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Water Protection Division
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Subject: Comments of North Carolina Department of Environment and Natural Resources, Division of Water Resources and North Carolina Environmental Management Commission on the U.S. Environmental Protection Agency Decision to Add 52 Waterbody-Pollutant Combinations to North Carolina's 2014 Section 303(d) List

Dear Ms. Hopkins:

The North Carolina Department of Environment and Natural Resources, Division of Water Resources (DWR) and the North Carolina Environmental Management Commission (EMC) have reviewed your July 31 letter approving portions of North Carolina's 2014 303(d) list. We appreciate EPA's approval of the majority of the submission. However, we disagree with EPA's decision to add 52 waterbody-pollutant combinations to the list.

For the following reasons, DWR and the EMC ask that EPA reconsider the listing of these additional waters and instead fully approve the 303(d) list as submitted.

EPA's Decision Improperly Intrudes 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 water quality standards (33 U.S.C. section 1313(c), 40 C.F.R. section 131.20) and impaired waters listing decisions (33 U.S.C. section 1313(d), 40 C.F.R. 130.7(b)).

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. 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.

We respectfully submit that EPA's decision that 52 additional waters should be listed goes far beyond its responsibilities and authority because it substitutes its interpretations of North Carolina's water quality standards and listing protocol for those of the State.

EPA's Decision Improperly Rejects North Carolina's Approved Listing Methodology

EPA proposes to add the 52 waters to North Carolina's 303(d) list on the grounds that "EPA has not determined that the State's methodology is a reasonable method to assess toxic or non-conventional pollutants consistent with the State's currently applicable, EPA-approved water quality standards."

The “methodology” that EPA refers to is one that was developed by DWR with significant input and ultimate approval by the EMC after months of effort and discussion, including the involvement of interested stakeholders. A fundamental principle underlying this methodology was that there be sufficient quality data to have a 90% confidence level that 10% of samples exceed a water quality standard. As part of the 2014 303(d) list development, DWR staff used this EMC-approved methodology to reclassify the 52 waters at issue to Category 3a (inconclusive) and remove them from the 303(d) list.

EPA, however, essentially ignores the extensive and careful consideration that North Carolina put into developing its listing methodology and unilaterally substitutes its own judgment for that of the State. Specifically, EPA proposes to place the 52 waters back onto the 303(d) list using greater than 1 exceedance in 3 years (“>1-in-3”) listing method. This action by EPA is improper for a number of reasons.

EPA Lacks Legal Authority to Impose the >1-in-3 Listing Method

The >1-in-3 listing method is not mandated by the Clean Water Act. It has not gone through the public safeguards of notice and comment rulemaking and been published as an enforceable regulation. In short, the >1-in-3 listing method is not a binding legal requirement that EPA can impose upon North Carolina or any other state.

The >1-in-3 Listing Method Ignores the Importance of Sample Size

The National Research Council has recommended that EPA endorse statistical approaches, such as the binomial hypothesis test, “that can more effectively make use of the data collected to determine water quality impairment than does the raw score approach.” Such approaches help to manage error rates, reduce false-positive errors, take into account sample sizes, establish the confidence level associated with the assessment, and address sampling and analytical errors and non-representative sampling bias.

Like the raw score method, the >1-in-3 listing methodology is problematic because it does not take into account the importance of sample size. While the raw score method at least considers the proportion of samples that exceed water quality standards, the >1-in-3 listing methodology would require a finding of impairment whether two exceedances in a three-year period are out of a total of two samples or 200 samples, even though the latter would be much less likely to indicate truly impaired ambient conditions. Larger datasets are more likely to include samples collected during brief extremes, such as the “first flush” of stormwater, which are too short-lived to impact the biological community. In determining whether a stream is impaired, DWR and the EMC believe it is essential to take sample size into account.

