

DRAFT January 3, 2017

To be put on EMC letterhead

Subject: Comments from North Carolina Environmental Management Commission (EMC) (the “State”) to US EPA (“EPA”) regarding EPA’s Dec 8, 2016 proposal to add waterbody-pollutant combinations to the State’s April 1, 2016 Section 303(d) List

EPA is intruding on responsibilities reserved to the States

The Clean Water Act (CWA) carefully and specifically carves out for the states certain responsibilities. Among those are the establishment of impaired waters listing decisions (33 U.S.C. section 1313(d), 40 C.F.R. 130.7(b), and CWA Section 303(d)), known as “303(d) List”. The State has primacy for implementing the CWA.

As to 303(d) listing decisions, the states are responsible for defining the protocol for determining attainment and non-attainment of water quality standards in individual waters and then identifying impaired and unimpaired waters based on good cause, and accurate data and modeling. The NC Environmental Management Commission (EMC) specifically takes formal action to approve 303(d) listing methods that are, in turn, applied by the State Department of Environmental Quality Division of Water Resources (DWR) staff to determine listing decisions. The DWR staff then submit a 303(d) List to the EPA for approval. EPA has an important role in the process but that role is limited to determining that the States’ approaches are consistent with the Clean Water Act.

The State respectfully submits that EPA’s Dec 8, 2016 decision that additional waterbody-pollutant combinations should be 303(d) listed goes beyond its responsibilities under the Clean Water Act. In making their proposal, EPA is being inconsistent with determining states’ consistencies with the CWA. For example, EPA allows some states to decide to use confidence statistics for toxics, but does not allow NC to decide to do so, despite our complaint by a similar letter to EPA in 2014, and now this letter.

EPA’s decision improperly rejects North Carolina’s EMC’s approved listing methodology

EPA proposes to add waterbody-pollutant combinations to North Carolina’s 303(d) list on the grounds that “EPA’s review of NC’s submittal concluded that the state’s assessment approach was acceptable for most, but not all, listing decisions. The EPA again found that the state’s methodology was not defensible for assessment of toxic pollutants. In addition, the state’s methodology did not contain reasonable, statistically-sound delisting procedures for most numeric water quality standards. This led to a failure to demonstrate good cause to delist impaired waters. Also, provisions in the state’s methodology related to age of data and minimum sample size were not consistent with federal requirements, resulting in a failure to properly evaluate all existing and readily available data. Therefore, the EPA conducted an independent assessment of water quality data to determine if additional impairments should be added to the 303(d) list.”

The State disagrees with those statements made by EPA as findings or conclusions because the EPA has no direct authority to disapprove the State's Listing Methodology that the State uses to make listing decisions. The State's disagreement with EPA's statements is in addition to the submittal that EPA is going beyond its role under the Clean Water Act.

The EPA is referring to the State's methodology, authorized by the State's General Statutes (NCGS § 143B-282(c)), developed by the State with significant input and ultimate approval by the State's EMC after involvement of public input and stakeholders. A fundamental principle underlying this methodology is that there be sufficient quality data to have a 90% confidence level that 10% of samples exceed a water quality standard. The 90% confidence level is necessary and appropriate and modern statistics strongly recommends the use of confidence values. A confidence level is the probability that sample data with a given number of criteria exceedances could be drawn from an overall population for the water segment where the overall exceedance probability is the intended 10%. In other words, it is the probability that the value of a parameter falls within a specified range of values. Use of confidence levels helps identify when a sufficient number of exceedances have occurred that indicate a true exceedance rate of > 10%. Confidence levels of 90% address whether the available data upon which the listing decision will be based are sufficiently representative of water quality conditions in the assessment unit as a whole.

The State developed a listing methodology and applied its listing methodology, as approved by the EMC, as it said it would to create the April 1, 2016 303(d) list of impaired waters.

Why is the 90% Confidence Level necessary and appropriate for determining impairment for toxic substances and non-conventional pollutants?

