Clean Ocean Action

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Ocean Advocacy Since 1984

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February 17, 2009

Leslie McGeorge
Administrator
Water Monitoring and Standards
NJ Department of Environmental Protection
401 East State Street
Trenton, NJ 08625-0402

RE: Nutrient Criteria Enhancement Plan

VIA: EMAIL

Dear Ms. McGeorge;

Clean Ocean Action (COA) has reviewed the draft New Jersey Department of Environmental Protection's (NJDEP) Nutrient Criteria Enhancement Plan (NCEP) and provide the following comments, on behalf of our coalition and the American Littoral Society (ALS). COA is a broad-based coalition of over 125 conservation, environmental, fishing, boating, diving, student, surfing, women's, business, service, and community groups. Our goal is to improve the degraded water quality of the marine waters off the New Jersey/New York coast.

Overall, this nutrient criteria plan is unacceptable. The plan failed to meet US Environmental Protection Agency (USEPA) deadlines for a nitrogen criteria, fails to respond to the urgent need to reduce nitrogen pollution, nor even acknowledge the extent of the nitrogen-related problems plaguing New Jersey marine waters. In 2000, the National Research Council identified nutrients as the most significant coastal pollutant and called for a national strategy to reduce nutrient loadings that had been well documented to be increasing and causing eutrophication and degrading coastal estuaries and waters.[1] Recognizing this dangerous trend, the USEPA recommended states develop nutrient criteria plans by the end of 2001 and adopt the criteria by 2004.[2] The USEPA in 2007 called for "bold steps" to reduce nutrients, as "*High nitrogen and phosphorus loadings, or nutrient pollution, result in harmful algal blooms, reduced spawning grounds and nursery habitats, fish kills, oxygen-starved hypoxic or "dead" zones, and public health concerns related to impaired drinking water sources*

[1] National Research Council. 2000. *Clean Coastal Waters: Understanding and Reducing the Effects of Nutrient Pollution*. National Academies Press.
[2] *Federal Register*, Vol. 66, No. 6, Tuesday, January 9, 2001

and increased exposure to toxic microbes such as cyanobacteria."[3] USEPA reinstated the need for numerical nutrient criteria or numerical translators for narrative criteria arguing that *"we need to move more quickly and more comprehensively in order to meet the growing challenges from increasing population, expanding and more intensive agricultural activities, and spreading urbanization."*[4] According to the National Oceanic and Atmospheric Administration (NOAA), "*the Mid-Atlantic estuaries were the most impacted nationally: the majority of estuaries recorded a moderate high or high overall eutrophic condition rating, with more than one third of the estuaries having worsened since the early 1990s*."[5]

While NJDEP has made progress by updating the phosphorous criteria for freshwaters established back in 1981, the NCEP fails to respond to the well-documented nitrogen-related problems in New Jersey's bays, estuaries and coastal habitats.[6,7,8] In fact, the only stated actions on nitrogen criteria are the ongoing efforts in the coastal ocean and Barnegat Bay to develop a benthic index of biota integrity and examine nutrients (no details are provided on this study or how it will be used to assess nitrogen impairments), further evaluation of the Delaware River estuary, and an evaluation to assess whether a numerical nitrogen criteria is needed for fresh waters. The NJDEP's plan needs to be more proactive and adopt immediate actions to reduce nitrogen loadings now, as the evidence is clear and actions are feasible.

The USEPA's 2007 Memorandum to States to develop numeric nutrient criteria and reduce pollution requires that ***"The state's nutrient criteria plan should reflect the state's approach to setting standards for its waters, and include schedules for adopting those standards."***[9] The proposed plan lacks any specifics on the development of additional nitrogen criteria beyond the existing narrative criterion for nutrients in freshwaters, leaving significantly more questions than answers. How will the results of the two benthic studies in marine waters be correlated with nutrient enrichment? Will these benthic indices translate to the state's other marine habitats? How will the NJDEP determine whether dissolved oxygen (D.O.) and aquatic use impairments are due to nitrogen loadings? How will information from the paleo-studies for evaluating past nutrient loadings and ecosystem response be used for management purposes? Will nitrogen TMDLs underdevelopment ever be completed and enforced? The NCEP fails to provide a detailed, stepwise process for identifying eutrophication problems and developing nitrogen criteria for state waters that clearly answers these and other relevant questions.

