass would occur at TP concentrations >100 µg/L, and states that it is intuitive that productivity would subsequently peak (and then fall off) in reservoirs as hypolimnetic oxygen depletion or excessive vegetative cover degrades habitat.

- Robillard and Fox (2006) saw a shift in species composition among piscivorous fish in shallow Canadian lakes—from walleye to bass—after declines in phosphorus concentration and increased water clarity. The authors cite additional pressures such as introduction of exotic species and other anthropogenic stressors as possibly influencing species abundance.

- Maceina and Bayne (2006) identified shifts in species composition among sportfish associated with reductions in waterbody nutrient concentrations. A decrease in chlorophyll *a* concentrations from > 40 µg/L (in 1987–1988) to 9–17 µg/L (in 1998–1999) resulted in a decline in largemouth bass recruitment as well as growth rates. An increase in spotted bass recruitment was seen as chlorophyll *a* levels decreased. Overall, there was a shift toward smaller spotted bass and fewer, smaller, and less robust largemouth bass with lower concentrations of chlorophyll *a*.

- Walker et al. (2007) summarized a number of studies on nutrient concentrations appropriate for sport fish in lakes and reservoirs. Cited studies showed that the chlorophyll *a* concentrations at which peak abundance of sport fish occurred varies by species, and were dependent on other conditions. The authors point out that there are differences in how one would manage a lake to maintain sport fisheries, depending upon the desired fish species. The authors note that generally, fish populations in small lakes and reservoirs are more subject to influence by non-nutrient factors (*e.g.*, suspended sediments, physical features, and structural elements) than fish populations in large lakes and reservoirs.

- Persson et al. (1991) built on previous studies that found that substantial changes to fish species composition take place with increasing productivity. The authors found a change in fish species present with increasing productivity in Swedish lakes, and that fish biomass of each species peaks at different levels of productivity. For instance, in lakes with medium productivity, proportion of piscivores in the total fish biomass peaked. With increasing productivity, there was a general shift from a dominance by salmonids to percids (perch) to cyprinids (minnows).

- Jeppesen et al. (2000) studied 71 mainly shallow Danish lakes along a TP gradient of 2 to 990 µg/L and found a significant decline in species richness of zooplankton and submerged macrophytes as TP

increases, and an increase in species richness for fish, phytoplankton, and floating-leaved macrophytes, all peaking at 100-400 µg/L. The authors also report a shift from piscivorous fish (particularly perch) to planktic-benthivorous cyprinids (roach, in this case) with TP.

- Egertson and Downing (2004) examined 32 lakes in Iowa (a mix of impoundments and natural lakes) with chlorophyll *a* spanning from approximately 10 to 100 µg/L and found that total fish and sport fish (defined as crappie, bluegill, and channel catfish) biomass increased with lake trophic status. However, sport fish, and bluegill in particular, declined significantly as a fraction of total catch, while benthivores (defined as carp and black bullhead) increased significantly as a fraction of total catch. This study did not identify a specific break point for chlorophyll *a* associated with each species and did not include specific data for each species for analysis.

- Weber and Brown (2011) examined fish populations in 81 lakes in eastern South Dakota along with various physicochemical characteristics. The authors found inverse relationships in relative abundances between common carp and native fishes, and that lakes with greater carp abundance also had larger surface areas and watersheds and higher dissolved solids and chlorophyll *a* and lower secchi depth based on multivariate statistical analysis. The authors do not identify any water quality thresholds.

- Michaletz et al. (2012) examined fish populations in 89 small (<400 ha) impoundments in Missouri with chlorophyll *a* spanning from 2 to 114 µg/L and found that variables associated with predation, competition, and lake fertility were most important in explaining variation among sport fish populations. The authors discuss the negative impacts of common carp on relative abundance of largemouth bass, but do not identify specific water quality levels where these impacts occur. The authors note that apparently few of the study lakes contained nutrient levels high enough to allow negative effects on sport fish populations.

- Brucet et al. (2013) analyzed a large dataset in an attempt to distinguish the relative contributions of natural and anthropogenic local factors on patterns of fish diversity in European lakes at different geographical scales. They concluded that local fish species richness and diversity were related mainly to morphometric and (bio)geographical/climatic variables. In general, there was greater species richness and diversity in larger and deeper lakes in warm areas. They also found that fish density was related mainly to productivity. After controlling for the natural factors, productivity had a positive effect on fish species richness and diversity, whereas it negatively influenced fish size.

The studies summarized above demonstrate that, as a general matter, as nutrient levels increase in a lake system, algal growth and fish biomass also increase, with increasing abundance of most, if not all, fish species. At the same time, as overall productivity increases there can be a shift in the relative proportion of species present in a lake, with benthivore species (*e.g.*, catfish, carp) more able to exploit the increased energy and food sources than piscivore species (*e.g.*, largemouth bass, bluegill, crappie) at some point in the process. The available scientific literature does not identify a universal point on this spectrum of algal growth, measured by chlorophyll *a*, where meaningful shifts in populations would occur in lakes. Rather, the shifts can occur at different levels depending on many other biotic and abiotic factors. The particular mix of species that is desired for a manmade lake is more a matter of preference and judgment than a matter of science.

As explained below, the key to MDNR's combined criterion approach is the protectiveness of the "Response Impairment Threshold" for chlorophyll *a* in the three ecoregions. For natural systems, such as rivers and lakes formed by glaciers or other natural processes for example, it is more feasible to identify an expected level of productivity and mix of species with respect to nutrient levels (*i.e.*, an expected trophic state) to serve as a target for nutrient criteria development, but this exercise is more difficult for reservoirs, which are highly managed systems[9]. The question becomes more a matter of what do naturally occurring water quality and habitat conditions mean for manmade lakes and what mix of sport fish species does a state wish to manage these systems to maintain. In its selection of Response Impairment Thresholds for chlorophyll *a*, MDNR has identified what the scientific literature would generally describe as eutrophic conditions (highly enriched) to represent the upper bound for their Plains Ecoregion lakes (Jones et al. 2008a and Nürnberg 1996, as cited in MDNR 2017). For the Ozark Highland and Ozark Border Ecoregions, MDNR identified targets closer to the boundary with the mesotrophic range. *Id.*

In a letter from Mr. Brian Canaday, Fisheries Division Chief of the Missouri Department of Conservation, to Mr. Chris Weiburg, Water Protection Program Director of the Missouri Department of Natural Resources, dated June 18, 2018, Mr. Canaday writes:

> The Department effectively manages fish populations in Missouri's major reservoirs for a sport fish combination of black bass spp., bluegill, crappie and catfishes. Those populations are self-sustaining and managed through effective regulation and enforcement. Supplemental stocking for these primary species is not needed.
>
> Additionally, those reservoirs also have strong populations of non-sportfish that are self-sustaining and managed through effective regulation and enforcement. Again, supplemental stocking is not needed to maintain these populations.[10]

In its Nutrient Criteria Implementation Plan dated July 27, 2018, the Missouri Department of Natural Resource discusses the Response Assessment Endpoint of "Observed shifts in aquatic diversity attributed to eutrophication" (10 CSR 20-7.031(5)(N)6.D):

> Relative abundances of fish at the various levels of the food chain can be surveyed to see if it is in balance. High nutrient inputs along with high levels of suspended solids can cause a decrease in the number of sight-feeding predators and an increase in the number of the prey that the predators are unable to catch. More numerous prey put a strain on the resources available, resulting in smaller prey and smaller, less numerous predators. This imbalance in the number and/or size of fish, or a shift to less sight-feeding fish in favor of bottom-feeding fish such as carp, due to eutrophication is a cause for concern. (MDNR 2018).

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[9] Management actions could include licensing, hydrology alteration, dam operation, physical habitat enhancement, and other actions.

[10] Mr. Canaday goes on to say that the Department stocks additional fish species to provide a "bonus" or "specialty" sport fishing opportunity, including but not limited to paddlefish, rainbow trout, brown trout, striped bass, hybrid striped bass, walleye, and muskellunge.

Taken together, these statements indicate Missouri is most interested in maintaining a healthy sport fishery of black bass species (*e.g.*, largemouth bass, smallmouth bass), other sunfish such as bluegill and crappie (which are also "sight feeding" piscivores), and catfish, but wishes to avoid an "imbalance" or shift to bottom-feeding fish such as carp. Missouri does not elaborate further on what constitutes an "imbalance" or "shift." One study (Egertson and Downing 2004), cited by both MDNR in its Rationale document and commenters, suggests that the decreasing proportion of total catch of sport fish (defined in the study as crappie, bluegill, and channel catfish) and increasing proportion of total catch of benthivores (defined in the study as carp and black bullhead) occur as a continuum over a range of chlorophyll *a* from approximately 10 to 100 µg/L, but the benthivore group does not overtake the sport fish group in proportion of catch until approximately 70 µg/L (*See* Figure 4 of the cited document), which is well above the numeric values in MDNR's nutrient criteria. The same study indicates that the biomass of sport fish remains constant or increases slightly over the same chlorophyll *a* range (*See* Figure 3of the cited document). It will be a matter of state implementation as to how it will specifically identify what constitutes "observed shifts in aquatic diversity attributed to eutrophication" (10 CSR 20-7.031(5)(N)6.D) related to protection of a wide variety of biota.

MDNR's Nutrient Criteria are Based on a Sound Scientific Rationale and Protect the Aquatic Life Uses as Applied to Missouri's Manmade Reservoirs

The EPA supports a "combined criterion" approach that integrates causal (nitrogen and phosphorus) and response parameters and has provided Guiding Principles (USEPA 2013) for their development and construction. EPA recognizes that the specific levels of TN and TP that adversely affect designated uses, including harm to aquatic life as indicated by various measures of ecological responses, may vary from waterbody to waterbody, depending on many factors, including geomorphology and hydrology among others. As a result, EPA has worked with several states as they developed a combined criterion approach that allows a state to determine that a waterbody is meeting designated uses despite elevated TN and TP levels where there is evidence to confirm that the designated uses are in fact not impaired from excess nutrients. The physical, chemical, and biological parameters that serve as evidence to confirm protection of designated uses are collectively termed "response" parameters. EPA's articulation of this combined criterion approach is intended to apply when states wish to rely on response parameters to indicate that a designated use is protected, even though a nitrogen and/or phosphorus level is/are above an adopted threshold. As with any criteria, states should make clear when a waterbody is meeting and not meeting its designated use.