While in some states, 90% confidence has been acceptable by EPA for toxics because it helps address concerns about bad data (outliers, minimum data sets, borderline impairment background conditions, collection mishandling, calibration errors, and laboratory errors), it is acceptable in NC for some, but not all, of the reasons mentioned above (outliers, minimum data sets, borderline impairment, background conditions), due to NC's robust and high quality QA/QC processes and requirements, which NC implements. Other states include "sloppier" data in their datasets, for many good and valid reasons (such as trying to encourage citizen participation and engagement), but NC has for a long time, chosen not to include such data for listing decisions. For the 2016 303(d) listing methodology, NC had included within the "2016 303(d) Listing Methodology" a direct link to data quality and data qualifiers information at (http://portal.ncdenr.org/c/document_library/get_file?p_l_id=1169848&folderId=25060035&name=DLFE-113306.pdf) in order to help improve understanding of the qualifiers required for data. EPA does not like for NC to use 90% confidence statistics methods on toxics (metals) data because NC's data are too good. While NC data quality is high, DWR still makes 303(d) listing decisions based on a large quantity of data collected and analyzed by numerous sources, including DWR's Ambient Monitoring System, NPDES Discharge Monitoring Coalitions, DWR's Biological Assessment Unit; the DEQ Division of Marine Fisheries, the NC Department of Health and Human Service Division of Environmental Health; the United States Geological Survey; local governments; environmental groups; industry, municipal and university groups.

While the EPA so far only expresses support of confidence values for conventional pollutants in NC, it does not support NC applying confidence statistics for toxics. The State affirms that confidence values for toxics standards are even more importantly relevant, should be applicable and are especially critical and relevant for toxics data because often the numeric criteria for many toxic substances are near the practical quantitation limit (“PQL”). For example, North Carolina’s aquatic life criteria for cadmium has been 0.4 µg/l (less than 1) for trout waters while the PQL for cadmium is 1 µg/l. In addition, toxics are particularly susceptible to sampling and analytical errors in part due to the very low pollutant concentrations commonly at issue. Measuring low-concentration pollutants is challenging because various operations performed on the sample during its preparation for the stage of final determinations can be a source of errors affecting the final result of the analysis. The risk that spurious excursions due to such errors result in improper listings of waters for impairments is higher for toxics, than for non-toxics. Because toxics data are particularly prone to sampling and analytical errors, even low levels of contamination can dramatically affect results when sampling for low-concentration constituents. Thus, applying the 90% confidence value to toxics data is especially critical for good, responsible 303(d) listing decisions.

Modernizing EPA policies and questioning EPA policies applied as rules

The CWA does not mandate the use of the “>1 exceedance in a 3-year period” (“>1-in-3”) listing method. However, US EPA has mandated the use of (“>1-in-3”) in NC. The method is not promulgated as a regulation, nor has it gone through the public safeguards of notice and comment, nor has it gone through rulemaking, nor has it been published as an enforceable regulation. The method is not a binding legal requirement for listing that EPA should impose upon North Carolina or any other state, especially not for listing decisions.

In 2015, the State also questioned the scientific validity of the (“>1-in-3”). In doing so, the State made the effort to compile the scientific literature referenced for the (“>1-in-3”) method. The State prepared a white paper, “Modernizing Water Quality Assessment Methods for Toxics” to repudiate the use of (“>1-in-3”) method for listing decisions, and submitted it to EPA with its April 1, 2016 303(d) list. A synopsis of the white paper:

The State’s white paper provides an analysis of the (“>1-in-3”) assessment method for toxics, and requests that a modernization of water quality assessment and sampling methods for toxics is now appropriate. The white paper should encourage EPA to do a retrospection and reexamination, and it enables EPA to do so by providing all of the references that the (“>1-in-3”) was based upon. In its research for the white paper, the State found that the literature is based on biological response and not toxics concentrations. The (“>1-in-3”) assessment method is largely based on EPA’s use of: 1) eight studies cited in EPA’s Technical Support Document for Water Quality-based Toxics Control (EPA 1985) and 2) a compilation of papers, including a literature review (Niemi *et al.*, 1990) published in *Environmental Management* in 1990 (Volume 14, Issue 5).

