

**Lower Neuse Basin Association® / Neuse River Compliance Association®**  
**P.O. Box 1410 Clayton, N.C. 27528-1410**

November 16, 2020

Mr. Stephen Daniel Smith ([danny.smith@ncdenr.gov](mailto:danny.smith@ncdenr.gov))

Ms. Karen Higgins ([karen.higgins@ncdenr.gov](mailto:karen.higgins@ncdenr.gov))

Ms. Pamela Behm ([pamela.behm@ncdenr.gov](mailto:pamela.behm@ncdenr.gov))

Mr. Rich Gannon ([rich.gannon@ncdenr.gov](mailto:rich.gannon@ncdenr.gov))

Division of Water Resources

1611 Mail Service Center

Raleigh, N.C. 27699 - 1611

**Subject:** LNBA/NRCA Comments on the **Draft Request for Proposal: Development of Neuse River Basin Watershed Model.**

On behalf of the Lower Neuse Basin Association (LNBA) and the Neuse River Compliance Association (NRCA) we extend our appreciation to DWR for their November 5th meeting engaging stakeholders on the DWR Draft Request for Proposal: Development of Neuse River Basin Watershed Model. We understand that this DWR modeling process is to determine new transport zones and delivery factors for the Neuse River Basin in conformance with S.L. 2020-18 Section 15. We also understand and support DWR's intention to seek a Neuse River Basin Watershed Model. It is unfortunate that the Session Law did not provide additional resources for DWR to accomplish the project. We recognize DWR's forward thinking on the benefits of a watershed model even though it was not included in the Session Law. The misalignment of available funding for developing a quality watershed model (or suite of models) is regrettable. The LNBA/NRCA recognizes that the magnitude of the challenge posed by the development of a complex watershed analysis that produces highly confident results without great uncertainty cannot be achieved without significantly more resources than are now shown in the Request for Proposal. We offer the notion that "something is NOT better than nothing". If the results of the watershed model are not produced in a highly confident and acceptable manner the impacts of poorly informed management decisions can become highly significant. The inequities in the TMDL strategy, and the resulting failure to regulate nonpoint source contributions, for the Neuse Estuary are ample evidence of the damage that arises from incomplete modeling. In this light, we respectfully submit the attached comments on the draft DWR (RFP) request for proposals.

The LNBA and the NRCA have invested significant resources in time and funding over several decades in cooperation with DWR and the Neuse River Management Strategies. To date, the LNBA/NRCA have invested approximately 500 million dollars to successfully meet and exceed the point source (PS) nutrient loading TMDL reductions required for the attainment of the chlorophyll-a water quality standard in the Neuse River estuary. This successful effort has been quantitatively reported to the DWR for many years. This financial lift is designed to extend the point source control contributions while providing for adequate public sewer services into the future. Planning for adequate service requires a predictable regulatory scheme to justify the high costs of such controls. The LNBA/NRCA members and their local governments have provided broad based public support and financial resources to reduce

the PS load of both nitrogen and phosphorus to the Neuse River Estuary. Thus, a complete RFP should clearly recognize that NPS's are the leading contributor of nitrogen to the Neuse River estuary and NPS's have few regulatory controls to address their loading. We believe that DWR needs to explicitly recognize the importance of developing confident and evidenced based approaches to establishing zones and delivery factors not just for PS's but for NPS's as well. The Phase II TMDL baseline relative loading for point sources vs nonpoint sources was 34% and 57% respectively. Since that time the LNBA and NRCA have greatly reduced the point source load.

