

## CHAPTER 5

### Water Quality

### Water Supply

### Action Plan

*Development in Ortley Beach and beyond, looking toward Point Pleasant, late 1990s. PHOTO BY STUDIO NINE, WARETOWN, NJ*

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Water, water everywhere,  
Nor any drop to drink.

—*The Rime of the Ancient Mariner*,  
Samuel Taylor Coleridge

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### BBNEP GOALS THAT ARE SUPPORTED THROUGH THIS ACTION PLAN

**PRIMARY:** The natural water cycle will be balanced to: (a) protect the quantity and quality of public water supplies, and (b) maintain or restore ecological conditions to support living aquatic resources in the estuary and watershed.

Water quality in the estuary and watershed will support recreational bathing, direct shellfish harvesting, and the integrity of the freshwater and tidal benthic communities.

**SECONDARY:** All citizens and visitors understand how they influence the natural resources of the estuary, its watershed and the water cycle within it, and their role in its conservation and improvement.

### 5.1 INTRODUCTION—STATE WATERSHED MANAGEMENT RULES

The completion of this CCMP coincides with the NJDEP watershed planning and management process. The centerpiece of this process is the Water Quality and Watershed Management Rules document, published for public comment in the *New Jersey Register* on July 3, 2000, after an extensive stakeholder input process from March to October 1999.

The existing Water Quality Management Planning Rules, which are being proposed for repeal, were initially adopted in 1989. They established a process for the NJDEP to develop and approve Wastewater Management Plans (WMPs) as amendments to area-wide Water Quality Management (WQM) plans. These rules also established a process for review and approval of project-specific amendments to area-wide WQM plans. In implementing the process, the NJDEP works with the designated planning agencies, such as the Ocean County Planning Board (OCPD), to develop the area-wide WQM plans and adopts all plan amendments on behalf of the Governor under the Water Quality Planning Act. The rules provide a base level of detail on the examination of the potential impacts on natural resource capacity of the development which the plans and plan amendments accommodate. The rules emphasize instead the impact of sewer service area changes on wastewater treatment needs, which are determined through the land use development patterns identified in the municipal master plans. Nonetheless, the existing rules have had important environmental benefits, because: (1) they have helped ensure better conformance between local zoning and utility plans; (2) provided updated and more realistic projections of sewer service areas and needs; and (3) identified potential conflicts among regional sewer systems and between the regional systems and local wastewater facilities.

Over the last several years, the NJDEP has required the submittal of more comprehensive evaluations of the direct and indirect environmental impacts of wastewater treatment systems in the course of reviewing WMPs, area-wide WQM plans, and plan amendments under the rules. These evaluations are necessary because development has effects on water resources beyond those related directly to wastewater management.

On January 11, 2000, Governor Whitman signed Executive Order No.109, which supports this direction and calls for the consideration of the applicability of alternative analyses that address water supply issues, land use, environmental build-out, and pollutant loading during the NJDEP's review of plans and plan amendments. Executive Order No.109 applies to all new and pending applications for wastewater management plans and plan amendments that directly affect 100 or more acres of land or the disposition of 20,000 gallons of wastewater or more per day until these rules are adopted.

The proposed new Water Quality and Watershed Management rules represent a fundamental shift in water resource protection planning. Rather than focusing on how to address point sources of wastewater by considering various treatment scenarios, the new rules reflect a holistic approach to water resource protection. They require consideration of both point and nonpoint sources of wastewater and pollutants generated from residential, agricultural, industrial, and commercial development and activities. This evaluation includes alternative treatment technologies (including reuse), best management practices (BMPs), and land use alternatives to assess the direct and indirect environmental impacts of development and to help determine how and where development can occur with minimal adverse impact to the water resources of the State.



## WATER QUALITY/ WATER SUPPLY ACTION PLAN

The proposed new rules also reflect a change from a primarily point source “command and control” regulatory approach to a more cooperative, place-based planning framework that considers alternative wastewater treatment and land use as key to sound management of water resources. The proposed new rules are also intended to reinvigorate regional planning based on “nature’s boundaries,” with the objective of maintaining, enhancing, and restoring water quality, water quantity, and ecosystem health. The proposed new rules set the framework for determining the water resource capacities for a region through Watershed Management Area planning. These capacities are then used as the “limits” for more detailed infrastructure and land use planning at the local level.

