

Action Plan

Full implementation of the nutrient reduction strategy has been a measured process and was reached in 2006. Point sources continually have met their targeted nutrient loading caps from the early 1990's. The agriculture community has reduced their estimated nitrogen loss from cropland and pastureland by an average 45%, since 2002. Almost 2,000 fertilizer applicators have received nutrient management training and the six local governments covered under the stepped Stormwater Rule have all adopted and implemented local stormwater programs to limit nitrogen and phosphorus inputs from stormwater runoff resulting from new development. Despite this successful implementation, water quality standards in the Pamlico River Estuary are not being met.

The Pamlico Estuary is a very complex and dynamic system. Climatic variability plays an important role in the mobilization, processing, and delivery of nutrients to the Estuary. Estuarine water quality response is affected by climatic events causing variability that obscures clear trends in nutrient loading and the estuary's response to these loads, despite reductions to point and nonpoint source loads. Due to the decades of chronic overloading, the time lag required for nonpoint source input reductions to be fully expressed, and the likelihood of nutrient cycling within the estuary, it may be some time before current reductions in nutrient loading will reflect improved water quality.

DWQ staff have begun an evaluation of the limitations of the current strategies and identified opportunities for developing a better understanding of the nutrient dynamics for both the Tar-Pamlico and Neuse River systems. While further analysis of existing data and additional data collection will provide greater certainty as to the effect of the strategies on the estuaries, existing strategy's limitations and the other basin factors that contribute to estuarine conditions must be recognized. Listed below are the overarching recommendations and research needs identified in this plan which will be pursued during this next basin plan cycle. It is important to note that at this time, DWQ is not reassessing the TMDL or suggesting that the current NSW rules be modified.

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RECOMMENDATIONS & GOALS	ACTIONS NEEDED	RESPONSIBLE GROUPS	DATE
1) Water Resources Plan Continue to work with Division of Water Resources on the development of the Tar-Pamlico River Basin Hydrologic Model and Water Resources Plan.	Participate in planning meetings and identify coordination opportunities for water quality and quantity planning	Division Water Resources and DWQ-Basinwide Planning Unit	2014
2) Atmospheric Deposition Assess atmospheric nitrogen contributions to the watershed and develop recommendations on better characterization of atmospheric nitrogen deposition and emission source regulatory considerations. Specifically address better characterization of the contribution of ammonia emissions from Concentrated Animal Feeding Operations (CAFO).	Workgroup with DWQ & DAQ	DWQ-Nonpoint Source Unit & Basinwide Planning Unit & DAQ	2014
3) Watershed Monitoring and Trends Identify additional monitoring locations and parameter needs. Conduct additional trend and loading analyses upstream of the Pamlico River Estuary focusing on smaller watersheds. Better characterize basin nutrient sources and relative contributions.	Agreement on monitoring station needs and available resources needed to extend nutrient monitoring	DWQ- Basinwide Planning, TMDL & Modeling Unit, Environmental Sciences Section, Coalition Coordinators & Tar Pamlico Basin Association	2014