Overall we find the proposed RFP too limited in both scope and funding. DWR justified its request to re-examine the transport factors by the lack of a watershed model. While the RFP appears to comply with the Session Law, it fails to provide for a watershed model of appropriate quality. Based on the available funding, it is likely that a data limited, single model approach will result in a singular analysis without a high degree of confidence based on a number of assumptions, generalities, literature values, and published decay rates – most of which have not been measured in the Neuse River Basin. Rather, than a single model approach, we suggest DWR consider the use of a suite of models. Moreover, given the importance of establishing accurate delivery factors, we encourage the DWR to explore the use of three distinct approaches (models). We note that the Neuse TMDL Phase II modeling approach employed three separate models to contribute confidence to the development of management decisions. We also note that the Phase II TMDL designated five use support areas in which the three models grouped their predictions. The various TMDL model predictions were grouped in three use support areas because the observed data showed similar behavior, and because they generally correspond to where DWQ had assessed use support. Assessment of use support and regulatory compliance is a critically important component of water quality management and TMDL attainment and should be considered in the development of a watershed approach. We note that DWR has changed the use support assessment approach and is now evaluating individual monitoring stations rather than the five designated use support areas.

We are concerned that a poorly-funded single-model approach based on limited data will result in more questions than confident answers and too little information for regulating NPS's in an equitable manner. After all, models are not mathematical proofs nor factual laws of physics. Models must include a number of assumptions typically confined to a certain set of conditions. The anticipated funding, and the two-year work schedule does not appear to allow for sufficient stakeholder engagement, model revisions, and an adequate assessment of model confidence, uncertainty, and the identification of additional data needs.

That said, we are grateful for DWR's acknowledgement of the benefits that can be derived from the development of a high quality watershed model for the Neuse River Basin. We recognize that models are only as good as the stakeholder engagement, data, and assumptions that goes into them. In cooperation with the DWR, the LNBA/NRCA we would like to offer all of our data, engagement, feedback, and encouragement to help with the development of the highest quality effort.

Division of Water Resources

Page 3.

Thank you for the opportunity to submit our attached list of comments. If you require any additional information please let us know.

Sincerely,

A handwritten signature in black ink, appearing to read "H. Phthisic, III". The signature is fluid and cursive, with a prominent initial "H" and a stylized "P".

Haywood M. Phthisic, III  
Executive Director

cc: LNBA Board

1. Consider changing the title of the RFP to more explicitly describe the anticipated work.  
We suggest that any title include the intended application of the work product. For example – How will the Watershed Model be used? We believe that the current RFP language assumes the potential contractor has decades of knowledge on the management of the Neuse River Basin. It would be helpful to add a number of important references to the RFP. Further we suggest DWR consider adding a pre-proposal meeting or question and answer session for potential vendors. Given the possibilities of using this watershed model for regulatory purposes, perhaps the contractor should have model development for regulatory purposes as part of their qualifications. It is not clear if DWR will be seeking academic modelers as potential contractors. Given the limited resources, it is a possibility, that only academic modelers may be responsive to the RFP.
2. DWR should consider the addition of NPS transport zones and delivery factors for the Neuse River basin and under what flow or storm conditions any modeling is anticipated to be performed. For both PS and NPS modeling the RFP should elaborate under what flow or seasonal conditions the analysis should be directed or targeted. Perhaps application of the model for transport factors should ultimately be based on a multi-year simulation period to account for representative long-term flows and perhaps explicitly identify conditions that are to be exempted from analysis – extreme drought and extreme floods. The RFP should provide some indication of the types and forms of nutrient sources that should be included in the watershed model. Perhaps: point, nonpoint, atmospheric, terrestrial, onsite-wastewater, stormwater, urban, rural, fertilized land, golf courses, lawns, crops, pasture, animals/livestock etc. The RFP might also recognize that N and P may potentially have different zones and different transport factors. We recognize that the RFP is intentionally limited in prescribed details in order not to limit the potentially beneficial offering of “new approaches” to the development of the watershed model. But, we would suggest that by including Table 1 (the only table) DWR seems to be offering a directional perspective of a desired outcome. Thus, we suggest that Table 1 be removed from the RFP. Alternatively, perhaps DWR could offer some indication of quality measurements that should be included in the responses to the RFP – perhaps quantitative measurements of validation, confidence, and uncertainty?
3. DWR may wish to consider the establishment of a stakeholder Technical Advisory Group (TAG) to inform appropriate model assumptions, adequacy, reliability, and confident information transferability. A TAG could offer insights on many factors that need to be considered in the application of a decision support model, assumptions, scenarios, number of zones, appropriate data bases, implementation challenges, etc. Consistent with this comment – perhaps the number of meetings (2) in Task one should not be limited. We are pleased that Task II deliverables include two meetings “at a minimum”.
4. There may be added value in better describing what type of modeling approach or approaches will be considered and more specifically how the information will be used. The RFP does not identify if a quantitative or qualitative modeling approach is adequate. The Session Law seems to suggest that the desired approach is for point source regulation only. Does this include the NPDES stormwater discharge sources regulated for discharges from municipal separate storm sewer systems (MS4s), construction activities, and industrial activities? The RFP offers an opportunity to streamline the entire contractor selection process. If the RFP adequately describes the desired product those responding can more ably hit the desired target. Perhaps a decision support model or a predictive water quality model will be required under various conditions. Perhaps a statistical or a probability modeling approach is what is intended. Many types of models exist for the consideration of nutrient export and transport. Models are different in terms of inputs and requirements, the processes they represent, and the output

