

APPENDIX

**SENATE ENVIRONMENT AND ENERGY COMMITTEE
ASSEMBLY ENVIRONMENT AND SOLID WASTE COMMITTEE**

(Testimony on the Barnegat Bay-Little Egg Harbor Estuary)

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Introduction

My name is Michael J. Kennish. I am a Research Professor in the Institute of Marine and Coastal Sciences at Rutgers University. I am also a member of the Deep-Sea Ecology and Biotechnology Center and the Climate Institute at Rutgers. In addition, I am affiliated with the Ecology and Evolution Graduate Program at the University. Furthermore, I serve as the director of the research and monitoring program of the Jacques Cousteau National Estuarine Research Reserve in Tuckerton. As a marine ecosystem scientist at Rutgers, I conduct basic and applied research on the structure and function of estuarine and coastal marine environments, most notably those in New Jersey. This research forms the scientific foundation and platform for ecosystem-based management. I have extensive experience conducting research and monitoring on the Barnegat Bay-Little Egg Harbor (BB-LEH) Estuary, as well as other coastal systems in New Jersey.¹⁻¹⁸ Most of this research has focused on the effects of human activities on these environments.

State of the Estuary

BB-LEH is a highly eutrophic, ecologically impacted, and impaired coastal lagoon. Because it is bounded by a nearly continuous barrier island complex (Island Beach and Long Beach Island) and an extensively developed watershed, BB-LEH is

susceptible to pollution inputs as well as other human and natural stressors. Its poor flushing and protracted water residence times result in retention of pollutants in the estuary and their recycling among abiotic (nonliving) and biotic (living) system components. These characteristics increase the probability of pollution impacts and ecological damage. The system has undergone significant ecological decline as documented by a series of recent peer-reviewed, scientific publications.^{7,13,19-22}

BB-LEH is most seriously impacted by eutrophication, a process defined as nutrient enrichment and increase in the rate of organic matter input in a waterbody leading to an array of cascading changes in ecosystem structure and function such as decreased dissolved oxygen levels, increased microalgal and macroalgal abundance, occurrence of harmful algal blooms (HABs), loss of seagrass habitat, reduced biodiversity, declining fisheries, imbalanced food webs, altered biogeochemical cycling, and diminished ecosystem services.¹⁴ Eutrophication poses the most serious threat to the long-term health of BB-LEH by altering its ecosystem structure and function.^{6,7,19-20} The net effect of eutrophication is potentially permanent alteration of biotic communities, extensive loss of living resources and habitats, and greater ecosystem-level impacts. Eutrophication of BB-LEH has accelerated during the past two decades, and it is now impacting the uses that we, as a society, make of the system.

Studies of coastal lagoonal systems indicate that environmental impacts escalate as population growth, development, and the amount of impervious cover increase in surrounding watersheds. A watershed impact threshold, where degradation of water quality is observed, is exceeded when the amount of impervious surface cover surpasses 10%.²³ Impervious land cover in the BB-LEH Watershed is greater than 10%, and it is projected to exceed 12% at buildout. The watershed is now nearly 35% developed (Center for Remote Sensing and Spatial Analysis, Rutgers University).

The population growth in Ocean County increased from 108,241 in 1960 to 576,567 in 2010 at the last census (Table 1). Between 1980 and 2010, the population in the county increased by more than 66%. During the summer months, the population in Ocean County increases to ~1,500,000 people as noted by the Ocean County Planning Board in 2011, and the eutrophication problems in the estuary escalate. Dramatic land use and land cover changes have occurred in the watershed concurrently with population growth over the past three decades. Therefore, it should come as no surprise that serious ecological problems are now occurring in the BB-LEH Estuary. Ecological impacts are expected to increase with ongoing land alteration.^{4,24}

I want to briefly recount important details on the eutrophication problems that currently impact BB-LEH. The estuary condition has escalated from moderately eutrophic, first identified in the early 1990s, to highly eutrophic over the past decade.^{7,28} Nitrogen is the most problematic nutrient element responsible for this deterioration, although phosphorus also plays a role during certain time periods and must be considered as well. Wieben and Baker²⁵ reported that nitrogen enters the estuary via the following pathways: ~66% of the load (i.e., the amount of nitrogen entering the bay) derives from watershed surface water inflow, ~22% from atmospheric deposition, and ~12% from

direct groundwater discharges. In 2007, Bowen et al.²⁶ estimated that the fertilizer nitrogen load from the watershed to the estuary comprised 29.3% of the total nitrogen load from the watershed. The total nitrogen pollution load is expected to increase as development and accompanying land use and land cover changes (the conversion of forests and open spaces to development) increase in the watershed. Baker et al.²⁷ reported highest total surface water loads (baseflow plus runoff) of nitrogen and phosphorus for the BB-LEH Watershed in 2010, amounting to ~857,000 kg TN (1,889,362 lbs TN) and ~32,000 kg TP (70,548 lbs TP), respectively.

To understand the slow deterioration of BB-LEH, it is instructive to review key characteristics that render the estuary vulnerable to environmental impacts. First, both nonpoint and point sources of pollution affect BB-LEH; these are often thought of as “stressors.” Of the various environmental problems arising from these stressors, eutrophication poses the most serious threat because it creates the potential for ecosystem-wide decline, affecting the long-term health and function of the entire system from Bay Head to Tuckerton, impacting living resources, essential habitat (e.g., seagrass and shellfish beds), and human uses throughout.^{7,10} These effects are now apparent in BB-LEH, and the estuary has been ranked among the most eutrophic systems in the U.S.²⁸

Depending on the physicochemical and biotic conditions, the consequences of eutrophication in a waterbody are numerous and varied and include low dissolved oxygen, harmful algal blooms (HABs), loss of essential habitat (e.g., seagrass and shellfish beds), lower biodiversity, reduced harvestable fisheries, imbalanced trophic food webs, declining system stability and resilience, diminished ecosystem services, and impacted human use. Most of these eutrophic effects have been documented in the BB-LEH Estuary.^{4,7,10,29} The eutrophic condition can worsen. The long-term effect of eutrophication is potentially permanent alteration or loss of biotic communities and habitats, and great ecosystem-level degradation.¹⁴

The eutrophication process disrupts the ecological interrelationships and functioning of coastal waterbodies like BB-LEH. Nutrient enrichment, notably nitrogen and phosphorus inputs, stimulates algal production and sets into motion changes in the ecosystem from the bottom-up, literally altering the foundations of the way the estuary works. As algal populations bloom, die off, and then sink to the floor of the estuary, they undergo microbial decomposition which uses up oxygen causing stress and loss of living resources there.

Species composition, abundance, distribution, and diversity of organisms often change considerably in such eutrophied systems, including top-down feeding groups that regulate algal populations, keeping them in check. Opportunists and nuisance organisms (e.g., macroalgae, *Enteromorpha* spp. and *Ulva* spp.) frequently dominate these systems, outcompeting and replacing more desirable and stable forms, notably seagrass. A positive correlation exists between nutrient loading and algal production and biomass. The accumulation of large amounts of decaying algae on the estuarine floor not only leads to hypoxic conditions but also the production of sulfides in bottom sediments

mediated by microbial activity that can be extremely toxic to bottom-dwelling communities. Extensive phytoplankton and macroalgae blooms, epiphytic overgrowth, and suspended particulates also create unfavorable shading conditions for seagrass that can cause dieback and elimination of this essential bottom habitat for shellfish and finfish.

Additional biotic impacts associated with nutrient enrichment include changes from filter-feeding to deposit-feeding benthic (bottom dwelling) organisms. There is frequently a progressive change from larger, long-lived benthic organisms (e.g., hard clams, *Mercenaria mercenaria*) to smaller, rapidly growing, but shorter lived forms. The loss of larger, filter-feeding shellfish species is well documented in BB-LEH,⁴ which can reduce bottom-up control and regulation of phytoplankton populations. In such an environment of less top-down control, toxic phytoplankton blooms also commonly occur (e.g., brown tide, *Aureococcus anophagefferens*). The potential for permanent alteration of biotic communities and habitats exists in this type of impacted system, and its stability and resilience are likely compromised.