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[3] USEPA Memorandum to States and water quality partners Re: Nutrient Pollution and Numeric Water Quality Standards May 25, 2007. http://www.epa.gov/waterscience/criteria/nutrient/files/policy20070525.pdf

[4] USEPA Memorandum to States and water quality partners Re: Nutrient Pollution and Numeric Water Quality Standards May 25, 2007. http://www.epa.gov/waterscience/criteria/nutrient/files/policy20070525.pdf

[5] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

[6] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

[7] Kennish et al. 2007. Barnegat bay-Little Egg Harbor Estuary: Case Study of a Highly Eutrophic Coastal Bay system. *Ecological Applications* 17:5:S3-S16.

[8] Howarth, R.W., Marino R., Swaney D., and W. Boyer. 2006. Wastewater and Watershed Influences on Primary Productivity and Oxygen Dynamics in the Lower Hudson River Estuary, in *The Hudson River Estuary*, Levinton & Waldman, editors. Cambridge Press.

[9] USEPA Memorandum to States and water quality partners Re: Nutrient Pollution and Numeric Water Quality Standards May 25, 2007. http://www.epa.gov/waterscience/criteria/nutrient/files/policy20070525.pdf

The NCEP simply leads to more studies and evaluation, when meaningful nitrogen reductions are needed now.

This proposed plan does not recognize that nitrogen is a problem for coastal waters (except for the Hudson/Raritan Bay estuary system) until further evaluation occurs. This strategy is unacceptable, as it will only exacerbate eutrophication and associated coastal problems by allowing nitrogen pollution to continue unabated. The proposed plan states that *"These benthic indicators for coastal waters, once they are developed, will be used to reassess aquatic life uses in these waters. Where assessment results indicate use impairment based on these new indicators, the NJDEP will need to determine **if** nutrients are the cause of impairment before proceeding with nutrient criteria development for these waters."* (emphasis added) The NOAA 2007 National Estuarine Eutrophication Assessment (NEEA) effectively verified that Barnegat Bay and New Jersey's Inland Bays are highly eutrophic.[10] By refusing to acknowledge the state's well documented nitrogen pollution problems, the NJDEP is delaying action on this important issue and undermining its mission to protect the environment. It also seems contradictory that the NJDEP has expressed concerns about phosphorous limitations for Barnegat Bay, in particular, recognizing that such limitations only occurs in marine areas where nitrogen levels are so high that it is no long the limiting nutrient, and yet NJDEP refuses to acknowledge this nitrogen problem in this plan.

We are concerned that the benthic index developed for Barnegat Bay/Little Egg Harbor system scheduled to be developed by 2010 will not be directly applicable to other shallow coastal bays, as the plan suggests, and thus will not be completed by this date. At a recent BBNEP Science and Technology Advisory Committee meeting, the scientists working on the Bay said that, given the uniqueness of the Barnegat Bay system, the indices under development would not be directly applicable to other coastal bay and estuaries. Will other shallow coastal bays be investigated for benthic index development in order to meet the 2010 schedule (i.e.: Shark River Bay and the southern NJ coastal bays and lagoons)? Are there any non-shallow coastal bays/estuaries where benthic indicators will also need to be developed (other than Delaware Bay and Hudson River/Raritan Bay regions)? Please clarify whether benthic indicators are currently under development in the Shrewsbury and Navesink Rivers as part of the Hudson River/Raritan Bay estuarine system effort.

Based on the NJDEP's plan, it appears that these estuary-specific indices will not be developed for years and no action will be taken in the meantime. After completion of these studies for each estuary, will the NJDEP next propose individual TMDLs for each coastal system and further delay action?

The NCEP's only proposed tool to reduce nitrogen loadings in marine waters is the TMDL process, which includes no timelines or requirements for action. The TMDL process involves years of research and development before any implementation strategies are even proposed, much less adopted.