While the proposed new rules emphasize wastewater facilities planning, they also recognize the importance of assessing and managing by non-structural means stormwater, water supply, and habitat preservation. Thus, the rules encompass and promote both “green” and “gray” infrastructure planning. Specifically, the proposed new rules:

- Emphasize that the primary objective of water quality and watershed management planning is, wherever attainable, to restore, maintain, and enhance water quality, water quantity, and ecosystem health. These objectives are comparable to the goals of the CCMP;
- Establish the process for integrating surface and groundwater quality standards and assessments, anti-degradation, total maximum daily loads (TMDLs), and water quality maintenance in watershed management planning. These features of watershed management planning support the CCMP and its various action plans;
- Emphasize Watershed Management Area planning as the primary vehicle for conducting regional water resources planning and for integrating water resource protection measures and land use development scenarios in order to achieve water resource objectives; the CCMP is the first iteration of a watershed management area plan for the Barnegat Bay watershed;
- Articulate the roles and responsibilities of the various participants in the development of effective strategies

to address water quality, water quantity and ecosystem health issues and achieve the desired results for a specific watershed management area. There are similarities between the public processes in the NJDEP’s proposed planning efforts and the NEP process, including public outreach through a consensus process. This will facilitate the BBNEP’s ability to serve the role as a watershed management forum, primarily through action plan implementation;

- Establish watershed management area plans as dynamic and flexible planning tools. They will consist of certain mandatory statewide elements but also incorporate components specific to each watershed;
- Support the integration and coordination of planning efforts across all planning levels (state, regional, county, and municipal) and across NJDEP programs (wastewater, water supply, and land use);
- Improve and expand the environmental assessments and analyses which will be required as part of wastewater management planning. These include: pollutant loading analysis; environmental build-out analysis; population, household, and employment projection analysis; land use projection analysis; alternatives analysis; coordination and integration with state, county, watershed and municipal plans, including the State Development and Redevelopment Plan; consumptive water use analysis; environmental and public health needs assessments; and wastewater and water supply projection analysis. The CCMP action plans call for some of these analyses to be performed in order for appropriate water strategies to be accomplished;
- Ensure that all new development outside of existing designated sewer service areas will be evaluated for its water resource impacts. This includes developments totaling six units or more that will use septic systems and that have not already received municipal approval;
- Enhance the wastewater plan amendment process by: utilizing impervious cover as a screening tool to promote infill development; requiring mandatory



*The Shack, a landmark seen from LBI Causeway circa, 1950. PHOTO COURTESY OF THE OCEAN COUNTY HISTORICAL SOCIETY.*

pre-planning conferences for projects with the potential to result in direct, indirect, or cumulative impacts to clarify for the applicant the application process and requirements; requiring statements of local plan consistency and local consents at the time of application to ensure that there is local support for a project prior to the expenditure of substantial state resources and to enhance state/local communication; and incorporating timeframes for the processing of plan modifications to increase predictability for applicants and to support the NJDEP's goal of Open and Effective Government under its Strategic Plan; and

- Incorporate aspects of the continuing planning process (CPP) required by the federal Clean Water Act (CWA), including area-wide water quality management plans, TMDLs, and procedures for revisions to water quality management plans. Other aspects of the CPP are implemented under other NJDEP regulations and programs.

As the state adopts its new proposed rules, the BBNEP is strategically positioned to make productive use of the existing relationship of its member agencies to implement, where appropriate, various aspects of watershed management and to accomplish the goals of the CCMP. The Barnegat Bay watershed will continue to directly benefit from the funding which the NJDEP is providing to Ocean County for watershed management efforts in the Barnegat Bay watershed.

The second chapter of the CCMP demonstrates the wealth of water resources that are a part of the Barnegat Bay and its watershed. Both in terms of water quality and quantity, the watershed provides needed fresh water, through streams, lakes, and groundwater, for the many freshwater aquatic uses, including fish and wildlife, aquatic inverte-

brates, drinking water, recreational use, and industrial and commercial uses. Fresh water from the watershed is also needed as inflow to the estuary, to maintain the unique ecosystem where fresh and salt water mix and create a vital nursery for life along this section of the Atlantic coast.