Eutrophication Report

Rutgers scientists, in collaboration with investigators from the U.S. Geological Survey, conducted a comprehensive four-year eutrophication study of BB-LEH (2009-2013) that culminated in the completion of a detailed report on the eutrophic condition of the estuary.²⁹ Completed in April 2013, this eutrophication report clearly characterizes and quantifies the biotic and habitat responses occurring in BB-LEH to nutrient loading from the watershed in an effort to delineate cause-and-effect relationships involving nutrient enrichment. An analytical method used in this study provides an accurate assessment of eutrophic condition in BB-LEH and quantifies the status and trends of the estuary in response to nutrient loading. The assessment tool (i.e., Index of Eutrophication) quantifies the eutrophic condition of the estuary over a protracted period of time (1989-2010) and identifies the condition of, and relationships between, ecosystem pressures, ecosystem state, and biotic responses by integrating over 74,400 observations among 85 variables for ~20 indicators. It therefore offers one of the most comprehensive and holistic assessments of the BB-LEH ecosystem condition to date. Subsequently, the results of this eutrophication study were published in the peer-reviewed scientific literature,²⁰ and in an extensively reviewed U.S. Geological Survey scientific investigations report.²⁷

A major goal of this ecosystem-based study has been to provide databases useful for developing nutrient loading criteria in support of nutrient management planning. Generating nitrogen and phosphorus water quality standards for the estuary and establishing Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus are two ways of managing and mitigating the eutrophication problems. The eutrophication report provides quantitative limits on nitrogen and phosphorus loading from the watershed that can be used to establish numeric standards and TMDLs for nitrogen and phosphorus for the BB-LEH Estuary. That is, once loading increases above 2,000 kg TN km⁻² yr⁻¹ or 100 kg TP km⁻² yr⁻¹ (4,409 lbs TN km⁻² yr⁻¹ or 220 lbs TP km⁻² yr⁻¹), as is the case of the north segment of the estuary, eutrophication condition reaches a new, lower steady state

of poor condition. Therefore, an upper limit on nitrogen and phosphorus loading to the estuary of $1,500 \text{ kg TN km}^{-2} \text{ yr}^{-1}$ and $75 \text{ kg TP km}^{-2} \text{ yr}^{-1}$ ($3,307 \text{ lbs TN km}^{-2} \text{ yr}^{-1}$ and $165 \text{ lbs TP km}^{-2} \text{ yr}^{-1}$) can be used as nutrient targets to effectively manage eutrophication in the system.²⁹

Major findings of the eutrophication report on the BB-LEH Estuary are as follows:²⁹

- BB-LEH is an estuary that has undergone significant ecological decline through time. The strong positive relationship between nutrient loading from the watershed and estuarine nutrient concentrations, the degradation of an array of biotic indicators, and the relationship between nutrient loading and the Index of Eutrophication supports this finding.
- BB-LEH has generally experienced declining environmental conditions since the early 1990s as documented by Index of Eutrophication scores for the system using a suite of ~20 water quality, biotic, and habitat indicators.
- Over the 1989-2010 period, BB-LEH experienced low dissolved oxygen (82 times $\leq 4 \text{ mg L}^{-1}$), high total suspended solids (max $>200 \text{ mg L}^{-1}$) and chlorophyll *a* (max $>40 \text{ } \mu\text{g L}^{-1}$), harmful algal blooms ($\geq 200,000 \text{ cells mL}^{-1}$), epiphytic loading (mean values up to 38.3% cover of seagrass), macroalgae blooms (80-100% bottom cover 36 times, 70-80% bottom cover 19 times, 60-70% bottom cover 10 times), habitat loss, $>67\%$ fewer clams, and degraded seagrass biomass (to $2.7 \pm 8.0 \text{ g m}^{-2}$ aboveground; $17.9 \pm 37.5 \text{ g m}^{-2}$ belowground).²⁹
- The condition of BB-LEH has progressively worsened over the past two decades for both nitrogen and phosphorus, and there is an overall poorer condition for nutrient loading.
- Nutrient loading – both total nitrogen loading and total phosphorus loading – clearly results in substantial degradation and eutrophication of BB-LEH. The poor condition of nutrients in the estuary over the study period is directly related to nutrient loading from the watershed.
- Total nitrogen loading and total phosphorus loading scores were more degraded during 2003-2010 than during previous years.
- BB-LEH is particularly sensitive to even relatively small increases in nutrient loading due to its extreme enclosure and a watershed to estuary areal ratio of 6.5:1.
- Nutrient loading to the estuary has increased with watershed development. Urban land development and increasing impervious cover are responsible for nutrient levels that are elevated above background levels.
- Nitrogen loads from turf areas of the watershed are about twice those from non-turf areas. Phosphorus loads from turf areas are about eight times those from non-turf areas.²⁷

- From 1989 to 2011, the annual total nitrogen loads from the watershed (surface water loads) to the estuary ranged from about 455,000 to 857,000 kg TN yr⁻¹ (1,003,103 to 1,889,362 lbs TN yr⁻¹). The lowest levels were recorded in 1995, and the highest levels, in 2010. The north segment accounted for about 66% of the annual total nitrogen load to the estuary.²⁷
- From 1989 to 2011, the annual total phosphorus loads from the watershed (surface water loads) to the estuary ranged from about 17,000 to 32,000 kg TP yr⁻¹ (37,479 lbs TP yr⁻¹ to 70,548 lbs TP yr⁻¹). The lowest levels were recorded in 1995, and the highest levels, in 2010. The north segment accounted for about 63% of the annual total phosphorus load to the estuary.²⁷
- The north segment of the estuary experienced the most severe eutrophication and degradation over the 1989-2010 study period.
- The central and south segments of the estuary are currently undergoing eutrophication and are in a state of decline based on calculations of the Index of Eutrophication.
- The north segment of BB-LEH is designated as impaired for dissolved oxygen (DO) and remains on the Clean Water Act 303d list for impairment. However, greater numbers of low DO occurrences ($\leq 4 \text{ mg L}^{-1}$) were recorded in the central and south segments of the estuary than in the north segment, over the 1989-2010 study period.
- There were 82 occurrences of DO levels $\leq 4 \text{ mg L}^{-1}$ (the surface water quality criterion for DO is 4 mg L^{-1}) recorded in the estuary and tributary systems at multiple sampling sites between 1989 and 2010. Most of these low DO levels occurred in the south segment of the estuary (N = 63), with far fewer in the central segment (N = 13) and the north segment (N = 6).²⁹
- DO measurements in the estuary during the 1989-2010 period represent only one DO measurement taken quarterly (grab samples) at multiple sampling stations and mainly during the morning to afternoon daylight hours. No grab samples were collected at night when DO levels would generally be lowest in the estuary. Hence, these DO data likely underestimate the actual number of low DO occurrences that occurred in the estuary during this period.
- Nutrient enrichment has caused an array of biotic and habitat impacts in the estuary as noted below.
- Seagrass condition is highly degraded, having declined substantially through time. In 2010, the lowest eelgrass biomass values were recorded for the estuary (aboveground biomass = $2.7 \text{ g dry wt m}^{-2}$; belowground biomass = $17.9 \text{ g dry wt m}^{-2}$).¹⁹ Low eelgrass biomass continued through 2011. The decline of seagrass beds is a serious concern in the estuary because of their multiple ecosystem services, notably major sources of primary production, food for waterfowl, essential habitat and nursery areas for numerous fish and invertebrates, filters of chemical substances, agents in

biogeochemical cycling, and buffers against wave and current action as well as sediment erosion.

- Macroalgal blooms (e.g., *Ulva lactuca*, *Enteromorpha intestinalis*, and *Gracilaria tikvahiae*) appeared frequently in the estuary in response to nutrient enrichment. The number of macroalgal blooms increased through time, being statistically significantly greater during the 2008-2010 period than during the 2004-2006 period.³⁰
- Epiphytic cover of seagrass blades, which can impair photosynthesis, was significant in 2009, 2010, and 2011, reaching a maximum mean value >48%.
- Harmful algal blooms (HABs) (i.e., brown tide, *Aureococcus anophagefferens*) occurred repeatedly between 1995 and 2002 (no monitoring of brown tide was conducted after 2004). The highest *A. anophagefferens* abundances $\geq 1.5 \times 10^6$ cells mL⁻¹ occurred in 1995 and 1999-2002. *A. anophagefferens* occurred in the estuary during 2010 at densities up to 5,300 cells ml⁻².
- Nuisance summer phytoplankton blooms commonly occur in the estuary often caused by small picoplanktonic microalgal species such as the chlorophyte *Nannochloris atomus* and the cyanobacterium *Synechococcus* sp. These blooms can be detrimental to hard clams (*Mercenaria mercenaria*) in the estuary.³¹
- Hard clam abundance decreased markedly compared with abundance in the mid-1980s. An estimated total of 64,803,910 hard clams was recorded in Little Egg Harbor in 2001 compared with an estimated total of 201,476,066 hard clams in 1986/87.³² A State hard clam survey conducted in 2011, however, showed an increase in abundance to an estimated 85,745,065 hard clams, although this represents a decline in abundance of 57% compared with hard clam abundance in 1986/87. In addition, most of the increase in 2011 was ascribed only to a few sampling stations, with 25% of the total stock found at only 5 of the 196 stations sampled. Furthermore, the median hard clam abundance actually decreased by 11% in 2011 compared with 2001.³³
- Hard clam harvest recorded in the estuary decreased by more than 98% between 1975 (636,364 kg; 1,402,942 lbs) and 2005 (6,820 kg; 15,036 lbs).³⁴ The number of commercial clam licenses for the system has declined significantly through time due to low clam abundance.³⁵
- Abundance of the sea nettle (*Chrysaora quinquecirrha*) increased dramatically over the past decade, with blooms commonly observed in the north segment of the estuary since 2004.²⁹ Large numbers of sea nettles has posed a hazard to human use of some estuarine areas. Sea nettles also consume large quantities of zooplankton and thus may shorten the food chain, potentially altering energy flow and impacting fish and other higher-trophic-level organisms in the estuary.