MDNR's combined criterion approach includes three components: Response Impairment Thresholds for chlorophyll *a* which represent a "ceiling" above which a lake is considered impaired (not meeting its aquatic life designated use); Nutrient Screening Thresholds for chlorophyll *a*, TP, and TN which represent a "floor" below which a lake is considered to be attaining its aquatic life designated use; and a set of five Response Assessment Endpoints to determine attainment status in between.

1. Response Impairment Thresholds Components

MDNR adopted chlorophyll *a* criteria for the Plains, Ozark Border and Ozark Highland of 30 µg/L, 22 µg/L, and 15 respectively called "Response Impairment Thresholds." In its Rationale document, MDNR describes a process of literature review and discussion with fishery management professionals for

selecting Response Impairment Thresholds (MDNR 2017). MDNR specifically refers to the "sport fish biomass peak" near 100 µg/L identified in Ney (1996) and its correlation to approximately 36 µg/L chlorophyll *a* in the Plains ecoregion (using the regression equations appearing on Figure 5-3 of the Rationale document), observing that the selected threshold of 30 µg/L is "more conservative" (MDNR 2017). Given the range of chlorophyll *a* from studies summarized above (*i.e.*, at least between 10 µg/L and 100 µg/L) concurrent with observed abundances of fish species identified by MDNR as their target sport fish, and the reasons MDNR summarizes on pages 26-27 of their Rationale document (MDNR 2017), the EPA considers the selection of 30 µg/L for the Plains to be reasonable with respect to protecting a wide variety of biota and maintaining a healthy sport fish population as Missouri defines it.

In its Rationale document, MDNR describes the chlorophyll *a* threshold of 15 µg/L for the Ozark Highlands as reflective of the "regional pattern of reservoir fertility associated with the different physiographic regions of the state" and the threshold of 22 µg/L for the Ozark Border as an intermediate value representing a transition zone between the Plains and Ozark Highlands. It is evident from the data displayed in Figures 5-2 and 5-3 of the Rationale document that the overall distributions of chlorophyll *a* and nutrient levels differ among the three ecoregions, with higher productivity in the Plains, intermediate productivity in the Ozark Border, and lower productivity in the Ozark Highlands. The EPA observes that the 75th percentile of growing season chlorophyll *a* geometric means (presented on Figure 5-2 of the Rationale document) of 31 µg/L, 27 µg/L, and 13 µg/L for the Plains, Ozark Border, and Ozark Highlands, respectively closely approximate MDNR's selected thresholds (30 µg/L, 22 µg/L, and 15 µg/L for the Plains, Ozark Border, and Ozark Highlands, respectively). As discussed above, MDNR's adopted value for the Plains is protective of MDNR's aquatic life use and therefore the 75th percentile of growing season chlorophyll *a* geomeans for the Ozark Border and Highlands represent protective values. The value adopted for the Ozark Border, 22 µg/L, is more conservative than the 75th percentile value of 27 µg/L. The difference between the value adopted for the Ozark Highlands, 15 µg/L, as compared to 75th percentile value, 13 µg/L, are comparable. Because of the different physiographic features, lakes in the Ozark Border and Ozark Highlands do not exhibit as high a level of productivity (or "reservoir fertility" as MDNR phrases it) as lakes in the Plains. As such, establishing lower thresholds for chlorophyll *a* reflects these differences in terms of expectations for the associated mix of species that define the aquatic habitat use in each ecoregion. The EPA has determined that this rationale supports MDNR's establishment of differing Response Impairment Thresholds for each ecoregion and for establishing the specific values MDNR selected. Furthermore, it is reasonable to use these regional boundaries based on their demonstrated differences in nutrient enrichment.

The EPA recognizes that lakes in Missouri currently reflect a mix of trophic state conditions, and that the optimal selection of an upper bound depends in part upon the desired mix of aquatic life species and desired relative and absolute abundance. The EPA further recognizes Missouri has discretion to establish this intended level of protection given the variable habitat conditions of manmade lakes and the subjective nature of the term "wide variety" with respect to manmade managed systems. The EPA also recognizes that this degree of productivity expressed as chlorophyll *a* is consistent with similar CWA Section 303(c) WQS approval actions for comparable subsets of lakes in other states, such as in Minnesota (Heiskary and Wilson 2008) and Virginia (Zipper et al. 2005; Walker et al. 2007).

As discussed above, Missouri broadly defines its aquatic life as "wide variety of biota," and has explicitly determined that sport fish can be interpreted as an indicator of a sufficiently "wide variety of

biota" in their waters. Based on its review of available information cited above, EPA has concluded that Missouri's Response Impairment Thresholds will protect a general target of sport fish populations and are therefore based on sound scientific rationale and protective of the aquatic life use. EPA acknowledges that in its proposed rule, it identified chlorophyll *a* criteria values in its "Alternative 1" as "ceiling" values (above which impairment is determined) that are more stringent than MDNR's Response Impairment Thresholds. This difference in values is a result of the fact that for "Alternative 1," the EPA interpreted Missouri's aquatic life uses (and other uses) as protected where conditions are "least disturbed," whereas MDNR interprets their aquatic life uses as a highly productive sport fishery. As discussed above, EPA recognized in its proposal that Missouri could choose to address EPA's disapproval using a variety of approaches and MDNR's adopted nutrient criteria for manmade reservoirs aligns with its aquatic life use definitions.

2. Nutrient Screening Thresholds Components

Missouri's nutrient criteria include not just the chlorophyll *a* Response Impairment Thresholds, but also Nutrient Screening Thresholds and Response Assessment Endpoints that work in conjunction to provide additional protection of aquatic life uses. When a Nutrient Screening Threshold is exceeded, a Response Assessment Endpoint may confirm that aquatic life uses are not protected.

As documented in its Rationale document, MDNR derived the Nutrient Screening Thresholds for chlorophyll *a* as the 50th percentile of the distribution of growing season data for each ecoregion (*See* Figure 5-2 of the Rationale document) and for TP and TN using the regression relationships presented in Figure 5-3. These values closely approximate the values the EPA had calculated as protective under "Alternative 1" of the federal proposal from December 2017. The EPA derived these using the 75th percentile of reference conditions from least disturbed watersheds in Missouri (USEPA 2017b). For the Plains, the EPA proposed TP, TN and chlorophyll *a* nutrient protection values of 44, 817, and 14 µg/L, respectively.[11] For the Plains, MDNR established TP, TN, and chlorophyll *a* Nutrient Screening Thresholds of 49, 843, and 18 µg/L, respectively. These are comparable values because the differences between them are small (*i.e.*, 44 versus 49, 817 versus 843, and 15 versus 18) considering the range of measured variability of these parameters (*e.g.*, *See* 5-3 in MDNR 2017) and such differences are not significant in terms of when a shift in biology generally would be expected (*e.g.*, *See* Table 5-1 of MDNR 2017). Likewise, the proposed values for a combined Ozarks ecoregion that are between the values MDNR established for Ozark Border and Ozark Highlands. The values in the EPA proposal "Alternative 1" and the values MDNR established as Nutrient Screening Thresholds have the same purpose: to establish a floor below which lakes are presumed to support designated uses they are intended to protect. Although the EPA and MDNR derived these values using different methods, they are nonetheless comparable in magnitude (factoring in that the EPA chose to combine the Ozark ecoregion and thus identified higher productivity levels for the Ozark Highland lakes and lower productivity levels for the Ozark Border lakes than did MDNR, above which to examine effects). The EPA remains confident that the reference condition-derived values for "Alternative 1" reflect an appropriate floor below which adverse impacts from nutrient enrichment should not occur, and thus the EPA is likewise confident that MDNR's Nutrient Screening Thresholds are appropriate for the same function because these sets of values closely approximate each other.

3. Response Assessment Endpoint Components

[11] Subsequent to the proposal, the EPA found the correct calculation for chlorophyll *a* to be 15 µg/L, not 14 µg/L.

The potential adverse responses are articulated in a combination of narrative and quantitative Response Assessment Endpoints. Response Assessment Endpoints are related to biological (fish mortality, cyanobacteria, and shifts in aquatic diversity) and chemical (dissolved oxygen and pH) responses to elevated levels of TN, TP, or chlorophyll *a*. A fifth Response Assessment Endpoint relates to a physical attribute (excess turbidity that can limit productivity during certain times and thus mask potential impairments).

a) **Occurrence of eutrophication-related mortality or morbidity events for fish and other aquatic organisms.** This endpoint is related to water quality that may not be protective of the aquatic habitat designated use. In its Implementation document, MDNR indicates it will review individual and annual fish kill reports from the Missouri Department of Conservation (MDC) and determine impairment if there are more than one fish kill within 10 years or one large fish kill (>100 fish covering more than 10 percent of the lake area) caused by dissolved oxygen excursions, pH, algal blooms, or the toxins associated by algal blooms. The EPA approves MDNR's adoption of this Response Assessment Endpoint because such an event would be evidence of aquatic life use impairment.

b) **Epilimnetic excursions from dissolved oxygen or pH criteria.** This endpoint addresses ecosystem function parameters (USEPA 2013). The processes of photosynthesis and respiration fueled by nutrients can affect both dissolved oxygen and pH level throughout the lake, potentially causing wide daily variation. In its Implementation document, MDNR includes a lengthy description (page 13-15) of thermal stratification and why this should limit application of this endpoint to the epilimnion (the endpoint would apply to the entire lake depth in the absence of stratification, and thus no discernible epilimnion). In Missouri WQS, dissolved oxygen and pH criteria are not qualified in this manner[12], as MDNR elected to do in the context of this component of nutrient criteria. The presence of stratification and its impact on dissolved oxygen (and pH) levels is not in dispute between MDNR and the EPA. Although the EPA recognizes the effects of stratification, in its proposed rule the EPA elected not to limit the applicability of dissolved oxygen and pH criteria to the epilimnion to be consistent with the expression of those criteria in Missouri WQS. The EPA approves the combined criterion aspect that exceeding the dissolved oxygen or pH criterion in the epilimnion (or whole lake in the absence of stratification) in the same year as a Nutrient Screening Threshold is exceeded would constitute an aquatic habitat impairment. MDNR could consider developing an appropriate approach for evaluating dissolved oxygen and pH protection of aquatic habitat within the hypolimnion as other states have done.