[10] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

Inexplicably, the Hudson River/Raritan Bay Nutrient TMDL is not even included in the plan's schedule. Last year, excessive algal blooms and high chlorophyll levels were again common in Raritan and Sandy Hook Bays as they have been for decades.[11] Some of these were nuisance blooms that are known to be harmful to fish and shellfish. The NCEP proposed plan and schedule must include a schedule for TMDL completion and actions resulting from the TMDL process to address these ongoing eutrophication issues.

The plan is not clear how D.O. and aquatic life impairments will be addressed in other coastal estuaries and nearshore ocean waters. Will nutrient TMDLs also be developed for the D.O. impairments in the Shrewsbury and Navesink River estuaries? If not, the NJDEP must provide evidence to support their determination that estuarine D.O. impairments in these systems are not due to nitrogen enrichment. How will the NJDEP assess if ocean waters are impaired by nitrogen, when nitrogen loading rates by ocean dischargers are unknown?

Another critical concern is that the plan is not clear that funding and staff will be available to complete the proposed items in the plan. The state and the USEPA must support crucial efforts for both sufficient monitoring activities and reducing nitrogen loadings. It is unacceptable for the NJDEP to submit a plan for which it is known that its objectives and tasks cannot be funded and implemented within the proposed schedule. How will NJDEP address the funding issue?

Therefore, the NJDEP must address these severe deficiencies in the NCEP and make the plan more proactive. We suggest the following strategy and details follow.

Immediately,

- **Adopt a narrative nitrogen criteria for coastal estuaries that have numeric translators based on NOAA's Assessment of Estuarine Trophic Status (ASSETs)**
- **Accept NOAA's 2007 conclusions regarding impairment of NJ coastal estuaries**
- **Take immediate actions to reduce nitrogen loadings to coastal waters and eutrophication.**

Concurrently,

- **Continue benthic index development.**
- **Develop an improved method for SAV assessment/monitoring.**
- **Develop a modified ASSETs assessment method for nearshore ocean waters and narrative nitrogen criteria for nearshore ocean waters**

Given the complexity of nitrogen dynamics, NOAA, the other federal agency charged with control of nonpoint source pollution to marine waters, has developed a multi-faceted, quantitative approach for assessing nitrogen-related eutrophication in coastal estuaries. The Assessment of Estuarine Trophic Status (ASSETS) tool was developed by NOAA for use in the National Estuarine Eutrophication Assessment Program.[12] It includes random sampling

[11] Reid, Olsen and Mahoney, 2002. A Compilation of Reported Fish Kills in the Hudson-Raritan Estuary during 1982 through 2001. Northeast Fisheries Science Center Reference Document 02-09

[12] S.B. Bricker, J.G. Ferreira, and T. Simas, 2003. An integrated methodology for assessment of estuarine trophic status, *Ecological Modeling* 169: 9–60

locations within pre-designated salinity zones (high, medium, and low) and assesses influencing factors, such as physical, hydrologic, and anthropogenic dynamics and pressures. It is well known that the nitrogen loadings to a system are more critical for evaluating biotic response than nitrogen concentrations within a system.[13] The overall eutrophic condition is determined from data for five primary and secondary symptoms. Primary symptoms: excessive concentrations of chlorophyll a (phytoplankton), macroalgae and epiphytes. Secondary symptoms: low D.O., loss of submerged aquatic vegetation, and occurrence of nuisance/toxic blooms. Additional information from the local benthic index and assessments of relevant nutrient-tolerant biota should also be included in assessing the overall eutrophic condition once completed.

Adoption of this approach would provide the NJDEP with an immediate, narrative nitrogen criterion for estuarine waters based on currently available data and information for the five, quantifiable symptoms described above. A moderate or high level of eutrophication would indicate impairment.