- About 45% of the estuarine shoreline is now bulkheaded, including most of the north segment. Nektonic biodiversity is ~25% lower along bulkheaded shorelines than along natural shorelines.³⁶

Impairment

The State's List of Water Quality Limited Waters (i.e., Section 303(d) of the Clean Water Act) includes the north segment of BB-LEH which is now designated as impaired for dissolved oxygen due to low DO measurements. The central and south segments of the estuary had more occurrences of DO levels $\leq 4 \text{ mg L}^{-1}$ (the surface water quality criterion for DO is 4 mg L^{-1}) between 1989 and 2010 than did the north segment.

No numeric nutrient criteria exist for BB-LEH that would provide more rigorous water quality standards for the estuary. Action item 7 of the Governor's 10-point Action Plan (Table 2) is to "Adopt More Rigorous Water Quality Standards." Based on results of the eutrophication study of BB-LEH, numeric nutrient criteria can now be established for the estuary. Once loading increases above $2,000 \text{ kg TN km}^{-2} \text{ yr}^{-1}$ or $100 \text{ kg TP km}^{-2} \text{ yr}^{-1}$ ($4,409 \text{ lbs TN km}^{-2} \text{ yr}^{-1}$ or $220 \text{ lbs TP km}^{-2} \text{ yr}^{-1}$), as in the case of the north segment of the estuary, eutrophication condition reaches a new, lower steady state of poor condition. Therefore, an upper limit on nitrogen and phosphorus loading to the estuary of $1,500 \text{ kg TN km}^{-2} \text{ yr}^{-1}$ and $75 \text{ kg TP km}^{-2} \text{ yr}^{-1}$ ($3,307 \text{ lbs TN km}^{-2} \text{ yr}^{-1}$ and $165 \text{ lbs TP km}^{-2} \text{ yr}^{-1}$) can be used as nutrient targets to manage eutrophication in the system.²⁹ These numeric values can be used to establish TMDLs for nitrogen and phosphorus for BB-LEH.

The New Jersey Department of Environmental Protection has adopted rules establishing narrative nutrient criteria for BB-LEH that are certainly constructive. It is important to stress here, however, that documented impacts in the estuary noted above appear to violate the State's Narrative Nutrient Standard (NJAC 7B-1.14(d)4.i.), which states that:

"Except as due to natural conditions, nutrients shall not be allowed in concentrations that render the waters unsuitable for the existing or designated uses due to objectionable algal densities, nuisance aquatic vegetation, diurnal fluctuations in dissolved oxygen or pH indicative of excessive photosynthetic activity, detrimental changes to the composition of aquatic ecosystems, or other indicators of use impairment caused by nutrients."

Other System Impacts

The detrimental effects of eutrophication are exacerbated by other factors. Superstorm Sandy had a significant impact on estuarine habitats due to overwash events and sedimentation which caused shoaling problems. Storm surge caused erosion of benthic habitats in some areas as well, altering the sediment composition and potentially impacting seagrass beds and other benthic organisms. In addition, beach, dune, and salt marsh habitats were impacted.

Salt marshes in the BB-LEH Watershed are vulnerable to perimeter shoreline erosion, sea-level rise linked to climate change, extreme weather events, storm surge, and coastal subsidence. Coastal marsh stability requires sufficient sediment accretion on the salt marsh surface to maintain elevation. Recent studies by Drexel University indicate

that sedimentation in salt marshes of the BB-LEH Watershed may not be adequate in areas, making them more susceptible to inundation and flooding. Studies of the Tuckerton Peninsula salt marsh system at the southern margin of Little Egg Harbor have revealed a high rate of salt marsh habitat loss along the eastern and southern shorelines amounting to 1.6 m yr^{-1} between 1995 and 2008.³⁷ Coastal marshes play a vital role in filtering or sequestering nutrients from upland areas and the atmosphere. Thus, the ongoing loss of marsh area surrounding BB-LEH is a major concern since marsh habitat can reduce nutrient loading to the estuary.

Loss of natural habitat due to bulkheading, dredging, ditching, and lagoon construction continues in some areas of the system. Human activities in watershed areas, notably deforestation and infrastructure development, partition and disrupt habitats while also degrading water quality and altering biotic communities. Ongoing land surface alteration raises turbidity and siltation levels in tributaries of the estuary, which can create benthic shading problems. We still do not know what overall effect boat and jet-ski use has had on biotic communities and habitat in the estuary. However, a benthic imaging study conducted by the Center of Remote Sensing and Spatial Analysis at Rutgers University in 2009 revealed more than 25 linear miles of boat scars damaging seagrass beds.²⁹

BB-LEH has experienced reduced freshwater inputs in the estuary related to operation of centralized wastewater treatment facilities (>50 million gal/day discharged to the coastal ocean) and increased freshwater withdrawals for domestic use (~78 million gal/day).²⁹ Reduced freshwater inflow has a marked influence on water residence time and the accumulation of nutrients in estuarine system components. Reduction of freshwater inputs may significantly affect physical-chemical processes and biotic responses.

Impingement, entrainment, thermal discharges, and biocidal releases of the Oyster Creek Nuclear Generating Station (OCNGS) cause significant mortality of estuarine and marine organisms in Barnegat Bay.² OCNGS is scheduled to close in 2019.

More biotic species are invading the estuary from subtropical or even tropical waters as climate change proceeds, which can alter biotic community structure. It is important to track the effects of climate change on the estuary to formulate effective sustainable management plans for the future.

Land Use Change

Human activities in the BB-LEH Watershed linked to declining environmental conditions in the estuary are largely land use and land cover issues – or how we use land in the watershed. Of particular impact is the continued development of the open spaces and forests of the watershed that require effective land use planning and management decisions for remediation. With population growth in the watershed expected to increase from more than 575,000 year-round residents (~1,500,000 people during the summer tourist season) to ~850,000 people at buildout (~50% increase in year-round residents), aquatic environmental pressures will continue to occur, particularly as impervious cover

and other land surface alteration in the watershed increase, leading to greater input of nutrients and other pollutants to the estuary.²⁹ The watershed surface will continue to be partitioned and natural habitats altered. The challenges will be formidable to develop and apply the appropriate measures to remediate the future impacts on the estuary.

Urban land use in the BB-LEH Watershed has increased dramatically over the past four decades. In 1972, the watershed-developed area amounted to ~19%, but it increased to 25% in 1995, 30% in 2006, and ~34% at present. By 2010, the watershed had 111,560 acres of urban land area. Agricultural land area amounted to 4,965 acres in 2010, down from 6,314 acres in 1995. Upland forest area in turn decreased from 158,147 acres in 1995 to 139,915 acres in 2010.³⁸ The BB-LEH Watershed now has (>20 times) more urban land cover than agricultural land cover, and the trend is increasing.³⁹ Cumulative changes in the watershed land surface are leading to greater impervious cover and runoff to area streams and rivers discharging to BB-LEH, thereby promoting nutrient enrichment and other pollutant discharges to the estuary.²⁹ One acre of pavement, for example, results in 27,000 gallons of runoff per inch of rainwater.⁴⁰

Remedial Measures

A well-coordinated, holistic, long-term management plan is important for improving the ecological condition and resources of BB-LEH. In other estuaries such as Chesapeake Bay, the following remedial strategies have been pursued: upgrades of stormwater controls, greater open space preservation, accelerated soil restoration, best land use management practices (e.g., improved management of turf areas), TMDLs for nutrients, and support of education programs that explain to the public how and why these strategies are important and necessary for the protection of BB-LEH. Management strategies in the coastal watersheds of these impacted estuaries have also addressed ways to minimize the creation of impervious surfaces, compacted soils, and sprawl, while concurrently preserving natural vegetation and landscapes.