The >1-in-3 Listing Method Ignores High Error Rates in Toxics Data

Scientific literature reveals that conventional sample handling methods used in measuring freshwater metals levels often result in significant rates of erroneously high data due to contamination artifacts, especially for trace metals such as arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. For example, the sample composition may be distorted by

contact of analytes present in both gas and liquid mixtures with the walls of sampling vessels, tubing and appliances which crucially affect the concentration levels of trace components. Due to the ubiquitous presence of metals and other inorganic analytes in laboratories and analytical reagents, errors in toxics measurements tend to be skewed toward values higher than actual concentration levels, increasing the risk of incorrectly including unimpaired waters on North Carolina's 303(d) list.

EPA agrees that this problem exists by recommending that metals be analyzed using clean techniques as established in Method 1669 (Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, July 1996). This method was developed by EPA to specifically address the needs of States to measure toxic metals at water quality criteria levels. EPA found that one of the greatest difficulties in measuring pollutants at these levels was precluding sampling contamination during collection, transport and analysis. Despite this, EPA bases its action to put these 52 waters on the 303(d) list even though none of the data on which it relies was analyzed using clean techniques.

Another reason for high error rates in toxics data is the fact that numeric criteria for many toxic substances are near the practical quantitation limit ("PQL"). For example, North Carolina's aquatic life criteria for cadmium are 0.4 µg/l for trout waters, 2.0 µg/l for non-trout waters, and 5.0 µg/l for salt waters, while the PQL for cadmium is 1 µg/l. There is significant uncertainty in data values close to detection limits, so the risk of erroneously high data points increases where the criteria are near the PQL. Additionally, the method for determining detection limits may lead to false positives due to bias and variability in methodological noise and sensitivity, and errors may result from incorrect reporting of values below detection limits.

In addition to sampling by state agencies, North Carolina bases 303(d) decisions on large quantities of data collected by numerous third parties. Since DWR lacks the resources to conduct comprehensive screening of all these data to ensure reliability, it is necessary for the listing methodology to factor in uncertainties regarding data quality for toxic substances to prevent waters from being listed as impaired due to erroneously high data points.

North Carolina's 10% Probability Value/90% Confidence Level is Appropriate for Determining Impairment by Toxic Substances and Non-Conventional Pollutants

The 10% Probability Value is Necessary and Appropriate

The statistical 10% probability value establishes the frequency at which data must exceed a water quality standard in order to make a determination that an in-stream concentration actually exceeds a water quality standard. This 10% probability value accounts for sampling and analytical errors to which toxics data (as previously described) are particularly prone.

In addition, the levels of toxic substances can vary significantly during the first flush of stormwater. Exceedances of water quality standards during such events are unlikely to impact the biological community due to the short term nature of the increase in toxics levels. Additionally, the concentrations of many toxic substances have also been observed to fluctuate diurnally. Application of the 10% probability value to toxic pollutants prevents occasional

exceedances from the “first flush” of stormwater and diurnal variability from triggering unwarranted 303(d) listings. This is consistent with accepted statistical approaches.

We do not understand from the agency’s decision letter that EPA questions the use of the 10% probability value. Nevertheless, DWR and the EMC want to clearly state that the value is an integral part of the State’s listing methodology and is necessary and appropriate

The 90% Confidence Level is Necessary and Appropriate

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%. Use of confidence levels helps identify when a sufficient number of exceedances have occurred that indicate a true exceedance rate of > 10%. This helps address concerns about outliers, minimum data sets, borderline impairment background conditions, collection mishandling, calibration errors, potential laboratory errors, etc.

Modern statistics strongly recommends the use of confidence values. While other states using a similar listing methodology have chosen to use confidence levels between 80% and 95%, a confidence level of less than 90% is not considered acceptable by most statisticians. Indeed, Region 4 has approved listing decisions by Florida and Mississippi using a 90% confidence level like North Carolina.

Conclusion

DWR and the EMC strongly believe that the listing methodology used to generate North Carolina’s 2014 303(d) list was properly designed and implemented. Furthermore, that design and implementation is specifically a state responsibility which EPA must respect and honor. For the reasons stated in this letter, DWR and the EMC request that EPA not add the 52 water bodies to the 2014 303(d) list.

Sincerely,

Benne C. Hutson, Chair
North Carolina Environmental Management Commission

Thomas A. Reeder, Director
Division of Water Resources
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