Many of New Jersey's coastal waters and bays have already been evaluated and recognized as moderately and highly eutrophic. NOAA's 2007 National Estuarine Eutrophication Assessment (NEEA) has already documented nitrogen-related eutrophic conditions for Barnegat Bay, NJ Inland Bays, Delaware River and the Hudson River/Raritan Bay estuarine systems.[14] The NJDEP does not need to independently confirm these findings and could list these waters as impaired now allowing for immediate actions in response. The EPA should recognize these as the "bold steps" needed to reduce nitrogen levels.

For example, using currently available data and information to evaluate nitrogen impairment in the Barnegat Bay system utilizing the ASSETS five symptom, narrative nitrogen criteria would result in a determination of high eutrophication and an impairment.[15,16] Primary symptoms: Both chlorophyll and macroalgae levels in the Bay were assessed as high by NOAA.[17] Maximum chlorophyll levels occur in the northern part of the bay which coincides with the highest nitrogen levels in the bay.[18] Increasing numbers of macroalgae blooms and their extent have also been documented.[19] Secondary Symptoms: The bay is impaired in northern region for dissolved oxygen according to the NJDEP. Temporary low D.O. events may also be occurring in other regions in response to localized bloom die-offs. The loss of seagrass coverage has been well-documented and occurs seasonally as well.[20,21] The

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[13] Heisler, J. et al. in press, 2008. Eutrophication and harmful algal blooms: A scientific consensus. Harmful Algae http://www.whoi.edu/science/cohh/whcohh/publications/index.htm

[14] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

[15] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

[16] Kennish et al. 2007. *Ecological Applications* 17:5:S3-S16.

[17] NOAA 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change http://ccma.nos.noaa.gov/publications/eutroupdate/

[18] Seitzinger et al. 2001. *Journal of Coastal Research* Special Issue 32:144-162.

[19] Kennish et al. 2007. Ecological Applications 17:5:S3-S16.

[20] Bologna et al. 2000. Assessment of submerged vegetation in Little Egg Harbor, NJ. Technical Report 200-11, Rutgers University, New Brunswick, NJ.

[21] Kennish et al. 2005. Demographic investigation of sea grasses in the Barnegat Bay-Little Egg Harbor estuary with assessment of potential impacts of benthic macroalgal and brown tides. NERR Technical Report.

occurrence of nuisance blooms was determined to be high by NOAA. Reoccurring blooms of *Aureococcus anophagefferens* have occurred in 1995, 1997, and 1999-2002.[22] Levels were lower in 2004 and 2005,[23] and no data was found for 2006 and 2007 and only very limited data was available from 2008 state phytoplankton sampling. Brown tides are indirectly affected by nutrient enrichment often appearing after a pre-bloom of another algal species, as the nitrogen is transformed from inorganic to organic forms.[24] Additional harmful algal species have also been found to occur in the bay.[25] Algae blooms have likely contributed to long-term declines in hard clams and seagrass.[26] Loss of seagrass also reduces nursery habitats for fish. The increasing abundance of sea nettles, nutrient tolerant biota, has also significantly affected the ecosystem since they appeared in 2004.[27] Nitrogen loading to the system has also been documented and modeled.[28]

In fact, as described in the NCEP, previous studies of Barnegat Bay indicate that both accelerated and chronic symptoms are occurring:

> *"Accelerated eutrophication is characterized by reduced dissolved oxygen, extreme diurnal swings of dissolved oxygen or pH, increased turbidity (or decreased water clarity), loss of beneficial submerged aquatic vegetation, and increase in nuisance vegetation (excessive algae or macrophytes) that occur during the summer."* (p.7)
>
> *"Chronic symptoms of over-enrichment include large diurnal swings in dissolved oxygen or pH, reduced spawning grounds and nursery habitats, fish kills, and the replacement of the natural flora and fauna with nutrient tolerant biota (USEPA, 2007)."* (p.8)

Last July, the NJDEP said they would take steps toward reducing nitrogen to the Barnegat Bay system. However, the actions proposed in this plan are insufficient and must be made more aggressive and concrete in terms of immediate actions. It borders on the inexcusable for the NJDEP to continue to minimize and fail to prioritize these serious coastal eutrophication problems, when recognition and actions are extremely needed, justified, and feasible.