For BB-LEH, the fertilizer law that went into effect in 2012 and targets reduction of fertilizer nitrogen and phosphorus loading to BB-LEH is certainly constructive. Compacted soil remediation will reduce stormwater runoff as well. Establishing numeric standards and TMDLs for nitrogen and phosphorus for the BB-LEH system would provide additional measures to manage eutrophication.

Summary

The eutrophication report completed in 2013 indicates that BB-LEH is seriously impacted by nutrient enrichment (i.e., nitrogen and phosphorus).²⁹ A holistic environmental management approach is therefore critical to reduce nutrient loading and eutrophication of the estuary. This includes in part upgrading stormwater controls (only 10 of ~2700 stormwater basins are currently being restored), mandating land use best management practices in the BB-LEH Watershed, preserving open space, and educating the public as to how and why these strategies are important and necessary for protecting the BB-LEH system. It is also important to examine population growth and development rates in Ocean County that represent drivers of change that cause substantive land use and land cover changes and resulting ecological impacts in the

estuary.²⁹ Generating nitrogen and phosphorus numeric standards for the estuary and establishing Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus are two ways of managing and mitigating the eutrophication problems. An upper limit on nitrogen and phosphorus loading to the estuary of 1500 kg TN km⁻² yr⁻¹ and 75 kg TP km⁻² yr⁻¹ (3,307 lbs TN km⁻² yr⁻¹ and 165 lbs TP km⁻² yr⁻¹) can be used as nutrient targets to manage eutrophication problems in the system.²⁹ A sustained, well-coordinated, and holistic management plan is critical to improving the ecological condition and resources of the estuary.

¹Kennish, M. J. and R. A. Lutz (eds.). 1984. Ecology of Barnegat Bay, New Jersey. Springer-Verlag, New York. 396 pp.

²Kennish, M. J. (ed.). 2001. Barnegat Bay-Little Egg Harbor, New Jersey: Estuary and Watershed Assessment. *Journal of Coastal Research*, Special Issue 32, 280 pp.

³Kennish, M. J. 2001. State of the estuary and watershed: an overview. *Journal of Coastal Research*, Special Issue 32: 243-273.

⁴Kennish, M. J. 2007. Barnegat Bay-Little Egg Harbor Estuary: Ecosystem Condition and Recommendations. Technical Report, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, New Jersey. 55 pp.

⁵Kennish, M. J. (ed.). 2007. Eutrophication of Estuarine and Shallow Coastal Marine Systems. *Ecological Applications*, Volume 17(5) Supplement. 196 pp.

⁶Kennish, M. J. and A. R. Townsend. 2007. Nutrient enrichment and estuarine eutrophication. *Ecological Applications*, 17(5) Supplement, pp. S1-S2.

⁷Kennish, M. J., S. B. Bricker, W. C. Dennison, P. M. Glibert, R. J. Livingston, K. A. Moore, R. T. Noble, H. W. Paerl, J. M. Ramstack, S. Seitzinger, D. A. Tomasko, and I. Valiela. 2007. Barnegat Bay-Little Egg Harbor Estuary: case study of a highly eutrophic coastal bay system. *Ecological Applications*, 17(5) Supplement, pp. S3-S16.

⁸Kennish, M. J., S. M. Haag, and G. P. Sakowicz. 2007. Demographic Investigation of SAV in the Barnegat Bay-Little Egg Harbor Estuary with Assessment of Potential Impacts of Benthic Macroalgae and Brown Tides. Technical Report, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, New Jersey. 366 pp.

⁹Kennish, M. J., S. M. Haag, and G. P. Sakowicz. 2008. Seagrass demographic and spatial habitat characterization in Little Egg Harbor, New Jersey, using fixed transects. *Journal of Coastal Research*, Special Issue 55: 148-170.

¹⁰Kennish, M. J. 2009. Eutrophication of Mid-Atlantic coastal bays. *Bulletin of New Jersey Academy of Science*, 54: 5-12.

¹¹Kennish, M. J. and H. W. Paerl (eds.). 2010. *Coastal Lagoons: Critical Habitats of Environmental Change*. Taylor and Francis, CRC Press, Boca Raton, Florida. 558 pp.

¹²Kennish, M. J., S. M. Haag, and G. P. Sakowicz. 2010. Seagrass decline in New Jersey coastal lagoons: a response to increasing eutrophication. In: M. J. Kennish and H. W. Paerl, eds., *Coastal Lagoons: Critical Habitats of Environmental Change*. Taylor and Francis, CRC Press, Boca Raton, Florida, pp. 167-201.

¹³Kennish, M. J., B. M. Fertig, and G. P. Sakowicz. 2011. Benthic macroalgal blooms as an indicator of system eutrophy in the Barnegat Bay-Little Egg Harbor Estuary. *Bulletin of the New Jersey Academy of Science*, 57: 1-5.

¹⁴Kennish, M. J. and V. N. de Jonge. 2011. Nutrient and organic enrichment: causes and consequences of eutrophication. In: M. J. Kennish and M. Elliott, eds., *Treatise on Estuaries and Coasts*, Vol. 8, *Human-induced Changes in Coastal and Estuarine Regions*. Elsevier, Oxford, England, pp. 113-148.

¹⁵Ramey, P., M. J. Kennish, and R. Petrecca. 2011. Benthic Index Development: Assessment of Ecological Status of Benthic Communities in New Jersey Marine Coastal Waters. Technical Report to the U.S. Environmental Protection Agency and New Jersey Department of Environmental Protection, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, New Jersey. 191 pp.

¹⁶Kennish, M. J. and B. Fertig. 2012. Application and assessment of a nutrient pollution indicator using eelgrass (*Zostera marina* L.) in Barnegat Bay-Little Egg Harbor Estuary, New Jersey. *Aquatic Botany*, 96: 23-30.

¹⁷Kennish, M. J. 2012. Restoration of Estuaries. *Nature (Education)* 3(11):1-5.

¹⁸Kennish, M. J., M. J. Brush, and K. A. Moore (eds.). 2014. Drivers of Change in Shallow Coastal Photic Systems. *Estuaries and Coasts*, Volume 37, Supplement 1, 242 pp. ISSN 1559-2723.

¹⁹Fertig, B. M., M. J. Kennish, and G. P. Sakowicz. 2013. Changing eelgrass (*Zostera marina* L.) characteristics in a highly eutrophic temperate coastal lagoon. *Aquatic Botany*, 104: 70-79.

²⁰Fertig, B., M. J. Kennish, G. P. Sakowicz, and L. K. Reynolds. 2014. Mind the data gap: identifying and assessing drivers of changing eutrophication condition. *Estuaries and Coasts*, 37, Supplement 1, pp. S198-S221, doi:10.1007/s1223701397465.

²¹Kennish, M. J., M. J. Brush, and K. A. Moore. 2014. Drivers of change in shallow coastal photic systems: an introduction to a special issue. *Estuaries and Coasts*, 37, Supplement 1, pp. S3-S19, doi:10.1007/s1223701497794.

- ²²Lathrop, R. G., Jr., S. M. Haag, D. Merchant, M. J. Kennish, and B. Fertig. 2014. Comparison of remotely-sensed surveys vs. in situ plot-based assessments of sea grass condition in Barnegat Bay-Little Egg Harbor, New Jersey USA. *Journal of Coastal Conservation*, 18: 299-308, doi:10.1007/s11852-014-0319-y.
- ²³Arnold, C. L. and C. J. Gibbons. 1996. Impervious surface coverage: the emergence of a key environmental indicator. *Journal of American Planning Association*, 62: 243-258.
- ²⁴Lathrop, R. G. and T. M. Conway. 2001. A Buildout Analysis of the Barnegat Bay Watershed. Technical Report, Center of Remote Sensing and Spatial Analysis, Rutgers University, New Brunswick, New Jersey.
- ²⁵Wieben, C. M. and R. J. Baker. 2009. Contributions of Nitrogen to the Barnegat Bay-Little Egg Harbor Estuary: Updated Loading Estimates. U.S. Geological Survey, Technical Report, West Trenton, New Jersey. 25 pp.
- ²⁶Bowen, J. L., J. M. Ramstack, S. Mazzilli, and I. Valiela. 2007. NLOAD: an interactive, web-based modeling tool for nitrogen management in estuaries. *Ecological Applications*, 17(5) Supplement, pp. S17-S30.
- ²⁷Baker, R. J., C. M. Wieben, R. G. Lathrop and R. S. Nicholson. 2014. Concentrations, Loads, and Yields of Total Nitrogen and Total Phosphorus in the Barnegat Bay-Little Egg Harbor Watershed, New Jersey, 1989–2011, at Multiple Spatial Scales. U.S. Geological Survey Scientific Investigations Report 2014–5072, USGS, Lambertville, New Jersey. 64 pp.
- ²⁸Bricker, S. B., B. Longstaff, W. Dennison, A. Jones, K. Boicourt, C. Wicks, and J. Woerner. 2007. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change. NOAA, National Ocean Service, Special Projects Office and National Centers for Coastal Ocean Science, Silver Spring, Maryland, USA.
- ²⁹Kennish, M. J., B. M. Fertig, and R. G. Lathrop. 2013. Assessment of Nutrient Loading and Eutrophication in Barnegat Bay-Little Egg Harbor, New Jersey in Support of Nutrient Management Planning. Final Report, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, New Jersey. 468 pp.
- ³⁰Kennish, M. J., B. M. Fertig, and G. P. Sakowicz. 2011. Benthic macroalgal blooms as an indicator of system eutrophy in the Barnegat Bay-Little Egg Harbor Estuary. *Bulletin of the New Jersey Academy of Science*, 56: 1-5.
- ³¹Bricelj, V. M., J. N. Kraeuter, and G. Flimlin. 2012. Status and Trends of Hard Clam, *Mercenaria mercenaria*, Shellfish Populations in Barnegat Bay, New Jersey. Technical Report, Institute of Marine and Coastal Sciences, Rutgers University. 143 pp.