None of the studies reviewed in EPA (1985), Niemi et al (1990), Jones and Schmitz (2009) and Gergs *et al.* (2016) represent studies of the effects of metals (toxics) discharged to the nation’s waters. This greatly limits the applicability of the (“>1-in-3”) assessment method to address the

effects of acute and chronic metal discharges. Much of the literature reviewed by EPA (1985), Niemi et al (1990), Jones and Schmitz (2009) and Gergs *et al.* (2016) can be classified as “pulse” perturbations (such as disturbances or events), whereas the discharge of toxics by point sources can be classified as “press” perturbations. Standards were designed to manage “press” perturbations. As the literature shows, the “(>1-in-3)” policy was developed based on “pulse” incidences. For those two distinct reasons, the “(>1-in-3)” policy should be revoked from applicability in the standards assessment and 303(d) list decision-making.

A primary part of the “(>1-in-3)” assessment method is the determination that it takes an average of three years for biological communities to recover from exceedances of a toxic compound, thereby linking chemical and biological assessments. This three-year period was established through studies examining the recovery of biological communities. Thus, the evaluation of biological communities is indispensable to determine when toxic compounds have impacts on measures such as biological integrity. When biological communities are evaluated during the same assessment period as the collection of metals samples, both sets of data are needed to identify and confirm any impacts. The “(>1-in-3)” method does not consider an actual assessment of the biological community, when, in fact, the recovery of the biological community is what the “3” of the “(>1 in 3)” is based upon.

Furthermore, only one of eight studies names a metal toxicant (zinc), describes the degree of damage to the biological community as “slight”, does not identify a zinc concentration (a standard), and documents the biological community recovering at six weeks. In 139 reviewed publications, dealing with recovery of aquatic systems, stressors were only identified as metal chemicals three times out of 139 literature citations, further stressing the fact that metals concentrations data (standards) were not used to develop the “(>1-in-3)” policy.

The full White Paper by NC DWR is available at [Modernizing Water Quality Assessment Method of Toxics](#).

Biology is an important indicator of water quality

In a related, but separate, action ([Triennial Review approval/disapproval 2016](#)), EPA also disapproved the State’s adopted rule to use biological confirmation for making metals impairments. However, the State has further justified the merit of biological confirmation for metals listing by bringing into light in the white paper the literature references for the “(>1 in 3)”, which are based upon biological recovery. Biological sampling is an important indicator of the effects of magnitude, duration and frequency of parameters or pollutants. Aquatic impacts occur not only from the magnitude of a pollutant, but also from the duration and frequency with which criteria are exceeded. The “(>1in 3)” basically ignores everything but frequency.

Therefore, the State reaffirms its position that biological confirmation is necessary, combined with standards assessment, in order to make good, confident decisions on impairment. “The assessment challenge is to interpret the limited amount of sample data to determine whether an apparent violation of standards warrants listing a segment as impaired,”¹

¹ Eric P. Smith, et al., *Statistical Assessment of Violations of Water Quality Standards under Section 303(d) of the Clean Water Act*, 35 ENVTL. SCI. & TECH. 606, 607 (2001), available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_policydocs/297.pdf.

The “(>1-in-3)” method ignores the importance of sample size

The “(>1-in-3)” listing methodology is problematic in another way because it does not take into account the importance of sample size. In determining whether a waterbody is impaired, the State believes it is essential to take sample size into account. A technical report by Pi-Erh Lin, et al., concluded that a minimum of ten samples should be required in order to list a water as impaired on a state’s 303(d) list. [Pi-Erh Lin, et al., *A Nonparametric Procedure for Listing and Delisting Impaired Waters Based on Criterion Exceedances at 6-7* (Oct. 2000), available at <http://www.dep.state.fl.us/water/tmdl/docs/Supdocument.PDF>.]