It should be noted however that we support the continued development and future use of benthic indices for coastal waters as described in the plan. A benthic index is useful for assessing aquatic life impairment directly and can be used in conjunction with NOAA's ASSETs method to determine eutrophic status and nutrient-related impairment. A benthic index is also useful for assessing biotic response to localized changes in nitrogen loadings to the system, and will be an important tool for evaluating the effectiveness of nitrogen reduction strategies.

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[22] Olsen and Mahoney 2001. *Journal of Coastal Research* Special Issue 32:115-143
[23] Lathrop, R. and Haag, S. 2005 Report Submitted to NJDEP
[24] Heisler, J. et al. in press, 2008. Eutrophication and harmful algal blooms: A scientific consensus. *Harmful Algae* http://www.whoi.edu/science/cohh/whcohh/publications/index.htm
[25] Kennish et al. 2007. *Ecological Applications* 17:5:S3-S16.
[26] Kennish et al. 2007. *Ecological Applications* 17:5:S3-S16.
[27] Moore, K. Stinging jellyfish taking over Barnegat Bay *Gannett New Jersey* July 27, 2008 http://www.mycentraljersey.com/apps/pbcs.dll/article?AID=/20080727/STATE/80727009
[28] Bowen et al. 2007 NLOAD: An Interactive, Wed-Based Modeling Toll for Nitrogen Management in Estauaries. *Ecological Applications.* 17 (5) Supplement S17-S30.

We also support efforts by NJDEP and Rutgers to develop an easier way to assess submerged aquatic vegetation (SAV) as soon as possible. In addition to remote sensing, the NJDEP and Rutgers should also consider other techniques such as a digital echo sounder system to identify a consistent and cost-effective method for assessing and monitoring SAV coverage.[29]

A modified ASSETS-based narrative criterion should also be developed for nearshore ocean waters. This criterion could integrate the benthic index, chlorophyll a levels, nuisance algal species, and other relevant parameters.

Finally, the NJDEP must take immediate actions to protect marine waters from nitrogen pollution. These include but are not limited to:

- Improve stormwater controls through implementation and enforcement of structural and non-structural best management practices (BMPs) for nutrient reduction.
- Adopt a nitrogen fertilizer ordinance in all eutrophic coastal watersheds that would restrict fertilizer applications and prohibit fast-releasing fertilizers. This BMP would have an immediate positive impact.
- Demand deadlines for completing TMDLs for the Hudson River/Raritan Bay estuarine system and enforcing actions to reduce loads
- Require all facilities that discharge to marine waters to monitor and report Total Nitrogen concentrations in their effluent. Without data on nitrogen loadings to marine waters, how will the NJDEP evaluate whether benthic and other biotic impairments, such as harmful algal blooms, are nitrogen-related in regions impacted by point-sources? Also, the TMDL process if needed will be significantly delayed while the NJDEP determines nitrogen load contribution of the numerous wastewater dischargers that impact the state's marine waters.
- Re-examine development issues and be more proactive in protecting and restoring wetlands and coastal buffers that have been shown to reduce nitrogen loadings by using all available and enforceable policies.
- To reduce atmospheric deposition of nitrogen, support energy policies that reduce reliance on fossil fuels, and strengthen air emissions requirements for nitrogen oxides from cars, boats, powerplants, and other sources.

In conclusion, the NJDEP's NCEP is woefully inadequate and does not respond as well as it must to the clear and present coastal impairments resulting from nitrogen pollution identified by USEPA and NOAA. We urge the NJDEP to adopt the above strategy and actions for this plan. The NJDEP must also ensure adequate funding to implement a serious, proactive plan in a timely manner. As also called on by the USEPA, **NJDEP needs to revise this plan accordingly and act now**.

COA and ALS request a written response to these comments. COA also plans to discuss these comments with the NJDEP at our scheduled Feb. 25th meeting.

[29] Sabol et al. 2003. Evaluation of a digital echo sounder system for detection of submersed aquatic vegetation. *Estuaries* Vol. 25, No. 1, p. 133-141

Sincerely,

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