³²Celestino, M. 2003. Shellfish Stock Assessment of Little Egg Harbor Bay. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Shellfisheries, Trenton, New Jersey. 47 pp.

³³Celestino, M. 2013. Shellfish Stock Assessment of Little Egg Harbor Bay (2011). New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Shellfisheries, Trenton, New Jersey. 37 pp.

³⁴Data source: Data from the National Marine Fisheries Service, Woods Hole, Massachusetts.

³⁵Data source: G. E. Flimlin, Rutgers Cooperative Extension, Toms River, New Jersey.

³⁶Data source: Paul Jivoff, Department of Biology, Rider University, Lawrenceville, New Jersey.

³⁷Kennish, M. J., B. M. Fertig, and G. Petruzzelli. 2012. Emergent Vegetation: NERR SWMP Tier 2 Salt Marsh Monitoring in the Jacques Cousteau National Estuarine Research Reserve. Technical Report, National Estuarine Research Reserve Program (NOAA), Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, New Jersey. 22 pp. plus appendices.

³⁸Data source: Richard Lathrop, Center for Remote Sensing and Spatial Analysis, Rutgers University, New Brunswick, New Jersey.

³⁹Data source: Richard Lathrop, Center for Remote Sensing and Spatial Analysis, Rutgers University, New Brunswick, New Jersey.

⁴⁰Data source: Christopher Obropta, Department of Ecology, Evolution, and Natural Resources, Rutgers University.

Table 1. Population Growth in Ocean County from 1950 to 2010.

Year	Number of People
1950	56,622
1960	108,241
1970	208,470
1980	346,038
1990	433,203
2000	510,916
2010	576,567

Data Sources: Ocean County Cultural and Heritage Commission;
U.S. Census

Table 2. Governor Christie's Ten Point Action Plan to Restore the Ecological Health of Barnegat Bay-Little Egg Harbor.

Close the Oyster Creek Nuclear Generating Station

Fund Stormwater Runoff Mitigation Projects

Reduce Nutrient Pollution from Fertilizer

Require Post-Construction Soil Restoration

Acquire Land in the Watershed

Establish a Special Area Management Plan

Adopt More Rigorous Water Quality Standards

Educate the Public

Fill in the Gaps on Research

Reduce Water Craft Impacts

The comments in this document are solely those of the author based on extensive research, technical reports, and scientific publications on the Barnegat Bay-Little Egg Harbor Estuary.



**Statement of the Surfrider Foundation on S2171,
a bill to allow certain NJ counties to take over beach operations.**

The Surfrider Foundation is greatly concerned with beach access and this bill could have an impact on beach access. We have commented on NJ DEP Rules on Public Access numerous times over the past eight years.

We largely favored the rule changes of 2007, but back then we asked the Department to consider regionalizing beach fees, or to at least explore or study it. We pointed out that anglers, surfers and other recreational enthusiasts often drive all over the county to find the best possible conditions for their particular sport. If counties took over beaches and there was one beach badge that was good anywhere in the county, this badge would be ideal for such individuals. Furthermore, families that are beach users who would just like to experience more of what the Jersey Shore has to offer would be encouraged to try new beaches in new towns. A countywide beach pass or badge would be incredibly popular in our estimation. A statewide beach pass would be even more popular. While S2171 does not explicitly say there would be a countywide beach badge, we feel this would be the main advantage for people who use our oceans, waves and beaches.

However, if only a handful of towns allowed the county to take over their beaches creating a patchwork of county-run beaches, we do not think that a countywide beach badge would be very useful or popular.

It also raises questions of jurisdiction for services and facilities that are *of* the beach but not *on* the beach. Suppose my county, Monmouth, decides to pass such a law and take control of the beaches. And my town, Bradley Beach, does not pass an ordinance to the contrary. This bill makes it clear who would control beach operations of lifeguards, trash collection, etc. But which entity would control the showers, and bathrooms, which are up on the boardwalk in our town? Those amenities are part of the reason the town can charge beach fees in the first place. We foresee it getting very complicated. There would need to be agreements between the county and town for the town to get some of that beach fee money back for the services and operations they continue to provide directly adjacent to the beach.

We conclude that S2171 takes a step in the right direction. But that is only if it will keep beach goes from being strictly provincial (we only go to *this* beach) and if it can bring about lower beach fees by sharing services and economies of scale.

TESTIMONY ON BEHALF OF BEACHES

Monday, July 21, 10:00 am

Toms River Municipal Bldg.

33 Washington St., LMH Room

Exit 82 GSP to 37 East, right onto Main St., left onto Washington

Presented by Margot Walsh, Executive Director, Jersey Shore Partnership

good morning. Senators and Assembly members.

I am Margot Walsh, Executive Director of the Jersey Shore Partnership, an advocate for New Jersey's 127 mile coastline. I am here today to join the Freeholders from the four shore counties of Monmouth, Ocean, Cape May and Atlantic and our more than 75 shore and bay communities in opposing Senate Bill 2171. It is not animosity that brings the Freeholders and Shore communities together to oppose Senate Bill 2171 but a shared recognition that it would not be in the best interest of either to transfer the operation of bay and oceanfront beaches to the four coastal counties based on sound operational and financial facts.

Committee

Chair

*Senators
Assembly members
I will*

*Thank
you for opp
to present
testimony
today*

Our county governments care about their beach communities and their safety. They also have confidence in the elected leadership in the shore communities to do their jobs. So too, do the shore communities recognize how important the county is to them in promoting shore tourism and economic development. As we speak today, the 4 county freeholders have joined shore mayors in submitting resolutions to the Legislature requesting an increase in the Shore Protection Fund to ensure that when the next storm hits our beaches, we will be financially prepared to meet the costs.

There is good reason that the Freeholders oppose this legislation. The Freeholders' extensive and diverse responsibilities already challenge their budgets and manpower. Taking on the beach towns would be an unrealistic, inefficient, fiscally unmanageable, and a potential threat to the safety of our beach communities. They do not have the resources to pay the costs or to accept the liability that shore towns must incur during the summer season: liability insurance, trained lifeguards and life-saving equipment, EMS on site services, extra police patrols, administrative services, beach maintenance crews, safety lighting, parking facilities and the strain on infrastructure. According to Monmouth County, their summer population swells by as much as 73% and, on a holiday weekend the population can increase more than 100%.

There is good reason that beachfront and bayside communities oppose this legislation. Each of our beach communities has its own unique identity and offerings that attract thousands of residents and millions of visitors who travel to our beach towns for seasonal recreation from the tri-state region and Canada. Legislating county control of the beaches will remove each town's individuality, authority and the revenues that ensure that their beaches are in sync with the unique characteristics of the town. Each shore municipality is best equipped to operate its beaches. A generic county-controlled beachfront will lose the uniqueness that makes the Jersey Shore a very special destination.

It was all hands on deck with Sandy's landfall and as a State and Shore counties we all share in the shore's recovery. That is a far cry from a total transfer of responsibility from the towns to the counties. There is no sound reason for transitioning shore community management to the County level. Towns ravaged by Sandy have demonstrated their resiliency, community spirit and cost containment efforts to restore their communities in a firmer footprint to protect themselves from future storms. They recognize the necessity and value of shared services and, I believe, that process will continue long after sandy recovery. We do not need the Freeholders to manage a shared service project across more than 75 shore and bayside towns.