c) **Cyanobacteria counts in excess of one hundred thousand (100,000) cells per milliliter (cells/mL).** This endpoint is related to primary productivity in the form of cyanobacteria at levels that are indicative of the potential production of cyanotoxins creating a harmful algal bloom. While the Response Impairment Thresholds reflect the primary response parameter addressing excess primary production of chlorophyll *a*, the cyanobacteria endpoint can function as a useful supplement. In its Implementation document, MDNR explains that algal toxins can be harmful to aquatic life as well as human health and pets. MDNR cites cost concerns with routine monitoring of cell counts and describes a program of monitoring algal toxins and evaluating them as a surrogate. MDNR indicates its intention to use thresholds for

[12] This action does not alter the EPA's prior approval of these criteria in Missouri WQS.

four specific algal toxins used by the Oregon Health Authority (which are themselves based on draft EPA health advisory information), explaining that those levels are "associated with a total toxigenic algal species cell count greater than or equal to 100,000 cells/mL." The EPA recognizes this is an evolving area of science and there remains uncertainty concerning levels of cyanobacteria that specifically harms aquatic life. This endpoint is reasonable for informing MDNR of an impairment condition related to a response to elevated levels of TN, TP, and chlorophyll *a*.

d) **Observed shifts in aquatic diversity attributed to eutrophication.** This endpoint directly addresses the desired mix of species that is inherent in MDNR's derivation of Response Impairment Thresholds. As described above, MDNR has expressed in its Implementation document that an "imbalance in the number and/or size of fish, or a shift to less sight-feeding fish in favor of bottom-feeding fish such as carp due to eutrophication is a cause for concern" (page 16). In the same document, MDNR describes the regular fish population monitoring and annual reporting conducted by MDC, and MDNR's intention to use this information to evaluate this endpoint. The EPA supports use of this information in the context of evaluating this endpoint and encourages MDNR to continue to develop approaches that specifically identify- and facilitate management interventions to avoid - shifts that do not reflect desired aquatic diversity conditions in Missouri lakes. The EPA approves MDNR's endpoint because observed shifts in aquatic diversity along with exceedances of a Nutrient Screening Threshold will identify potential aquatic life use impairment.

e) **Excessive levels of mineral turbidity that consistently limit algal productivity during the period May 1 – September 30.** This endpoint relates to reduced water column transparency that can suppress levels of chlorophyll *a* despite high levels of nutrients. In its Implementation document, MDNR explains the purpose of this endpoint to ensure that periodic suppression of excess primary production that nonetheless manifests itself at other times does not go unassessed. In the same document, MDNR describes several approaches to monitor mineral turbidity and transparency with some quantitative thresholds for specific types of measures. The specific secchi depth thresholds provided are consistent with or more protective than the thresholds suggested by the EPA in its Technical Support Document in support of "Alternative 1" of the proposed federal rule. The EPA approves inclusion of this endpoint in the combined criterion approach as an additional protection measure.

The EPA has stated that "all causal and response parameters should be expressed numerically" in a combined criterion approach (EPA 2013). Each of MDNR's Response Assessment Endpoints are quantitative in some respect if the further articulation in MDNR's Implementation Plan (MDNR 2018) is considered, except for the observed shifts in aquatic diversity, which is not conducive to quantification at this point. Key indicators of nutrient pollution include measures of primary productivity, measures of the algal assemblage, and measures of ecosystem function as biological response parameters (EPA 2013). MDNR's combined criterion approach includes numerical expressions for chlorophyll *a* (primary production), cyanobacteria (algal assemblage), and dissolved oxygen and pH (ecosystem function) as response endpoints. Because MDNR's approach includes all these measures, the EPA considers the suite of response parameters included in MDNR's combined criterion approach to be sufficiently numeric. For the reasons articulated in this and the previous section, the EPA has determined that MDNR's Nutrient Screening Thresholds and Response Assessment Endpoint are based on sound science and protective of the aquatic life use.

4. Duration and Frequency

Missouri specified that the Response Assessment Endpoints and Nutrient Screening Thresholds have a one-year duration and frequency and are to be evaluated within the same year. In contrast, in "Alternative 1" of the federal proposal, the EPA provided a three-year window. The EPA's intent was to ensure that sufficient data would be available, that is, effects within this window could reflect effects that occur within the same year but went unassessed. MDNR's final rule requires data for the Response Assessments Thresholds shall be collected at the same time as Nutrient Screening Thresholds are assessed, which should limit instances of inadequate information and unassessed waterbodies. 10 CSR 20-7.031(5)(N)6.

MDNR specifies that its Response Impairment Thresholds for chlorophyll *a* and its Nutrient Screening Thresholds for chlorophyll *a*, TN and TP reflect a seasonal geometric mean. This is appropriate because (1) the seasonality reflects the period of time when concern for excess primary production occurs (*i.e.*, the spring and summer months when algal production is at its peak) and (2) the geometric mean reflects a standard way to represent the central tendency and variability of data that typically occur as a log-transformed normal distribution and to guard against the statistical distortions created by unusually high or low values (*e.g.*, Jones et al. 2008b). The Response Impairment Thresholds include a no more than one in three-year return frequency allowance, which is typical of independently applied numeric criteria for pollutant parameters which are intended to reflect long-term conditions and where the aquatic ecosystem has some ability to recover from short-term impacts (USEPA 2010b[13]). Shorter term impacts (*i.e.*, those manifesting themselves in a single year) are addressed with the combination of Nutrient Screening Thresholds and Response Assessment Endpoints, which are applied on an annual basis for duration and frequency. The duration and frequency aspects of MDNR's combined criterion components are based on sound scientific rationale and protective of their aquatic life designated uses.

MDNR's Nutrient Criteria Components Operate to Protect the Aquatic Life Uses

Missouri's nutrient criteria are structured as an integrated or combined criterion that consists of stand-alone criteria for chlorophyll *a* (Response Impairment Threshold); separate TN, TP and chlorophyll *a* values (Nutrient Screening Thresholds); and five response parameters (Response Assessment Endpoints) for three ecoregions. Exceeding the Response Impairment Threshold indicates the criterion is not met. Water quality below the Response Impairment Thresholds, but above any of the Nutrient Screening Thresholds will be examined for observations of Response Assessment Endpoints. If any of the Response Assessment Endpoints are observed, the lake is not meeting the criterion. If none are observed, the lake would be meeting the criterion. If data are lacking for the Response Assessment Endpoints, the lake would be deemed unassessed until the data are collected.

EPA recognizes that MDNR's combined criteria approach differs from EPA's 2013 Guiding Principles in a number of ways. Like all agency guidance documents, the Guiding Principles provide recommendations to states and stakeholders, but the agency cannot mandate any specific action, outcome or requirement through guidance. As described below, EPA has determined that despite some differences, MDNR's criteria are based on a sound scientific rationale and are designed to protect the aquatic life uses.

[13] See discussion on pages 108-110.

Missouri's construction of its combined criterion is unusual in the EPA's limited experience because it includes a chlorophyll *a* Nutrient Screening Threshold in the typical position of a "causal" parameter rather than a "response" parameter, whereby a Response Assessment Endpoint would need to occur to determine that the criterion is not met, regardless of whether the chlorophyll *a* Nutrient Screening Threshold is exceeded. Without any other provision, this construction would be problematic because chlorophyll *a* could exceed any level as long as there is not a Response Assessment Endpoint exceedance. This is contrary to long standing science that documents the central role that elevated primary productivity (measured by chlorophyll *a*) plays in protecting aquatic life uses in lakes from adverse effects of nutrient enrichment (USEPA 2000a; USEPA 2013). However, Missouri also includes a separate Response Impairment Threshold for chlorophyll *a*, which operates as a stand-alone criterion. Thus, the protectiveness of the Response Impairment Threshold for chlorophyll *a* is a critical component to the protectiveness of Missouri's combined nutrient criterion. EPA has explained above why the stand-alone chlorophyll *a* Response Impairment Thresholds protects the applicable aquatic life uses for lakes in the three ecoregions.

The Guiding Principles also state that "[i]f a causal parameter is not exceeded but an applicable response variable is exceeded, then the criterion is not met and the waterbody is not meeting its designated uses." The response variables addressing critical elements of primary productivity and ecosystem function do function independently from causal variables, consistent with the Guiding Principles. For lakes, and with respect to aquatic life uses as MDNR has articulated them, the EPA considers this to be sufficient because the reference to algal assemblage in the Guiding Principles was principally in reference to streams.

Under MDNR's rule, in a situation where a lake or reservoir exceeds Missouri's Nutrient Screening Thresholds and data are unavailable for any of the Response Impairment Thresholds, the waterbody would not be considered as impaired. The EPA's 2013 Guiding Principles document recommends that in this situation, the combined criterion make clear that the criterion is not met, and the waterbody is not meeting the intended designated uses (USEPA 2013). Consistent with this approach, the EPA's December 2017 proposed rule "Alternative 1" required that water quality not exceed protective TN or TP values unless each of the response parameters are evaluated and none occur within the same three-year rolling average period. 82 Fed. Reg. at 61229. The EPA explained that it "included this presumption to address potential for data gaps for response variables." *Id.* at 61221. To address this issue of potential data gaps for response parameters, MDNR's rule requires data for the Response Assessments Endpoints to be collected at the same time as Nutrient Screening Thresholds are assessed, which should limit instances of inadequate information and unassessed waterbodies. 10 CSR 20-7.031(5)(N)6. In its Implementation document, MDNR describes its monitoring efforts and cooperative agreement with the university of Missouri (pages 6-7), as well as relevant monitoring efforts conducted by MDC (pages 17-18). While MDNR's approach differs in some respects from the 2013 Guiding Principles, the EPA has determined that MDNR's rule provides a reasonable approach to achieve the same objective (*i.e.*, address the data gap issue). As a result, MDNR's approach results in a criterion that protects the applicable aquatic life uses because it provides that if there is information demonstrating that TN, TP and chlorophyll *a* Nutrient Screening Thresholds are exceeded there will also be information available to evaluate regarding the Response Assessment Endpoints.