The State’s listing methodology allows for different approaches to be used for other types of data, such as for bacteria monitoring (as little as five samples are allowed for assessment), benthic and fish biological samples (as little as one sample is allowed for assessment), as well as fish consumption and shellfish harvesting advice. Given the public’s perception based on 303(d) listing decisions, the considerations of using smaller datasets for these specific standards and parameters makes practical sense and provides information to the public on specific uses such as recreation and fishing that is understandable to the public. Therefore, the State’s methodology supports using smaller datasets in these situations and its current methodology allows for that.

EPA has proposed to add some waters to the State’s 303(d) list based on small sample sizes for non-toxic pollutants. The State affirms that sample size minimums are relevant for non-toxic parameters, as well as toxics. EPA’s proposal is not acceptable to the State, because EPA would likely also require a larger sample size to remove the waters from the 303(d) list, than the sample size EPA is saying is justifiable to impair it. The EPA’s approach is skewed towards listing a waterbody, and using a small sample size is inconsistent with its own delisting approach.

Consequences of Conclusion

Listing a waterbody-pollutant combination as impaired has significant consequences. The regulated public pays a price for incorrect 303(d) listings. Listing a water raises concerns among the public as to whether it is safe to swim or fish, regardless of the parameter it may be listed for, and regardless of the magnitude of exceedance for what it may be listed for. Incorrect and inappropriate listing can hinder efforts by local governments and states to attract people or businesses to move to or visit an area. EPA’s proposed approach is an inappropriate methodology for North Carolina’s assessment as it ignores critical factors such as size of the data set, confidence levels, and management of false positives.

The State’s null hypothesis is that the water is not impaired for the pollutant at issue, while the alternative hypothesis is that the water is impaired. The State’s methodology supports that if the information is not sufficient to list, then it’s also sufficient to delist. The State contends that the EPA’s requiring the use of a reverse null hypothesis (to delist) is not appropriate.

The State will only designate a water as being impaired, the alternative hypothesis, if and when these three statistical endpoints are met for conventional and toxic pollutants:

- Greater than 10% of the data exceed the criteria
- With at least a 90% statistical confidence level, and
- The sample size exceeds nine.

The State approved 303(d) listing methodology ([EMC listing methodology](#)) thoroughly explains how and when statistics are applied and for which parameters. The State firmly rebuts the EPA's claim that the State's approach does not provide for assessment of toxics, as is justified throughout this letter. While the State agrees with the Dec 8, 2016 EPA's concurrence with the State to list 1231 water quality limited segments and delisting of 44 segments, the State firmly disagrees with the concurrent EPA decision to add 72 additional waterbody-pollutant combinations to the State's 303(d) list.

Action Requested and Conclusion

The State respectfully, but strongly, requests EPA to re-evaluate its disapproval of the State's 303(d) submittal, affirm understanding/acceptance of the State's listings based upon the State's Listing Methodology and approve the 303(d) List submitted by the State on April 1, 2016.

Post Conclusion

The EMC submitted a letter to EPA in 2014 (link: <https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014/EMC - EPA Oct 14 2014.pdf>) with similar concerns, following EPA's disapproval of components of the State's 2014 303(d) list. EPA has not attempted to discuss the differences, other than repeating their same arguments in formal, written correspondence. The State disagrees with the prolonged and drawn out EPA process of approving/disapproving the State's list. The State has a responsibility to prepare and submit a list every two years, and the disapprovals are very discouraging. The State's and EPA's shared goal of protected water resources and adequate information to document the status of the waters of the State to the public should be reason enough to communicate and collaborate, rather than submit prolonged written arguments to the State while the State is doing its best to carry out its responsibilities. The State disagrees with any added value to the water resources or to the public from the EPA's proposal to add additional waters to the State's list.

Listing a waterbody-pollutant combination as impaired without using the State's methodology has significant consequences. It is interpreted by the public to question whether it is safe to swim or fish. It hinders efforts by local governments to conduct additional monitoring and perhaps to even attract people or businesses to an area. The State affirms that the listing methodology used to generate the State's 2016 303(d) list was properly designed and implemented.