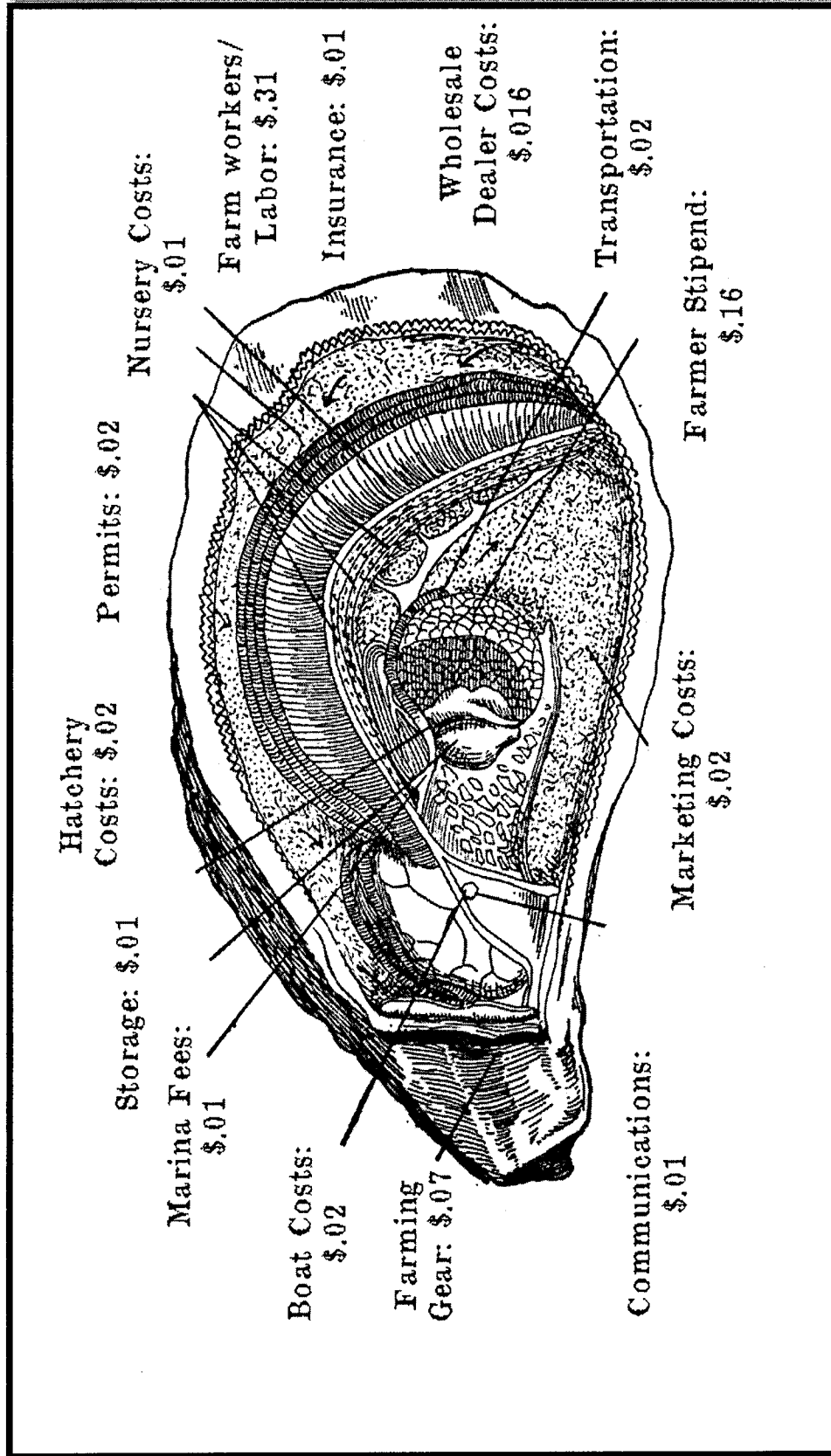
If Senate bill 2171 is a guise for eliminating beach badge ^{with} fees, it is an ill-conceived and ill-advised mechanism for achieving that objective. Take satisfaction in the fact that our shore communities provide \$19 billion annually - one-half the state's total tourism revenue - and that millions of visitors flock to our beaches during the summer months to enjoy our beaches because they know that they are safe, attractive and well-managed by our shore towns.

We stand with the Shore County Freeholders and Shore Municipalities in our opposition to Senate Bill 2171 and Assembly Bill 1596.

WHAT IT TAKES TO GROW AN OYSTER



FORTY NORTH
OYSTER FARMS



*Note Much of the gear and seed that Forty North Oyster Farms uses comes from Massachusetts. There, they have created a multi million-dollar industry that directly supports 226 oyster farmers and thousands of other jobs. Meanwhile, New Jersey, a state with slightly more coastline, supports about 12 oyster farmers.

THE IMPACT OF A SINGLE OYSTER

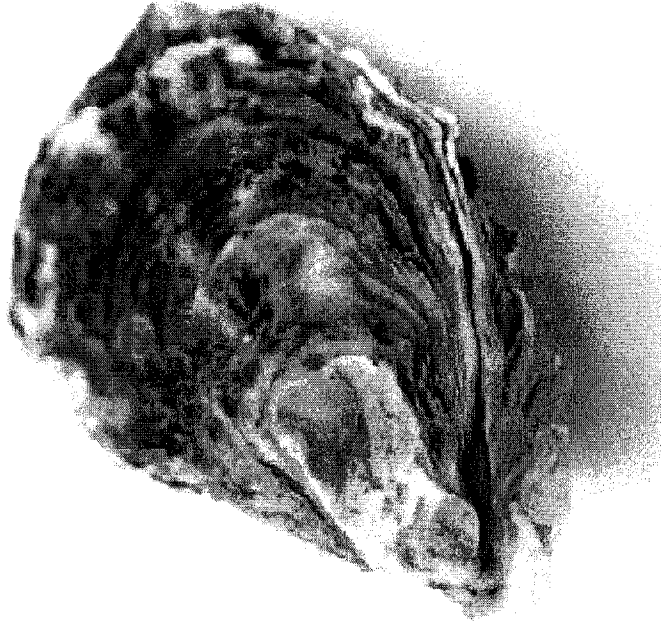


FORTY NORTH
OYSTER FARMS

ENVIRONMENTAL IMPACTS

This oyster:

- Filtered 24,000 gallons of water.
- Provided habitat for 0.005 blue crabs, 0.04 grass shrimp, 0.007 tautog, 0.003 black sea bass, 0.01 oyster toadfish, 0.02 mummichugs, et.al. – all commercially significant species.*
- Provided habitat for 50+ ecologically significant sessile organisms as well as over 100 marine invertebrates.
- Improved dissolved oxygen levels and absorbed nitrogen from runoff.
- Improved water clarity, allowing submerged aquatic vegetation to thrive.



ECONOMIC IMPACTS

(Aqua)tourism:

- This oyster was visited by more than 200 tourists during its life. 60% traveled from NYC and 25% from Philadelphia.

Jobs:

- This oyster was cleaned, sorted, and cared for by farm workers over 8 times during its life.

MEDIA EXPOSURE

- The life of this oyster was covered by media outlets such as MSNBC, USA Today, Asbury Park Press, Edible Jersey, PBS, NJTV, NJ Monthly, Fox News, Jersey Bites, and the Philadelphia Inquirer.

***Note:** Oyster habitat directly increases commercially significant fish recruitment. Recruitment is the number of fish in a stock that will reach



FORTY NORTH
OYSTER FARMS

ADDITIONAL NOTES

The presence and abundance of oysters positively affects all aspects of an ecosystem. Oyster Farmers are not only stewards of the environment, they also create a local product that contributes significantly to the economy. In New Jersey, we have almost everything we need to create a *blue green* industry. The one thing we are missing is oyster farmers. Like every other coastal Mid-Atlantic and New England state, we need to create sound policy that allows entrepreneurs to work.

Good:

NJ has the infrastructure for oyster farms

NJ is ideally located, very close to major culinary hubs

Rutgers oyster scientists are world class

Bad:

Limited access to waterfront property

Backwards and outdated policy

Extremely difficult and lengthy permitting process

POSITION STATEMENT

A-1007/S-2142

Requires DCA to establish standards concerning mold hazards in residential building interiors and school facilities, certification programs for mold inspectors and mold hazard abatement workers.

NJEA supports A-1007 (Benson, Riley, Wimberly, Garcia)/ S-2142 (Singer/Greenstein). This bill would require the Department of Community Affairs (DCA) to establish a mold abatement certification program for inspectors and mold removal workers. Under the bill, DCA would also be required to establish procedures for the inspection, identification, evaluation and abatement of mold in residential buildings and school facilities.