Although implementation is not within the scope of the EPA's WQS approval action, the EPA's Guiding Principles discusses implementation and state that the TN and TP values should be available to support assessment and provide a target for source control implementation (*e.g.*, NPDES permitting and TMDL development). Missouri's TN and TP Nutrient Screening Thresholds are available to serve this function. In addition to these values, MDNR would also have available direct translations of the Response Impairment Thresholds for chlorophyll *a* to TN and TP using the regression equations provided in their Rationale document (see Figure 5-3). The difference between these translations is that the former set is based on the Nutrient Screening Thresholds for chlorophyll *a* and the latter set is based on the Response Impairment Thresholds for chlorophyll *a*. As such, it may be appropriate to use the Nutrient Screening Thresholds where there is concern for effects described by the Response Assessment Endpoints at levels of chlorophyll *a* below the Response Impairment Thresholds, whereas it may be appropriate to use translations using the Response Impairment Thresholds where this additional level of protection does not appear necessary. In its Implementation document, MDNR states that: "TMDLs developed to meet applicable numeric nutrient criteria will consider targets appropriate for attaining chlorophyll-a response impairment thresholds with consideration given to other causal and response parameter concentrations to ensure WQSs are met and maintained" (page 24). With respect to permitting, MDNR states in the same document: "Because exceedance of the numeric Chl-a criteria is a response to excess TN and/or TP in the water body, regional correlations between nutrients and algal biomass will be used to set in-lake nutrient targets" (page 29). The EPA considers these statements to be consistent with the Guiding Principles with respect to source control and demonstrate that Missouri's numeric nutrient criteria contain sufficient elements to implement source control programs.

ESA CONSULTATION

The EPA initiated consultation with the U.S. Fish and Wildlife Service under Section 7(a)(2) of the ESA, 16 U.S.C. §1536, regarding the effects of the EPA approving a change to Missouri's WQS for numeric nutrient criteria on November 21, 2017. The EPA sent a letter to Karen Herrington, Field Supervisor, Missouri Ecological Field Services Office on October 1, 2018, to continue informal consultation with FWS with a specific focus on the EPA's proposed action on Missouri's WQS for numeric nutrient criteria for lakes and reservoirs. The EPA requested verification of the current species list on October 23, 2018. The EPA completed and submitted to FWS a Biological Evaluation on November 5, 2018, conveying the EPA's evaluation that the proposed approval of Missouri's new numeric nutrient criteria for Missouri's lakes and reservoirs is not likely to adversely affect listed species and designated critical habitat. On November 26, 2018, FWS confirmed it had reviewed the EPA's BE and based on the analysis of effects to listed species and critical habitat provided in the BE, FWS concurred with the EPA's determination of not likely to adversely affect pursuant to the ESA. This concluded ESA consultation.

CONCLUSION

MDNR submitted revised regulations including provisions for numeric nutrient criteria for manmade lakes for the EPA's review under section 303(c) of the CWA. These criteria include three components: Response Impairment Thresholds for chlorophyll *a* which represent a "ceiling" above which a lake is considered impaired (not meeting its aquatic life designated use); Nutrient Screening Thresholds for chlorophyll *a*, TP and TN which represent a "floor" below which a lake is considered to be attaining its

aquatic life designated use; and a set of five Response Assessment Endpoints to determine attainment status in between. These provisions appear in Missouri regulations at 10 CSR 20-7.031(5)(N). The EPA is approving these provisions in their entirety, except for (1) the provisions of (N)1.C.II, (N)3, and Table N which refer to Lake Site-Specific Criteria which EPA has previously approved; and (2) the provision at (N)4 which the EPA determined is not a new or revised WQS. The approved provisions are based on sound scientific rationale and are protective of the designated uses for which they are developed to protect and therefore address EPA's 2011 disapproval.

MDNR derived Response Impairment Thresholds for chlorophyll *a* consistent with eutrophic conditions in Plains lakes and mesotrophic/eutrophic boundary conditions in Ozarks lakes. Although the EPA derived protective chlorophyll *a* levels from the 75th percentile of reference conditions for least disturbed lakes that reflect levels more in line with the mesotrophic/eutrophic boundary for Plains lakes and the oligotrophic/mesotrophic boundary for Ozarks lakes, it is within Missouri's discretion to adopt a value associated with a higher level of productivity and overall biomass because Missouri's aquatic life use is broadly defined as "wide variety of biota"; these waters are manmade, highly managed systems; and Missouri has explicitly determined that sport fish can be interpreted as an indicator of a sufficiently "wide variety of biota" in their manmade lakes. Missouri's criteria would support a healthy sport fish population.

MDNR adopted Nutrient Screening Thresholds that are comparable to values EPA derived for least disturbed reference conditions and thus suitable as a "floor" below which attainment of aquatic life uses can be presumed. The Response Assessment Endpoints address conditions that are sensitive to nutrients and reflect protective quantitative or narrative expressions associated with primary production, ecosystem function, fish species survival and diversity, and mineral turbidity that could mask excessive algal production. Either the Nutrient Screening Thresholds for TN and TP or translations of the Response Impairment Thresholds using available regression relationships could be used as WQS elements to support NPDES permitting and TMDL development. MDNR retains sufficient general criteria provisions in narrative form to protect drinking water supply and recreational designated uses while MDNR continues to collect data and information and develop approaches for future numeric nutrient criteria for those uses.

Although not related to the EPA WQS review, the EPA recognizes that the level of protection established by MDNR's combined criterion approach for lakes represents incremental progress in controlling nutrient loadings. Many lakes in Missouri will likely be considered impaired that had not been, and the EPA anticipates there would be costs incurred and benefits realized from implementing corresponding controls to meet the newly adopted criteria. The EPA recognizes that many lakes in Missouri currently have chlorophyll *a* levels much lower than levels specified by the Response Impairment Thresholds. The EPA recommends that Missouri consider further sub-classification of lakes and consider whether lakes currently achieving conditions of a lower trophic state (*e.g.*, Plains lakes currently achieving chlorophyll *a* of 15 µg/L) should be expressly maintained at that level and have criteria set accordingly.

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Decision Document Enclosure Appendix

As mentioned in the decision document enclosure, the EPA's review of Missouri's nutrient criteria involved a unique circumstance where MDNR was engaged in its rulemaking process to adopt nutrient criteria during the same time period as the EPA issued a proposed federal rule (pursuant to the consent decree) and sought public comments on two alternatives: MDNR's proposed rule (Alternative 2) as well an alternative developed by the EPA (Alternative 1). During their respective rulemakings both the EPA and MDNR received comments on each of the issues discussed below, except for the last one (Truman Lake and downstream protection) which was only submitted as a comment during MDNR's rulemaking. The EPA's decision document approving Missouri's criteria directly or indirectly addresses the significant public comments as they relate to the EPA's approval. The EPA is approving Missouri's numeric nutrient criteria and is therefore no longer pursuing its proposed federal rule; however, the purpose of this appendix is to respond to comments that are relevant to the EPA's approval action, but not directly addressed in the EPA's decision document.

Some public comments expressed concern that the "Response Assessment Endpoints" identified in MDNR's final rule are too subjective. This is relevant because the EPA is approving MDNR's Response Assessment Endpoints as part of the submitted combined criterion for nutrients. First, the EPA considers that key response endpoints, such as chlorophyll *a* (as a Response Impairment Threshold) and dissolved oxygen and pH, do have objective thresholds for determining protection. In fact, EPA noted in the preamble to its proposed rule that it considered limiting the Response Assessment Endpoints to just dissolved oxygen and pH but instead chose to include in the federal proposed rule the additional Response Assessment Endpoints that MDNR included in its proposed rule. 82 Fed. Reg. 61213, 61225 (December 17, 2017). The additional Response Assessment Endpoints in MDNR's final rule relate to fish mortality, cyanobacteria cell counts and turbidity and have objective assessment approaches described in supplemental materials provided by MDNR to the EPA. The Response Assessment Endpoint related to shifts in aquatic diversity retains a certain degree of subjectivity, although Missouri's supplemental materials submitted to the EPA and correspondence between Missouri departments indicate broad management objectives. This degree of subjectivity is likely by design and may prove beneficial as MDNR develops approaches to evaluate potential shifts and their early indication signals.

Some public comments expressed concern that the criteria proposed by MDNR and EPA are reactive and only address water quality after it is identified as impaired, with a particular concern for application to discharge permits. These comments are relevant because the EPA is approving these criteria components. The EPA considers all the criteria components in MDNR's final rule to be set at protective levels. Furthermore, the EPA describes in the decision document (see pages 26-27) how the combined criterion approach includes both causal and response parameters, and how protective thresholds for the causal parameters are available for source control targets (permitting) regardless of impairment status. MDNR described in its Implementation document some initial approaches for permitting on a watershed basis, noting that "all permitting will be consistent with federal and state requirements."[1] MDNR also

[1] See page 26 of Missouri Department of Natural Resources (MDNR). 2018. *Nutrient Criteria Implementation Plan*. July 27, 2018. https://dnr.mo.gov/env/wpp/rules/documents/nutrient-implementation-plan-final-072618.pdf

implements a Nonpoint Source Management Program (NPSMP) with a stated goal to protect and improve the quality of the Missouri's water resources using a collaborative, statewide watershed approach.

Comments expressed concern that in its proposed federal rule, EPA changed its position since the May 2016 letter EPA sent to Missouri. In this letter, the EPA stated that "The MDNR needs to consider all uses for which Missouri's lakes are designated and to develop criteria that are protective for all uses for which adequate data and scientific information exist." As discussed in the decision document, MDNR's submission adequately describes its focus on aquatic life uses and presents a supportable basis for deferring development of numeric nutrient criteria for recreation and drinking water uses (see pages 9-12). In the May 2016 letter, the EPA also expressed concern that MDNR's thresholds "focus on the identification of waters already requiring restoration and would do little to protect designated uses" and that MDNR's approach "appears to offer no protection beyond that provided under the state's long-standing general (narrative) water quality criteria." Upon review of MDNR's complete submission and as explained in EPA's decision document, the EPA has determined that MDNR's rule is protective of MDNR's aquatic life use as applied to manmade lakes and that protective TN and TP values are available for use as source control targets. Many lakes in Missouri will likely be considered impaired that had not been, and the EPA anticipates there would be costs incurred and benefits realized from implementing corresponding controls to meet the newly adopted criteria. The EPA also described in the decision document that Missouri's long-standing general (narrative) water quality criteria continues to protect designated uses such as recreation and drinking water supply. In response to other concerns the EPA raised in its May 2016 letter, Missouri has incorporated TN and TP causal parameter thresholds in its combined criterion approach and each component of the combined criterion approach is based on a sound scientific rationale.