information results from the modeling processes. Quality responses to the RFP need to fully understand the background, potential uses and expectations. For example VA Code § 25-820-10 defines a "Delivery factor" as an estimate of the number of pounds of total nitrogen or total phosphorus delivered to tidal waters for every pound discharged from a permitted facility, as determined by the specific geographic location of the permitted facility, to account for attenuation that occurs during riverine transport between the permitted facility and tidal waters. Delivery factors shall be calculated using the Chesapeake Bay Program watershed model. The RFP does not provide sufficient clarity to understand if DWR is seeking a completely new watershed model for the basin or, as it now appears, is rather focused on providing delivery factors for different geographical areas. We note that the Chesapeake area has derived various approaches for delivery factors including location ratio, delivery ratio, in-stream delivery factors, trading ratios, edge-of-stream ratios, equivalency ratios etc. We also note the Chesapeake Model was developed with far greater resources in time and funding.

5. The RFP might also be strengthened by describing the boundary conditions for the extent of the watershed model. For example – the upper boundary is the Falls Lake Dam. The lower boundary is not described. Does it include the Trent River Basin? Does it include other tributaries to the estuary?
6. Stakeholder engagement is a critical part of this process. The inevitable assumptions used in the process and the specific model and frameworks need to be defined. A successful and embraced application of the results will need frequent stakeholder opportunities for review and comment. Review and comment on the contractor's proposed decisions will need stakeholder review and comment before they are joined or implemented in a modeling or decision making framework.
7. From a modeling perspective, accurate and complete source representation will be critical in order to provide confidence and underestimating of the incremental inputs in the middle portion of the basin. Incremental inputs along the basin have the potential to increase the apparent transport factors. Model calibration also has the potential to underestimate or overestimate the bioavailability, reactivity, and biological removal of nutrients within the river/stream network. The RFP should consider identifying this concern prior to release so as to obtain potential contractor's awareness and insight on how to manage this challenge.
8. If DWR chooses a mechanistic approach to modeling it is likely that different forms of nitrogen will need to be considered (notably organic nitrogen which has increased in the basin). However, for implementation purposes, it is also likely that an approach to derive confident (acceptable) transport factors will need to provide results as a Total Nitrogen composite value. These issues will need careful consideration.
9. The intent of this analytical process is not the development of new academic modeling, measuring, or analysis methods. A successful and accepted product of this work should provide for a reliable and fare mechanism of determining the relative significance of nutrient delivery from all sources to the Neuse River estuary. If it is DWR's intent to modify NPDES permit allocations for nutrients based on a change in transport factors, DWR should also evaluate the transport factors for NPS's as well within the same watershed modeling (decision making) framework. With this approach in mind, relationships between PS and NPS loads to the estuary could offer a trading shift in allocation between Point and Nonpoint Sources as well. DWR should also consider the real benefits of adaptive management changes that may be available with a revision to the Neuse River TMDL or through the adoption of an alternative management strategy to the current TMDL.