Each year, many New Jersey schools are forced to close school or delay openings due to the discovery of mold in classrooms. While most people are not affected by mold, the spores of some molds can cause a wide range of respiratory effects, including allergies, asthma development and exacerbation, respiratory infections and bronchitis. Both asthma and bronchitis may have symptoms of shortness of breath, wheezing and coughing. People with asthma or sinusitis and those already allergic to mold are most at risk, but other people can develop allergies or asthma and suffer other effects. In addition, mold may cause eye and skin irritation.

It is important that mold is removed quickly and properly. If this is not done, more significant damage to interior structures can occur, requiring extensive reconstruction.

A-1007/S-2142 is a good step in the right direction toward protecting New Jersey students, school employees, and residents from the negative impacts of mold in both classrooms and residential buildings.

NJEA urges your support of this bill.

GGS/BSB/ies

07/21/2014

Submitted
by

Brita Forsberg Wenzel
Save Barnegat Bay

SAVE BARNEGAT BAY BILLS

1. S502 Barnegat Bay Protection Act (Holzapfel)

- This bill would establish a protection fund, create a dedicated portion of sales tax that would go to the fertilizer and authorize special license plates to be made to provide for donations.

2. S1029 Urea as an Ice Melt (Holzapfel)

- This bill would prohibit the sale, distribution, and use of urea as an ice melt.

3. S1031 Phosphorus Bill (Holzapfel)

- This bill would require the labeling of ingredients and restricts phosphorus in household cleansing products.

4. S1492 DEP TMDL (Smith)

- This bill would require the DEP to adopt a total maximum daily loads for the Barnegat Bay ecosystem.

5. S1493 DEP Nutrient Standards (Smith)

- This bill would require the DEP to adopt total maximum daily loads for the Barnegat Bay ecosystem, and require the DEP to adopt nutrient standards for New Jersey marine waters.

6. S2004 DOT Native Vegetation (Holzapfel)

- This bill would require the DOT, NJTA, and SJTA to use only native vegetation for landscaping, land management, reforestation, or habitat restoration.

savebarnegatbay.org

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Save Barnegat Bay Annual Meeting

WHEN:

July 23, 2014 @ 7:00 pm - 9:00 pm

WHERE:


Toms River Library - Mancini Hall
101 Washington Street
Toms River, NJ 08753


CONTACT:


Britta Wenzel
(732) 830-3600
bwenzel@savebarnegatbay.org


Save Barnegat Bay will host its Annual Meeting on July 23rd, 2014 at the Toms River Library. We look forward to your attendance!


Evaluation of the Barnegat Bay 10 Point Plan - April 2014
American Littoral Society Clean Ocean Action Pinelands Preservation Alliance
Save Barnegat Bay

1.  **Close Oyster Creek Nuclear Power Plant** - Approximately 2 billion gallons of Barnegat Bay water is strained of life by the cooling systems at Oyster Creek each day. The plume of polluted, heated water is then released back into the Bay disrupting the Bay's natural ecology. The state negotiated and entered into an agreement with Exelon Corporation to cease electric generation operations at the Oyster Creek Generating Station by 2019. **If this happens, it will be a BIG win for Barnegat Bay.**

2.  **Fund Stormwater Runoff Mitigation Projects** - Stormwater runoff that is polluted with nitrogen and other nutrients is a leading cause of the Bay's decline. There are about 2,500 stormwater basins in the Barnegat Bay watershed that do not adequately capture and treat this pollution, so increasing their ability to remove harmful pollutants is an important strategy. The State has authorized low-interest and grant funding for stormwater basin improvement projects but to date only a small fraction of basins have been improved. The NJDEP has also provided support for other approaches and tools to reduce stormwater pollution. In addition, the Governor signed legislation requiring the State Department of Transportation to plan for improvements of the pollution removal abilities of state highway storm basins but, unfortunately, progress on this work has not been communicated to the public. **To be effective, many more stormwater projects must be funded and completed. The reporting and improvement information must be communicated to the public.**

3.  **Reduce Nutrient Pollution from Fertilizer** - Large quantities of pollution enter Barnegat Bay from the use of lawn fertilizers. On January 5, 2011, Governor Christie signed a law that established the most restrictive standards in the nation for nitrogen and phosphorous content in fertilizer products and the application amounts and timelines for its use. **This is a success and an example of grassroots and government collaboration.**






4.  **Require Post-Construction Soil Restoration** - Healthy soils are key to a healthy Bay. They allow water to recharge into the ground instead of becoming storm-water run-off and carrying pollution to our waterways. Too much of the land area that drains to Barnegat Bay has been over-developed and the soils are no longer able to provide clean water benefits. On January 5, 2011 Governor Christie signed legislation establishing soil restoration standards and practices. Unfortunately, the Secretary of Agriculture and the Commissioner of Environmental Protection, through the State Soil Conservation Committee, have yet to develop strong, effective standards. **The current standards are weak and flawed, and will not accomplish the intent of the legislation.**

5.  **Acquire Land in the Watershed** - Because Ocean County has been one of the fastest growing counties in the state of New Jersey, natural lands are vanishing at a rapid pace. Acquiring available, ecologically sensitive lands along the Barnegat Bay and its tributaries is a cost-effective and critical measure to prevent development activities that could further degrade the Bay's water and ecological quality. The Governor set a 30,000 acre in 30 year goal for land acquisition; in the first 3 years of the Governor's program over 2,000 acres have been purchased. However, the state is out of Green Acres funds, the Legislature has failed to advance a mechanism to renew these funds, and Governor Christie has not offered a plan of his own. **If this item is to ultimately succeed, the Governor needs to work with the Legislature to secure a stable source of funding for the program.**

28x

Evaluation of the Barnegat Bay 10 Point Plan - April 2014

American Littoral Society Clean Ocean Action Pinelands Preservation Alliance
Save Barnegat Bay

6.  **Establish a Special Area Management Plan** - Science has shown that runoff from development is a major source of pollution causing the Bay's decline. A comprehensive, land use approach to managing growth and development aimed at restoring the Bay was to be accomplished through a proposed "Special Area Management Plan (SAMP)". The last meeting held with public partners was in 2011 and the community has yet to see any action. Instead, the Christie administration has supported legislation and regulatory changes weakening protections for clean water statewide.
7.  **Adopt More Rigorous Water Quality Standards** - Barnegat Bay's health is determined by water quality measurements set forth in the Clean Water Act. The 10 Point Plan set out to "adopt more rigorous" standards to ensure that pollution control efforts could be measured. After adopting narrative nutrient criteria for coastal waters on December 21, 2010, the DEP launched a revised water quality monitoring network in the Barnegat Bay on June 6, 2011. Several years have gone by, but the state has neglected to use existing evidence that will trigger the standard. As a result, the DEP has failed to declare Barnegat Bay impaired for nutrients, the first step in developing a pollution reduction budget or Total Maximum Daily Load.
8.  **Educate the Public** - Public engagement and education is critical to the success of any plan to protect and restore Barnegat Bay. The DEP and its employees have committed resources to the Barnegat Bay Blitz, a bay-wide clean-up initiative. Grassroots community and environmental groups appreciate this opportunity to raise awareness about ALL of the problems facing the Bay.
9.  **Fill in the Gaps on Research** - The DEP has initiated new scientific studies to fill in research gaps. This research is valuable but not necessary to legally determine that the Bay is impaired or "unhealthy," and establishing stronger approaches supporting its restoration.
10.  **Reduce Water Craft Impacts** - Boats and personal water craft can harm the Bay by damaging underwater plants and disrupting aquatic habitats. Designation of a Conservation Zone, similar to the one at Island Beach State Park, can reduce such impacts. The DEP held stakeholder meetings in 2012 which helped to identify 16 ecologically sensitive areas that can be damaged by water crafts. The department hasn't updated the website with any new information in 2013 and seems to have stalled on making any more progress.

Lend Barnegat Bay a Hand – Sign the petition to have it declared impaired under the Clean Water Act!

[http://www.change.org/petitions/new-jersey-department-of-environmental-protection-commissioner-martin-declare-barnegat-bay-impaired-under-the-clean-water-act?recruiter=2373822&utm_campaign=twitter link&utm_medium=twitter&utm_source=share petition](http://www.change.org/petitions/new-jersey-department-of-environmental-protection-commissioner-martin-declare-barnegat-bay-impaired-under-the-clean-water-act?recruiter=2373822&utm_campaign=twitter+link&utm_medium=twitter&utm_source=share+petition)

Let's Work Together to Get Barnegat Bay Declared "Impaired"

During 2014 Save Barnegat Bay and our friends will work together to have public officials declare Barnegat Bay "Impaired" under the Clean Water Act.

A full effort to restore Barnegat Bay can be achieved only if government acknowledges what people and scientists already know and then employs our most powerful tools.