Some public comments expressed concern about the perceived intent by MDNR to ignore federal permitting regulations and include nutrient permit limits only if a water is first identified as impaired. The MDNR's WQS include the necessary components for implementation of CWA assessment, permitting, and TMDL programs (and other source control efforts). From a WQS perspective, protection of aquatic life uses as described by MDNR is provided by the Response Impairment Thresholds for chlorophyll *a* and the combination of Nutrient Screening Thresholds and Response Assessment Endpoints. As described in the decision document, MDNR has the means to identify corresponding protective TN and TP thresholds (which could be the Nutrient Screening Thresholds themselves). Adequate implementation is a matter of EPA oversight other than CWA 303(c) review, which focuses on the uses and criteria applicable to surface waters. Implementation programs have additional relevant components, such as the "reasonable potential" analysis that goes into determining the need for discharge permit limits.

Some public comments expressed concern that nutrient criteria adopted by other states do not support a conclusion that the criteria proposed by MDNR or the EPA are protective. Other states may interpret their designated uses differently, may have elected to address other designated uses in the numeric nutrient criteria, and may take alternative approaches to establishing protective criteria. The EPA reviews state criteria individually to determine whether CWA requirements are met. We would note that Missouri's NNC do not stand apart from all other states. In the decision document, the EPA noted the similarity to the criteria for chlorophyll *a* for a subset of lakes in Minnesota, and the similarity in aquatic life interpretation for lakes in Virginia (with comparable chlorophyll *a* magnitude values for some lake categories as well).

Some public comments expressed concern about the removal of Missouri's proposed rule language regarding use of the Nutrient Screening Thresholds as targets for TMDL development. These comments referenced the Missouri's response to comments, which the EPA has also reviewed and are consistent with MDNR's Rationale and Implementation documents. Missouri's removal of this language provides Missouri a degree of flexibility to implement the criteria in a manner that is allowable under the CWA. The EPA concurs with MDNR's approach that it may not be appropriate to use the Nutrient Screening Thresholds in all cases for TMDL development or source control. As described in the decision document, there are at least two choices for protective TN and TP levels: Nutrient Screening Thresholds and translations of the Response Impairment Thresholds for chlorophyll *a*, which are available now and could be refined as more information becomes available or more applicable site-specific information is available. The selection would involve ensuring that adverse Response Assessment Endpoints and Response Impairment Thresholds are not exceeded. Given the variability in nutrient levels and responses (which several commenters also noted), this degree of flexibility is warranted and beneficial with respect to protection of designated uses.

Some public comments expressed concern that the Response Impairment Thresholds are overly protective of sport fish and that research data supports the fact that harmful effects on sports fish populations only occur at higher levels of chlorophyll *a*. This comment relates to the Missouri's rationale for its rule. As discussed in the decision document, the EPA did not find studies that specifically document harm to sport fish at high levels of chlorophyll *a*. However, many studies point to shifts in relative proportion of populations of specific types of sport fish. Missouri has described a preference for maintaining a healthy sport fishery of black bass species (*e.g.*, largemouth bass, smallmouth bass), other sunfish such as bluegill and crappie (which are also "sight feeding" piscivores), and catfish, but wishes to avoid an "imbalance" or shift to bottom-feeding fish such as carp. Given this preference, it makes sense to establish the thresholds with the caution with which Missouri has exercised.

Some public comments expressed concern that there should not be a one in three-year exceedance frequency of exceeding the Response Impairment Thresholds because it could allow extremely high levels of chlorophyll *a* in some years. This is relevant because the EPA is approving this exceedance frequency. The studies MDNR relied upon to support the Response Impairment Thresholds (and summarized in the decision document) were typically based on several years of data and thus represent long term averages. Knowlton and Jones (2006) found that "Seasonal mean values based on a single summer misclassified 15-17% of Missouri reservoirs with respect to the status of their long-term averages (8 or more seasons)" and advise that "Given this level of temporal variation, numeric criteria determined from average conditions in reference lakes should be applied only to long-term averages in target lake" and "Rules for assessing compliance with nutrient standards should be framed with anticipation of the widely varying conditions in individual lakes".[2] Given this phenomenon, a one in three year exceedance frequency is appropriate.

Some public comments expressed concern that the EPA's proposed "nutrient protection values" under EPA's "Alternative 1" should have been based on the 50th percentile reference concentrations for the Plains ecoregion because the region as a whole has experienced a high degree of land cover disturbance. This is relevant to this approval because the EPA cites back to the Alternative 1 values as evidence that

[2] Knowlton, M.F. and J.R. Jones. 2006. Natural variability in lakes and reservoirs should be recognized in setting nutrient criteria. *Lake and Reserv. Manage.* 22(2): 16 1-166.

the comparable Nutrient Screening Thresholds reflect an appropriate floor below which adverse impacts from nutrient enrichment should not occur. The EPA considered using the 50th percentile to develop nutrient protection values for the Plains ecoregion under "Alternative 1" of the EPA proposed rule. In developing the set of reference condition waters, the EPA screened out lake watersheds with greater than 20 percent cropland and urban land. The EPA applied this screen (and other screens) to all ecoregions and then set nutrient protection values equal to the 75th percentile of the set of reference conditions approach for all ecoregions (see pages 13-14 of the Technical Support Document for the proposed rule). In the EPA's view, it does not matter if there is relatively more land disturbance in the Plains ecoregion in general because all reference watersheds for each ecoregion must contain less than 20 percent cropland and urban land to be considered part of the reference population.

Some public comments on MDNR's proposal expressed concern that it does not make sense for Truman Lake to have less stringent nutrient criteria than Lake of the Ozarks since Truman Lake feeds into Lake of the Ozarks. This is relevant because WQS as a whole must ensure protection of downstream waters. The EPA is aware of the geographic proximity of these two lakes. The EPA concurs with MDNR's response to that public comment on their proposed rule, which states in pertinent part: "Although water from Truman Lake does eventually discharge into Lake of the Ozarks, some settling and nutrient attenuation is expected. Additionally, because the criteria are expressed as geometric means, any individual measurements greater than the numeric criteria values do not in and of themselves indicate an excursion of water quality standards. Further protection of Lake of the Ozarks will be implemented as a result of added general criteria at 10 CSR 20-7.031(4)(E), which requires that waters shall maintain a level of water quality at their confluences to downstream waters that provides for attainment and maintenance of the water quality standards of those downstream waters."

EXHIBIT 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

JAN 06 2020

Ms. Jutta Schneider, Director
Water Planning Division
Virginia Department of Environmental Quality
1111 East Main Street, Suite 1400
Richmond, VA 23219

Dear Ms. Schneider:

The U.S. Environmental Protection Agency (EPA) has completed its review of the new or revised provisions of Virginia's Adoption of Chlorophyll-a Criteria for the Tidal James River, Water Quality Standards (WQS) regulations at 9 VAC 25-260-310 (bb). Virginia published the WQS revisions on September 16, 2019 and the Virginia Office of Attorney General certified the revisions as duly adopted in accordance with Virginia law in a letter dated November 6, 2019. The EPA received this package on November 12, 2019.

Based on EPA's review of the submission and supporting documentation, finds that the new or revised chlorophyll-a criteria for the Tidal James River adopted by Virginia are consistent with Clean Water Act (CWA) Section 303(c) and its implementing regulations at 40 CFR Part 131. The enclosure to this letter includes all of the new or revised WQS provisions (substantive and non-substantive) that EPA is approving in this action, as well as a brief rationale for our approval. It also lists two new or revised provisions that EPA is not approving as part of this action because EPA does not consider those provisions to be new or revised WQS subject to review under CWA Section 303(c).

Under Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. §1536, EPA has the obligation to ensure that the Agency's approval of these modifications to the State's aquatic life WQS regulations will not jeopardize the continued existence of federally-listed threatened and endangered species and their critical habitat in Virginia. To fulfill our obligation, EPA initiated consultation with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), prepared a biological evaluation of the revised chlorophyll-a criteria for the protection of aquatic life provision of Virginia's regulation, and concluded that our approval is not likely to adversely affect listed species and their critical habitat. NMFS concurred with this conclusion on October 17, 2019, and FWS concurred on October 22, 2019. This concluded ESA consultation.

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WATER PLANNING DIVISION

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If you have any questions regarding this action, please do not hesitate to contact me at 215-814-2737 or have your staff contact Gregory Voigt, Chief Standards & TMDL Section, at 215-814-5737 or Voigt.Gregory@epa.gov.

Sincerely,

Catherine A. Libertz, Director
Water Division

Enclosure

cc: John Kennedy, DEQ ✓

Enclosure Action Rationale

For Action on Virginia's Revised
Chlorophyll-a Criteria for the Tidal James River Section VAC 25-260-310 (bb)
Submitted on November 12, 2019

1. Background for Clean Water Act and Water Quality Standards

Under the Clean Water Act (CWA) section 303(a) and federal implementing regulations at 40 CFR 131.4, States have the primary responsibility for reviewing, establishing, and revising Water Quality Standards (WQS), which consist of the designated uses of a waterbody or waterbody segment, the water quality criteria necessary to protect those designated uses, and an antidegradation policy. This statutory framework allows States to work with local communities to adopt appropriate designated uses (40 CFR 131.10(a)) and to adopt criteria to protect those designated uses (40 CFR 131.11(a)). Each State must follow its legal procedures for adopting such standards (40 CFR 131.5) and submit a certification by the State's attorney general, or other appropriate legal authority within the State, that the WQS were duly adopted under State law (40 CFR 131.6(e)). In establishing criteria, States should establish numerical values based on 304(a) Guidance; or 304(a) Guidance modified to reflect site-specific conditions, or other scientifically defensible methods (40 CFR 131.11 (b)(1)). In addition, states should establish narrative criteria where numeric criteria cannot be determined or to supplement numeric criteria (see 40 CFR §131.11 (b)(2)).