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4) Fate and Transport Model/Analysis Develop a fate and transport model or other analyses to determine individual NPDES nutrient limits.	Identify appropriate nutrient data needs and flow data requirements	DWQ- NPDES Wastewater Unit, Non Point Source Unit, TMDL & Modeling Unit, Coalition Coordinators & Tar Pamlico Basin Association	2014
5) Agriculture Nutrient BMP Tracking More detailed reporting on tracking changes of BMPs and additional BMPs to offset new or increased sources of nutrients from agricultural operations.	Reconvene with Division of Soil & Water Conservation (DSWC) and Basin Oversight Committee (BOC) to explore plausibility of providing more detailed reports.	DWQ-Nonpoint Source Unit & Basinwide Planning Unit & Division of Soil & Water Conservation	2014
6) Poultry Potential Nutrient Source Continue to evaluate the impact of the Rose Acres egg-laying operation on the Pocosin Lakes National Wildlife Refuge and the surrounding aquatic ecosystem. Develop recommendations on how to reduce the impacts from this and other large poultry operations.	Summarize research findings to support future policy options and permit needs.	USFW, DSWC, BOC DWQ-Basinwide Planning Unit, & Animal Feeding Operations,	2012
7) Aquaculture Facilities Continue follow-up actions on hybrid striped bass farms and other fish farms in the lower Basin to improve their effluent quality and better quantify their impact to the Estuary. If warranted, include their nutrient contributions in the Basin's accounting of progress towards meeting nutrient reduction goals.	Identify fish farms with potential impacts to surface waters.	DWQ-WaRO, DSWC	2014
8) Stormwater •Assess stormwater runoff impact in areas within the basin that are currently not under any stormwater program. •Evaluate the magnitude of nitrogen loading in runoff from existing developed areas and assess the need to further address this source under the strategy. •Review stormwater and sediment and erosion control compliance activities; assess need for additional staff for inspection and enforcement needs.	Establish a DWQ working group to evaluate programs and nutrient control issues.	DWQ- Nonpoint Source Unit & Stormwater Permitting Unit	2014
9) Threatened and Endangered Species Continue development of threatened and endangered species management plans.	Review EPA ammonia toxicity standards, DWQ regulatory programs and plausibility of development of statewide mussel species management plan and/or rules.	DWQ- Classifications and Standards & Basinwide Planning Unit	2014

ADDITIONAL RESEARCH NEEDS

- Evaluate impacts to riparian buffers
- Explore additional nutrient offset options to be included in the NSW Point/Nonpoint Phase IV Agreement.
- Implement monitoring to better characterize the nature, magnitude and trends in atmospheric and groundwater derived nutrient contributions to the Tar-Pamlico River Estuary.
- Assess nutrient residence time in the estuary.
- Characterize the location, geographic extent and functionality of tile drains under agricultural fields.
- Quantify the potential magnitude of nutrient loading from spray fields, directly from animal housing and holding, and waste storage facilities on CAFOs.

ADDITIONAL RESEARCH NEEDS CONT.

- Characterize the geographic extent and quantify the potential magnitude of nutrient loading from dry litter poultry facilities, animal housing and waste storage.
- Characterize the potential for groundwater contamination and transport of nutrients from biosolids and wastewater land application fields to the surface waters of the Tar-Pamlico Basin.
- Quantify the nitrogen contributions from conventional on-site wastewater treatment systems to surface waters of the Tar-Pamlico Basin.
- Better quantification of BMP effectiveness (agricultural and stormwater BMPs); improve accounting tools.
- Characterize nutrient loading from various pasture management practices which leads to a better understanding of pasture's nutrient contributions and the value of different management options.
- Quantify the magnitude in which pharmaceuticals are impacting aquatic life. Pharmaceuticals and organic waste compounds were found in the Tar River as reported in a 2009 USGS study¹.
- Identify the local Drainage Districts and understand their current role in controlling water flow and drainage issues. Work with the Districts to develop recommendations on how to protect water quality in these areas.

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This document was approved and endorsed by the NC Environmental Management Commission on January 13, 2011 to be used as a guide by the NC Division of Water Quality in carrying out its Water Quality Program duties and responsibilities in the Tar-Pamlico River Basin.

Public input and contributing information was provided by:

- NC DENR agencies- Division of Water Resources, Division of Soil and Water Conservation, Natural Heritage Program, Ecosystem Enhancement Program, Division of Environmental Health, & Division of Forest Resources.
- Franklin County, Greenville, Pamlico-Tar River Foundation, PCS Phosphate, Pitt County, Rocky Mount, Tar-Pamlico Basin Association, Tar River Land Conservancy, Upper Coastal Plain COG, US Fish & Wildlife Service, Warren County, & Warrenton.

¹ Ferrell, G.M., 2009, Occurrence of selected pharmaceutical and organic wastewater compounds in effluent and water samples from municipal wastewater and drinking-water treatment facilities in the Tar and Cape Fear River basins, North Carolina, 2003-2005: U.S. Geological Survey Open-File Report 2009-1046: 45 <http://pubs.water.usgs.gov/ofr2009-1046>.