The A B C's of "Impairment":

Declaring the bay "impaired" triggers a constructive process:

A - The NJ Department of Environmental Protection (NJDEP) creates a quantitative model of how much nitrogen is *now* entering the bay.

B - NJDEP creates a quantitative model of how much nitrogen *should* be entering the bay for it to be reasonably healthy.

C - The Department generates a quantitative plan to get from A to B.

A Lot Has Gone Right So Far:

Governor Christie has signed the nation's strongest lawn fertilizer law. (It originated in the office of SBB.)

Governor Christie has persuaded Oyster Creek Nuclear Generating Station to close in 2019 instead of 2029.

The next positive step is to declare Barnegat Bay "impaired" in order to use the tools of the Clean Water Act to insure accountability by public officials.

It is only by measuring that true accountability can be achieved and Barnegat Bay can be restored.

This is Only Common Sense:

When a business is in trouble...

A businessperson does a quantitative evaluation of the dollars and cents.

When you have a health problem...

Your doctor evaluates quantitative test results.

When an estuary such as Barnegat Bay is in trouble...

Leaders of serious intent take a quantitative approach to the excess nitrogen running into it.

Such an approach allows *accountability* in protecting nature, controlling pollution, and ensuring enough clean water for future generations before it is too late.

Please ask Governor Christie and all public officials to declare Barnegat Bay "Impaired" under the Clean Water Act.

Hon. Chris Christie
The State House
Trenton, NJ 08625

Senator Smith and Assemblywoman Spencer and honorable members of the New Jersey State Senate Environment and Energy Committee and the New Jersey Assembly Environment and Solid Waste Committee I would like to begin by expressing my gratitude to the members of each committee for this opportunity to submit in writing my comments regarding S-2171/A-1596, permitting "fifth and sixth class counties to assume control and responsibility for operation and maintenance of beaches bordering Atlantic Ocean unless control and responsibility are reserved by a municipality," which is before the joint committee this morning for public hearing. While my preference is to present my comments in person before the committees the opportunity to do so has been precluded by my employment responsibilities.

By way of introduction my name is Peter Hartney and I have been a resident of the Borough of Surf City, in the County of Ocean for the past 19 years and since June of 2008 (by way of Municipal Council appointment to fill a vacancy and subsequent election) I serve the Borough of Surf City as a member of the governing body. In my responsibilities as a Councilman I have served since 2008 as the Chairman of the Beach Fees/Beach Protection Committee and as Chairman of the Environment and Public Issues Committee. In addition to having the responsibility of overseeing the management and operations of the beaches of the Borough of Surf City, in 2007, I was employed by the Police Department of the Borough of Surf City as a Code Enforcement Officer primarily tasked with foot patrol on the beach, as such I feel I am sufficiently qualified as to the intricacies of beach operations to address S-2171/A-1596.

I come before you today in opposition to S-2171/A-1596. My opposition to this legislation is grounded in three areas, fiscal cost, level of service and thirdly culture. Prior to addressing each of these areas I would like to begin by addressing, from my experience, an incorrect foundational assumption made with this legislation that a beach is a beach is a beach and thus operating one beach is the same as operating all beaches and fails to recognize that each beach has its own unique character (just ask any surfer, each beach has a unique personality) which requires local knowledge and oversight to manage and operate in an efficient and fiscally responsible manner. By placing operations of the beaches into the responsibility of the fifth and sixth class counties is not attainable since by the nature of the beast, large operations oft-times take a one size fits all approach which makes it difficult to be responsive and fiscally responsible to the unique operational characteristics of each beach.

Currently the operation of the beaches of the Borough of Surf City provides a high level of quality services through an equitable cost sharing between taxpayers and beach users which has kept the cost of beach operations in the Borough of Surf City affordable for all citizens of and visitors to the Borough of Surf City. An analysis of expenses and revenues for beach operation in the Borough of Surf City showed that over the 7 years studied the average expense of beach operations is \$585,415, the average revenue generated by beach fees is \$561,104 which means that for each \$1 of expense \$0.96 is provided for by beach fees and \$0.04 is provided from the general fund. I find it difficult to believe that County operation of the beaches could come close

to these numbers and in fact believe that the amount required to be paid for by the taxpayers of Surf City would be significantly higher.

Likewise, the shifting of responsibility for and control of the beaches bordering the Atlantic Ocean from the local governing unit to the government of the County of Ocean would have an immediate negative impact on both all the taxpayers of the County of Ocean and those who enjoy the beach in-so-far as the level of service at the current cost will not be able to be maintained with a county operation of the beaches; an increase in beach tag fees in the Borough of Surf City as costs for the operation/maintenance is assumed by uniform fee which on average will be higher than the current beach fees (in June 2008, at the beginning of the current economic recession the governing body of Surf City reduce the cost for daily badges by \$1 in response to the economic downturn and then reduce them by additional \$1 in 2009 and only this year, 2014, in response to the Constitutional increase in the minimum wage the cost of a daily badge was increased by \$1. The costs of weekly, seasonal and pre-season badges have remained the same, \$17, \$35 and \$25, for past decade). In addition this legislation will cause an increase in county property tax as a result of the exception to the 2.5% cap on increases in final appropriations as the county government attempts to create and pay for an increased level of expenses in a time of reduced property values as a result of the economy and Superstorm Sandy.

Turning to my second basis of opposition to this legislation, the level of service provided through county operation of the beaches would be significantly reduced. Municipal operation of the beaches enables us to immediately respond to and address the needs of the beach-goers as well as to have an immediate response to environmental issues which arise such as the washing up of residual household waste following the State's typical mid-June thunderstorms which cause combination storm/sanitary sewers in other regions of New Jersey to overflow leading to the wash up of household waste on the Borough's beaches. Local operation of the beach enables us to rapidly address and remediate such issues; issues to which a county operated beach, by nature of a large bureaucratic infra-structure would have a slower response, at ultimately a higher cost both in fiscal terms and in terms of the negative perception which would develop among beach-goers as to the cleanliness of the beach. The level of service under county beach operation vs. local beach operation is akin to the difference in service levels one experiences in a large retail box store vs. the level of service experienced at a small, local, mom & pop retail establishment.

Lastly, regarding my opposition to S-2171/A-1596 based on culture. Proponents of this legislation have used the argument that county operation of the beaches would provide a single beach badge and enable beachgoers to transit between municipalities. This transiting between different municipal beaches is present by proponents of this legislation as something that is not possible under the present system of beach operations. This is in fact a red herring since at present there is nothing to restrict a beachgoer from beginning in one municipality and walking the beach onto the beach of an adjacent municipality. The second part of the argument for a universal beach badge put forth by proponents of this legislation that there is an overwhelming desire/need among beachgoers to visit a number of different beached during their stay fails to

recognize the cultural reality of the beaches of the New Jersey Shore. As the beaches are physically/operationally unique it is even more so with the culture of the beaches of the State. All one has to do is watch the evening news and reports from the Shore. In interview after interview people identify with a particular beach, often times for many generations, and the thought of going to another beach/municipality is not considered since people chose the beach by the unique culture/experience offered by a specific municipality. Thus, this argument by proponents is an answer in search of a question and in my opinion being used by select proponents as a way in to bring, other, broader and tangentially related issues, into the discussion of this legislation to simply cloud the waters.

In closing, since S-2171/A-1596 have not enjoyed the benefit of co-sponsorship by the legislators representing the people of Ocean County and has been opposed by resolution of the Board of Chosen Freeholders of the County of Ocean in addition to the opposition of the other coastal counties as well as the Borough of Surf City's resolution of opposition to this legislation when it was presented before the previous session of the legislature, it has the feel of an out-of-state relative coming for a visit and during that visit rearranging your furniture and cabinets since they think it would be better. In the end this legislation does the same.

Thank you again for the opportunity to submit my comments for your consideration.

Peter Hartney

Peter Hartney
Councilman, Borough of Surf City
Chairman, Beach Fees/Beach Protection Committee
Chairman, Environment and Public Issues Committee

ADDITIONAL APPENDIX MATERIALS
SUBMITTED TO THE
SENATE ENVIRONMENT COMMITTEE *and*
ASSEMBLY ENVIRONMENT AND SOLID WASTE COMMITTEE
for the
JULY 21, 2014 MEETING

Britta Forsberg Wenzel, representing Save Barnegat Bay:

Editorial: “Apathy Killing Barnegat Bay,” *Asbury Park Press*, July 18, 2014, [app.com](#).

William deCamp Jr., Commentary: “Despite spin, bay ailing: Believe science, not DEP, about Barnegat Bay’s health,” *Asbury Park Press*, April 3, 2014, [app.com](#).