The Environmental Protection Agency (EPA) is required to review a State's new or revised WQS to ensure revisions to WQS are consistent with the CWA. The EPA determines whether a particular provision is a new or revised WQS after considering the following four questions: (1) Is it a legally binding provision adopted or established pursuant to State law? (2) Does the provision address designated uses, water quality criteria (narrative or numeric) to protect designated uses, and/or antidegradation requirements for waters of the United States? (3) Does the provision express or establish the desired condition (e.g., uses, criteria) or instream level of protection (e.g., antidegradation requirements) for waters of the United States immediately or mandate how it will be expressed or established for such waters in the future? (4) Does the provision establish a new WQS or revise an existing WQS? See EPA's What Is A New or Revised WQS Under CWA 303(c)(3) Frequently Asked Questions (USEPA 2012).

The EPA also considers the State's non-substantive administrative edits or editorial changes to be changes to WQS and therefore reviews and acts on them under CWA Section 303(c). While these edits and changes may not substantively change the meaning or intent of the existing WQS, the EPA believes it's reasonable to act on these edits and changes to ensure public transparency as to which provisions are applicable for CWA purposes. The EPA notes that the scope of its review and action on administrative edits or editorial changes extend only to the edits or changes themselves. The EPA is not re-opening or reconsidering the underlying WQS, which are the subject of the administrative edits or editorial changes.

2. Chesapeake Bay Water Quality Standards and Virginia's Current Chlorophyll-a Criteria

Starting in 1986, EPA and its Chesapeake Bay partners embarked on a process to synthesize scientific evidence on the water quality requirements of hundreds of aquatic species and biological communities inhabiting Chesapeake Bay. Those efforts informed the basis of EPA's Chesapeake Bay water quality criteria for the mainstem Bay and tidal portions of its tributaries (USEPA 2003). Based on EPA's 2003 Chesapeake Bay water quality criteria, in 2004 to 2005, Delaware, the District of Columbia, Maryland, and Virginia adopted, and EPA approved, a suite of new Chesapeake Bay WQS. These Chesapeake Bay WQS included criteria for dissolved oxygen, water clarity, and a narrative chlorophyll-a criterion for tidal waters. Since 2005 Virginia (and the other Chesapeake Bay States) have adopted and EPA approved specific amendments to its respective Chesapeake Bay WQS regulations. Based on EPA's 2003 Chesapeake Bay water quality criteria and 2004

addendum (USEPA 2004), Virginia adopted a set of tidal James River numerical chlorophyll-a criteria in 2005, which EPA approved in 2006.

3. Introduction to Virginia's Amended Chlorophyll-a Criteria for the Tidal James River

Virginia has adopted new and revised site-specific chlorophyll-a criteria for the tidal James River (JRCC) that reflect nearly a decade of comprehensive scientific studies intended to review and re-establish the scientific basis for the JRCC. This effort, overseen by the Virginia Department of Environmental Quality (VADEQ) focused on chlorophyll-a dynamics and linkages to aquatic life effects in the tidal James River.

In 2011, Virginia identified a need for additional scientific study to ensure that the 2005 chlorophyll-a criteria for the tidal James River were appropriately protective of aquatic life designated uses. Virginia initiated a review of the numeric chlorophyll-a criteria for the James and established a Science Advisory Panel (SAP)[1] to analyze the best scientific information available and provide recommendations as to whether the chlorophyll-a criteria were scientifically defensible. The SAP was tasked with providing a recommendation as to whether the 2005 chlorophyll criteria were scientifically defensible, and specifically, whether they were protective of aquatic life designated uses. The SAP evaluated metrics that take into account the multiple mechanisms by which algal blooms adversely affect aquatic life designated uses. These metrics included water quality conditions (pH, dissolved oxygen, water clarity) and phytoplankton community attributes (diversity, evenness, multimeric indices and occurrence of harmful algae). The analysis provided a basis for identifying the range of chlorophyll-a criteria that would be considered scientifically defensible and protective of the applicable designated uses (i.e., criteria falling within this range were neither over- or under-protective). This work informed Virginia's decision to revise its chlorophyll-a criteria for the tidal James River.

4. Overview Chlorophyll-a criteria and the Tidal James River

High concentrations of chlorophyll-a in a waterbody may be indicative of excessive algal growth. Excessive algal growth can negatively impact aquatic life, and is often a result of increased levels of nitrogen and phosphorous. In other words, algal biomass can be measured in an aquatic system by measuring the concentration of chlorophyll-a. Chlorophyll-a criteria enable better watershed management of nitrogen and phosphorus. These nutrients enter aquatic systems from fertilizers, septic systems, sewage treatment plants, air deposition and urban runoff.

Excess nutrient loading to a waterbody can cause a progression of eutrophic symptoms, most often beginning with observations of high chlorophyll-a concentrations and/or macroalgal blooms (Bricker et al. 2008). For this reason, among others, chlorophyll-a is widely used as a proxy in the prevention and assessment of eutrophic conditions and as numeric nutrient criteria endpoints for water quality management purposes under the CWA (EPA 2000a; Borja et al. 2012).

Management of eutrophic conditions is intended to prevent against excessive phytoplankton growth that may eventually lead to impacts including: the loss of submerged aquatic vegetation (SAV) and a shift from benthic to pelagic-dominated system productivity (Bowen and Valiela 2001), low dissolved oxygen and occurrences of nuisance or harmful algal blooms (HABs) (Bricker et al. 1999, 2007), and threatened abundance and/or diversity of fish and other biota (Bowen and Valiela, 2001; Breitburg, 2002; Wazniak and Glibert, 2004).

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[1] The James River Chlorophyll-a Study (JRCS) was initiated in 2011. VADEQ assembled the JRCS Scientific Advisory Panel (SAP), a group of academic, federal/state, and industry scientists covering different areas of expertise related to estuarine eutrophication. Members of the SAP are listed in the Virginina TSD (VADEQ 2019a).

However, all impacts do not occur in all systems, and eutrophic effects can be observed over a range of chlorophyll-a concentrations, at varying degrees of severity (Bricker et al. 2008).

Borja et al. (2012) provides a synthesis of academic and regulatory eutrophication assessment methodologies, which utilize varying thresholds of chlorophyll-a concentrations for indicating the potential severity of broader eutrophic conditions. Generally, in coastal environments, chlorophyll-a concentrations indicative of low eutrophic conditions range between 0 and 5 µg/L, between 5 and 20 µg/L for fair/moderate eutrophic conditions, and from 20 – 60 µg/L for high eutrophic conditions. These thresholds are considered over a seasonal time-frame (USEPA 2008), or at the 90th percentile of annual measurements (Bricker et al. 2003; Bricker et al. 2007).

While patterns of eutrophication are apparent across a gradient of chlorophyll-a over time (sensu Borja et al. 2012), many of the specific symptoms previously described (e.g., low dissolved oxygen, loss of SAV) may not be observed on shorter timescales and in the same place where algae take up nutrients. Specific biological responses to accumulated algal biomass, such as respiration of algal biomass (i.e., consumption of dissolved oxygen) and light limitation stress in SAV from increased algal turbidity, often lag in time and/or space behind the uptake of nutrients and the accumulation of algal biomass. Also, a range of environmental factors may obscure or mask broader ecosystem level responses to accrued algal biomass. Ecological responses to nutrient loading are dependent on the intrinsic factors of the waterbody, i.e., physiochemical (e.g., depth, volume, salinity, turbidity) and biological factors (e.g., nature of ecological communities, trophic interactions), hence there is no clear point on the spectrum of algal biomass, measured as chlorophyll-a, where adverse ecological effects would occur universally for all waters (NRC 2000; Swaney et al. 2008). Therefore, determining the ecological effects that would result from the chlorophyll-a thresholds set for the James River is relatively unique to the James River itself. Fortunately, the large existing body of water quality monitoring data and relevant ecological studies in the James River provide robust support for such an evaluation.

With the complexity of James River's natural physiochemical properties or characteristics in mind, Virginia designed the JRCC to be protective at effect thresholds recommended by the James River Chlorophyll-a Study. As discussed above, the SAP provided the backbone of Virginia's empirically derived recommended thresholds based on the James River Chlorophyll-a Study (JRCS) (Harmful Algal Bloom effects), independent studies (water clarity), and EPA nationally recommended thresholds (pH and dissolved oxygen (DO)). Virginia set the seasonal JRCC as the baseline central tendency, empirically derived from long-term chlorophyll-a monitoring for each segment and season (VADEQ 2019a). To establish whether baseline central tendencies are protective against a long-term effect of poor water quality, the "high risk" spring-summer chlorophyll-a means were compared to the baseline spring-summer means. If the baseline spring-summer mean for a segment is less than or equal to the "high-risk" threshold, then the former is considered protective. There were no baseline spring-summer means that were higher than their respective "high risk" threshold. This effort ultimately seeks to improve the protectiveness and implementation of the criteria, which are designed to protect aquatic life uses, especially against the effects of nutrient and sediment pollutants. Among the most notable changes to the regulation are modified seasonal mean criteria and new short-duration criteria that protect aquatic life from the effects of harmful algae.

5. Description of Virginia's Revised Regulations at Section 9 VAC 25-260-310 (bb)

Listed below are the revised text of the amendments that VADEQ submitted to EPA for review. Additions to the State's WQS regulations are shown underlined below, while deletions to the regulations are shown with strikethrough.

9VAC25-260-310. Special standard and requirements (bb). The following site-specific seasonal mean criteria should not be exceeded in the specified tidal James River segment more than twice in six years. Should

consecutive exceedances of the same seasonal mean criterion occur in a waterbody segment after the effective date of these chlorophyll a criteria, the department will examine additional lines of evidence, including the occurrence of harmful algae blooms, physicochemical monitoring and phytoplankton datasets, and fish kill reports in the evaluation of the appropriate assessment category for the waterbody segment. The department will develop guidance for inclusion in the Water Quality Assessment Guidance Manual to address evaluating the appropriate assessment category when consecutive exceedances of the same seasonal mean criterion occur. The department will determine if additional monitoring for harmful algal blooms is warranted.

Designated Use	Chlorophyll a µ/l	Chesapeake Bay Program Segment[2]	Temporal Application
Open water	~~10~~ 8	JMSTF2	March 1 - May 31 (spring)
	~~15~~ 10	JMSTF1	
	~~15~~ 13	JMSOH	
	~~12~~ 7	JMSMH	
	~~12~~ 8	JMSPH	
	~~15~~ 21	JMSTF2	July 1 - September 30 (summer)
	~~23~~ 24	JMSTF1	
	~~22~~ 11	JMSOH	
	~~10~~ 7	JMSMH	
	~~10~~ 7	JMSPH	

The following site-specific chlorophyll a concentrations at the specified duration should not be exceeded more than 10% of the time over six summer seasons in the specified area of the tidal James River. These criteria protect against aquatic life effects due to harmful algal blooms. Such effects have not been documented in the upper portion of JMSTF2 or in JMSOH.

Chlorophyll a µg/l	Chesapeake Bay Program Segment	Spatial Application	Duration
—	JMSTF2	Upstream boundary of JMSTF2 to river mile 95	
52	JMSTF2	River mile 95 to downstream boundary of	1-month median
52	JMSTF1	Upstream boundary of JMSTF1 to river mile 67	1-month median
34	JMSTF1	River mile 67 to downstream boundary of JMSTF1	1-month median
—	JMSOH	Entire segment	
59	JMSMH	Entire segment	1-day median
20	JMSPH	Entire segment	1-day median

[2] The estuary is subdivided into five segments—the boundaries of which are based on geomorphology and salinity: upper tidal fresh (JMSTFU), lower tidal fresh (JMSTFL), oligohaline (JMSOH), mesohaline (JMSMH), and polyhaline (JMSPH).

(1) The ~~following site specific~~ site-specific numerical chlorophyll a criteria apply ~~March 1 through May 31 and July 1 through September 30 as seasonal means~~ to the tidal James River segments (excludes tributaries) segments JMSTF2, JMSTF1, JMSOH, JMSMH, and JMSPH ~~and are implemented in accordance with subsection D of 9VAC25-260-185~~, the boundaries of which are described in EPA 903-R-05-004.

(2) For segments JMSOH, JMSMH, and JMSPH, the median of same-day samples collected one meter or less in a segment should be calculated to represent the chlorophyll a expression of a segment over that day, and the median of same-month chlorophyll a values should be calculated to represent the chlorophyll a expression of segment over that month. The seasonal geometric mean shall be calculated from the monthly chlorophyll a values for a segment.

(3) For segment JMSTF2, chlorophyll a data collected in the "upper zone" (from the upstream boundary at the fall line to approximately river mile 95 (N37° 23' 15.27" / W77° 18' 45.05" to N37° 23' 19.31" / W77° 18' 54.03")) should be pooled, in the manner described in subdivision bb (2) of this section, separately from chlorophyll a data collected in the "lower zone" (from river mile 95 to the downstream boundary of JMSTF2). The seasonal geometric mean for each of these zones should be calculated from their respective monthly chlorophyll a values. To calculate the seasonal segment-wide geometric mean, an area-weighted average of the zonal geometric means should be calculated using the following equation: Upper Zone Geometric Mean x 0.41 + Lower Zone Geometric Mean x 0.59

(4) For segment JMSTF1, chlorophyll a data collected in the "upper zone" (from the upstream boundary of JMSTF1 to approximately river mile 67 (N37° 17' 46.21" / W77° 7' 9.55" to N37° 18' 58.94" / W77° 6' 57.14")) should be pooled, in the manner described in subdivision bb (2) of this section, separately from chlorophyll a data collected in the "lower zone" (between river mile 67 to the downstream boundary of JMSTF1). The seasonal geometric mean for each of these zones should be calculated from their respective monthly chlorophyll a values. To calculate the seasonal segment-wide geometric mean, an area-weighted average of the zonal geometric means should be calculated using the following equation: Upper Zone Geometric Mean x 0.49 + Lower Zone Geometric Mean x 0.51

6. EPA Rationale for Approval of Virginia's New and Revised WQS

In Section (bb), Virginia amended the criteria table for site-specific chlorophyll-a levels in the tidal James River (excluding its tributaries). The table contains a list of two seasonal mean criteria (spring and summer) for each of the five James River segments (delineated by salinity regime), for a total of ten paired sets of criteria. The amendments lower eight of these values and raise two of them. Achievement of these revised criteria is expected to minimize both long-term and short-term effects on aquatic life. Additionally, a new table of criteria that apply only during the summer is inserted. Achievement of these new criteria is expected to minimize short-term effects on aquatic life stemming from potentially toxic harmful algal blooms. In subsection (1) Virginia replaces the reference to subsection D of 9 VAC25-260-185 with the reference to the EPA technical document that provides the boundaries of the James River segments. And in subsection (3), and (4) Virginia inserts new language stipulating how segments should be subdivided for the purposes of data aggregation.

WQS submittals containing new or revised site-specific criteria must include the methodologies and analyses used to develop these criteria (40 CFR 131.6(b) and 131.20(c)). The EPA must determine whether the criteria are based on sound science and protect the designated use, under 40 CFR 131.5(a), 131.6, 131.11 and 131.21(b). VADEQ's WQS submittal contains a 76-page technical support document (TSD) (VADEQ 2019a). This report discusses applicable EPA guidance and various scientific studies and how they were used in the development and application of the chlorophyll-a criteria. According to the TSD, the derivation of numeric chlorophyll-a criteria considers the following:

- The empirical linkage of chlorophyll-a to ecological effects is highly variable from site to site, particularly in the context of estuaries due to the presence of a salinity gradient. Because species do not all possess the same suite of adaptations to all habitat conditions, species composition does not stay constant along the estuarine continuum. This means that the relationship between chlorophyll-a and HAB risk is not uniform throughout the estuary. The JRCC are site-specific to mainly account for the confounding effect of salinity on the relationships between algae and ecological impacts.

- Chlorophyll-a criteria stem from the fact that the effects mediated or caused by algae vary seasonally. To account for temporal dynamics, JRCC are seasonal-specific: spring (March 1 to May 30) and summer (July 1 to September 30).

- The diversity of ecological impacts related to algae also complicates the derivation of chlorophyll-a criteria. The changes that algae impart on a system do not all occur at the same time scales. Thus, each algal-related effect must be evaluated on the appropriate temporal and spatial scale when deriving criteria.

Virginia's derivation approach begins by defining the typical chlorophyll-a expression for each segment-season. This "baseline" is estimated through the analysis of recent monitoring datasets and not only involves a calculation of normal chlorophyll-a central tendency, but also the normal spatial and temporal variability of chlorophyll-a. Then, empirical relationships (models) connecting chlorophyll-a to various response variables are used to predict whether harmful effects are expected to occur during a season with typical chlorophyll-a expression. If a specific harmful effect takes months to manifest, then the pertinent empirical model is used to find the highest seasonal central tendency expected to incur minimal effect. If a harmful effect occurs rapidly (over hours), its pertinent empirical model is used to predict the chlorophyll-a concentration associated with the harmful effect (the "effect threshold") and then a probability model is used to determine the likelihood of exceeding the effect threshold given baseline chlorophyll-a variability and central tendency. If the baseline central tendency is considered unprotective of the harmful effect, the probability model is used to predict the highest central tendency conferring an acceptable risk of the harmful effect. The seasonal central tendency that protects against all observed harmful effects is then selected as the criterion. For segment-seasons where no harmful effects are expected to occur in a "typical" season, the baseline central tendency is established as the candidate criterion.

Seasonal mean criteria are paired with short-duration criteria (to not be exceeded more than 10% of the time) in those segments where an empirical relationship can be established between a toxic HAB and chlorophyll-a concentration. The magnitude of these short-duration criteria corresponds to ambient chlorophyll-a concentrations that are linked to specific HAB effect thresholds, as determined from the pertinent empirical model. The duration of these short-duration criteria corresponds roughly to the period of time the effect is conservatively expected to occur. Although the seasonal mean criteria are developed to protect against long-term and short-term effects, potentially damaging algal blooms could occur at a high frequency without a concomitant seasonal mean exceedance. This possibility is significantly reduced by coupling the seasonal mean criteria with short-duration criteria.

Prediction uncertainty in stressor-response curves, natural variability, and the resiliency of aquatic life to algal-related stressors dictate that effects-based chlorophyll-a criteria be developed with some degree of "allowable" risk. An overall risk level up to 10% was deemed acceptable for short-term effects—like HABs and elevated pH. This is consistent with the USEPA (2003a) recommendation that waterbodies be allowed to exceed aquatic life criteria/thresholds no more than 10% of the time. It was also deemed acceptable if, at any given time, up to 10% of the overall habitat is at high risk of impacts due to excessive algae. This is consistent with the long-

standing practice of setting toxics criteria/thresholds to the pollutant concentration that is safe for at least 90% of the target population (USEPA, 2000).

VADEQ did excellent work, building from the work of their SAP's James River Chlorophyll a Criteria Study, to derive a protective set of chlorophyll-a criteria for the tidal James River. VADEQ further hybridized the underlying basis for the proposed criteria using work that coupled reference-based with empirical-based approaches. The magnitude and duration components of the JRCC (i.e., the numeric values and annual/monthly/daily duration periods) are based on the best available scientific research and long-term monitoring data. The updated JRCC criteria provide protection of the aquatic life designated use.

Based on the EPA's review, the amendments to Virginia's magnitude and duration components of the JRCC meet the requirements of the CWA and 40 CFR 131. Therefore, the revisions are approved by the EPA pursuant to section 303(c) of the CWA.

Lastly, Virginia revised subsection (1) to include the reference to the EPA technical document that provides the boundaries of the James River segments. This is a reference to the EPA 2005 addendum to the 2004 Chesapeake Bay Program Analytical Segmentation Scheme document that provides the boundaries of the James River segments. Originally all the Chesapeake Bay segments (including the James River segments) had been defined as a way of grouping areas with similar natural characteristics. The purpose of the 2005 addendum was to provide an updated description of segments and split segments by jurisdiction. Each segment definition contains a series of points that are defined by both a set of latitude and longitude coordinates in decimal degrees and a textual narrative describing their location. The segment boundaries follow the shorelines between the geo-referenced boundary coordinates within each segment. EPA has the authority to approve or disapprove administrative edits. Therefore, this revision is approved by the EPA pursuant to section 303(c) of the CWA.

7. **Revisions to Virginia's Regulations that do not constitute a change to WQS**

Virginia has inserted new provisions into its regulations that EPA has concluded do not constitute new or revised WQS themselves and therefore, are not subject to CWA section 303(c) review. Since EPA's action herein is limited to acting on revisions that constitute new or revised WQSs, EPA is taking no action on the following provisions.

In Section bb, Virginia added a provision that assessment guidance will be developed to address the appropriate assessment category if consecutive exceedances of the same seasonal mean criterion occur in a water body segment. While EPA strongly supports Virginia in the development of assessment guidance, this provision does not modify the State's water quality standards, hence EPA is not acting on this revision under Section 303(c) of the Clean Water Act.

Lastly, Virginia added subsection (2) to specify the manner in which chlorophyll-a data should be aggregated and calculation procedures for how to calculate the median chlorophyll-a values for a segment. This addition defines the manner in which chlorophyll-*a* data should be aggregated and averaged. In accordance with EPA guidance (USEPA 2012), EPA does not view data aggregation and calculation procedures to be a WQS and therefore, takes no action on this provision.

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UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF MISSOURI CENTRAL DIVISION

MISSOURI COALITION FOR THE ENVIRONMENT FOUNDATION, Plaintiff, v. ANDREW R> WHEELER, in his official capacity as the Administrator of the United States Environmental Protection Agency, Defendant.	Civil Action No. 2:19-cv-4215-NKL

ANSWER OF PROPOSED INTERVENOR-DEFENDANTS ASSOCIATION OF MISSOURI CLEANWATER AGENCIES, ASSOCIATION OF OHIUO METROPOLITAN WASTEWATER AGENCIES CALIFORNIA ASSOCIATION OF SANITATION AGENCIES NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES NORTH CAROLINA WATER QUALITY ASSOCIATION, SOUTH CAROLINAWATER QUALITY ASSOCIATION, VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AGENCIES, WEST VIRGINIA MUNICIPAL WATER QUALITY ASSOCIATION

Proposed Intervenor-Defendants Association of Missouri Cleanwater Agencies, the Association of Ohio Metropolitan Wastewater Agencies, California Association of Sanitation Agencies, the National Association of Clean Water Agencies, the North Carolina Water Quality Association, the South Carolina Water Quality Association, the Virginia Association of Municipal Wastewater Agencies, and the West Virginia Municipal Water Quality Association, pursuant to Rule 24(c) of the Federal Rules of Civil Procedure, hereby answers the Complaint of Plaintiff Missouri Coalition for the Environment Foundation filed on December 3, 2019, as follows:

RESPONSES TO NUMBERED PARAGRAPHS

The numbered paragraphs of this Answer correspond to the numbered paragraphs of the Complaint. All allegations, including headings, not expressly admitted are denied. Intervenor-Defendants admit, deny, or otherwise respond as follows:

1. This paragraph represents a characterization of Plaintiff's allegations and legal conclusions; and to the extent any response is required, Intervenor-Defendants deny the allegations.

2. Denied as stated. This paragraph presents a factual statement that is too generalized to be subject to a response in this form.

3. Intervenor-Defendants lack sufficient knowledge or information to form a belief as to the truth of the allegations in the first sentence. As to the second sentence, denied as to any characterization that the water quality standards at issue in this litigation are not valid water quality standards.

4. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no answer is required. To the extent that a response is required, denied as to the characterizations of basis for EPA's prior disapproval.

5. First sentence admitted; otherwise denied.

6. Denied as stated, and as a mischaracterization of the water quality standards at issue and their functioning.

7. Intervenor-Defendants state that the paragraph is a legal argument that requires no answer. To the extent that a response is required, denied.

8. Denied as to the characterization of basis for EPA's action.

9. This paragraph states the Plaintiff's requests to the Court, and requires no answer.

10. This paragraph is a statement of jurisdiction that requires no answer.

11. Admitted as to venue.

12. This paragraph is an identification of the Plaintiff and requires no answer. To the extent that the claims as to the purposes of the Plaintiff require an answer, the Intervenor-Defendants state that they have insufficient information to permit a response.

13. Intervenor-Defendants state that they have insufficient information to permit a response as to the characterizations of the Plaintiff and its members.

14. As to the first sentence no response is required to the Plaintiff's characterization. Otherwise denied.

15. Denied.

16. Admitted.

17. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

18. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

19. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

20. Denied as to the specific characterizations of the details of the second and third elements of water quality standards; admitted that standards include three elements. Otherwise, this paragraph purports to characterize a federal statute and regulation. The statute and regulation speak for themselves and are the best evidence of their contents, and therefore no response is required.

21. This paragraph purports to characterize a federal regulation. The regulation speaks for itself and is the best evidence of its contents, and therefore no response is required.

22. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

23. This paragraph purports to summarize the requirements of a federal regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

24. This paragraph purports to summarize the requirements of a federal regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

25. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

26. This paragraph purports to characterize a federal statute and regulation. The statute and regulation speak for themselves and are the best evidence of their contents, and therefore no response is required.

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30. This paragraph purports to summarize the requirements of a federal regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

31. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

32. This paragraph purports to characterize a federal statute. The statute speaks for itself and is the best evidence of its contents, and therefore no response is required.

33. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

34. Admitted.

35. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

36. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

37. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

38. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

39. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

40. This paragraph purports to summarize the requirements of a state statute. The statute speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

41. This paragraph alleges a factual conclusion and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

42. This paragraph alleges facts that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

43. This paragraph alleges a facts and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required. Denied as to Plaintiff's characterizations of those standards.

44. This paragraph alleges a factual and legal conclusions that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

45. Admitted.

46. This paragraph states requirements of a federal Consent Decree. The Consent Decree speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

47. This paragraph alleges a facts conclusion that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

48. This paragraph alleges a factual conclusion and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

49. This paragraph alleges a factual conclusion and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required. Denied as to Plaintiff's characterizations of defects in draft water quality standards.

50. Denied as to Plaintiff's characterizations of defects in draft water quality standards.

51. Denied as to Plaintiff's characterizations of defects in draft water quality standards.

52. This paragraph alleges facts that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

53. This paragraph alleges facts and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required. Denied as to Plaintiff's characterizations of defects in draft water quality standards.

54. This paragraph alleges facts and an argument that, to the extent that they have relevance, will be evaluated from the Record in this Administrative Process Act review, and no answer is required. Denied as to Plaintiff's characterizations of defects in draft water quality standards.

55. This paragraph purports to summarize the requirements of an EPA letter. The letter speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

56. This paragraph purports to summarize the requirements of the EPA letter referred to previously. The letter speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

57. Admitted that Missouri published draft nutrient standards. Denied as to Plaintiff's further characterization.

58. Admitted as to Plaintiff's participation in a rulemaking. Denied as to the legal characterization.

59. This paragraph refers to EPA actions and characterizations that would necessarily be expressed in writing. Any such writing would necessarily be a part of the agency Record in this matter, and therefore the writing would speak for itself and is the best evidence of its contents, and, therefore, no response is required.

60. Admitted.

61. This paragraph purports to summarize the provisions of an EPA proposed regulation. The proposal speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

62. This paragraph alleges facts that will be evaluated from the Record in this Administrative Process Act review, and no answer is required.

63. This paragraph purports to summarize the provisions of a Missouri DNR submittal to EPA. The submittal speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

64. This paragraph alleges facts argument that will be evaluated from the Record in this Administrative Process Act review, and no answer is required. It is denied that the document referred to was managed or provided in any manner inconsistent with law.

65. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

66. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

67. Denied, as stated. Paragraph 67 is an argument for the plaintiff's requested remedy, all of which is denied.

68. Denied, as stated. Paragraph 68 is an argument for the plaintiff's requested remedy, all of which is denied.

69. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

70. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

71. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

72. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

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74. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

75. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

76. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

77. This paragraph purports to summarize the requirements of a state regulation and an Implementation Plan. The regulation and the Implementation Plan document speak for themselves and are the best evidence of their contents, and, therefore, no response is required.

78. This paragraph purports to summarize the requirements of a state regulation. The regulation speaks for itself and is the best evidence of its contents, and, therefore, no response is required.

79. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

80. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

81. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review; and it purports to summarize the requirements of a state regulation, which speaks for itself and is the best evidence of its contents, and no response is required.

82. This paragraph alleges a factual conclusion that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

83. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required. To the extent that a response is required, the characterizations are denied.

84. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

85. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

86. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

87. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required. However, an Implementation Plan such as the DNR Implementation Plan referred to is in fact an implementation tool and plan, not a part of a state's water quality standards regulation, and any allegation of legal error in DNR's development or use of the Implementation Plan is denied.

88. This paragraph includes a quotation and alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review, and no response is required.

89. This paragraph alleges a factual conclusion and an argument that will be evaluated from the Record in this Administrative Process Act review; and it purports to summarize the requirements of a state regulation, which speaks for itself and is the best evidence of its contents, and no response is required.

90. This paragraph is a procedural inclusion, and requires no response.

91. This paragraph is a jurisdictional statement, and requires no response.

92. This paragraph states a conclusion of law, and requires no response. It is also an argument for the relief requested by plaintiff, is a matter for the ultimate determination of this Court, and further requires no response.

93. This paragraph states a conclusion of law, and requires no answer. It is also an argument for the relief requested by plaintiff, is a matter for the ultimate determination of this Court, and further requires no answer.

94. This paragraph states a conclusion of law, and requires no response. It is also an argument for the relief requested by plaintiff, is a matter for the ultimate determination of this Court, and further requires no response.

95. This paragraph states a conclusion of law, and requires no response. It is also an argument for the relief requested by plaintiff, is a matter for the ultimate determination of this Court, and further requires no response.

96. This paragraph states a conclusion of law, and requires no response. It is also an argument for the relief requested by plaintiff, is a matter for the ultimate determination of this Court, and further requires no response.

The remainder of the Complaint contains Plaintiff's Prayer for Relief, to which no response is required. To the extent any response is required, Intervenor-Defendants deny that Plaintiff is entitled to the relief it seeks.

GENERAL DENIAL

To the extent any allegation in Plaintiff's Complaint has not been admitted or specifically responded to, Intervenor-Defendants deny such allegation.

PRAYER FOR RELIEF

WHEREFORE, Intervenor-Defendants pray that this Court deny Plaintiff's requests for relief, dismiss the Complaint with prejudice, enter judgment against the Plaintiff and for Defendant and Intervenor-Defendants, and grant such further relief as the Court deems appropriate.

Respectfully submitted,

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Dated: February 12, 2020

CERTIFICATE OF SERVICE

I hereby certify that on this 12th day of February 2020, I electronically filed the foregoing Proposed Answer with the Clerk of Court using the CM/ECF system which will automatically send email notification of such filing to the attorney of record listed below:

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