Many activities that occur within the bay and its watershed have a profound effect on these water resources. As discussed in Chapter 2, some resulting priority water resource problems include increased nutrient loading to the streams of the watershed and to the bay; withdrawal of water that disrupts the natural hydrologic cycle; increased pathogen loadings; and an ever-increasing population that requires fresh water for its subsistence. However, to merely treat the priority problems as they become known would be similar to treating only the symptoms of a larger problem. To effectively remediate the impacts that are impairing water quality and quantity throughout the watershed, it is necessary to develop a strategy that effects change at the source of the impairment (e.g., stormwater runoff, point sources).

Because of the anticipated population growth in the watershed area, an effective water quality and supply plan must target both present and future conditions. As a result, action items have been developed that specifically address future population needs, and components of many action items have been designed to predict and manage impacts of the anticipated growth.

The scope of the various Action Items germane to the quality and supply of water within the Barnegat Bay watershed involve consideration of the quality of the water in the bay, waters from tributaries running off into the bay, and the supply and use of groundwater from which the majority of residents draw their drinking water (Table 5-1).

# WATER QUALITY / WATER SUPPLY ACTION PLAN

**TABLE 5-1. Water Quality / Water Supply Action Items.**

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Sources
5.1	Development of Total Maximum Daily Loads (TMDLs) for areas listed on the 303(d) list of impaired waterbodies. -C	H	NJDEP	To begin immediately. If TMDLs are necessary, it is expected that they will be completed by June 2006.	\$300,000 per TMDL		See Chapter 12
5.2	Complete a high-intensity Natural Resources Inventory (NRI) to identify pollution sources from land use information and site conditions. -R	H	OCSCD, USFWS, USDA-NRCS and Ocean County municipalities	The pilot area inventory could begin immediately and be complete within 2-3 years.	\$375,000 for the pilot area		See Chapter 12
5.3	Retrofit retention or detention basins, and retrofit stormwater basins to increase infiltration and recharge of rainfall runoff. -R	M	NJDEP, Division of Watershed Management and OCSCD	Completed within 5 years upon receipt of funding.	\$3,000 to \$7,000 per basin and \$85,000 for mapping		See Chapter 12
5.4	Implement Phase II Municipal Stormwater Rules in the Barnegat Bay Watershed. -C	H	NJDEP	12/99-03/2003	See Table 5.1	Public Participation and Education	Eligible State Loan Programs
5.5	Encourage native species landscaping to minimize water use and fertilizer and pesticide application. -R	M	NRCS	Implement within two years of final approval of the CCMP	Enhanced program funding; no estimate	Habitat and Living Resources	See Chapter 12

Status: Priority:

R = Recommendation H = High  
C = Commitment M = Medium  
PC = Partial Commitment L = Low

TABLE 5-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
5.6	Develop a financial incentives mechanism, "Water Quality Rebate", for implementing Best Management Practices on non-federal, non-agricultural lands. -R	M	OCSCD	As soon as funding is available	A start-up grant of approximately \$75,000 is necessary	Public Participation and Education Human Activities and Competing Uses	See Chapter 12
5.7	Institute the Nonpoint Education for Municipal Officials (NEMO) program with- in the Barnegat Bay watershed. -PC	M	RCE	Two years to fully implement in a small sub-watershed	\$65,000 per year	Habitat and Living Resources	NJDEP Funding
5.8	Promote existing technical and financial programs to imple- ment soil management prac- tices on agricultural lands. -R	M	NRCS and the OCSCD	Upon completion of the <i>Soil Management Systems</i> technical standard action item. Outreach to begin when funding becomes available.	\$4,000 per year, or \$20,000 mini- mum		See Chapter 12
5.9	Identify the extent of water quality problems emanating from livestock farms and work with livestock producers to reduce runoff from manure stockpiles. -R	H	OCSCD and NRCS	5 years from date of NRI data	\$66,000	Human Activities and Competing Uses	Eligible Federal and State Funding. See Chapter 12

Status:

R = Recommendation  
 C = Commitment  
 PC = Partial Commitment

Priority:

H = High  
 M = Medium  
 L = Low

# WATER QUALITY / WATER SUPPLY ACTION PLAN

TABLE 5-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
5.10	Develop a management strategy to reduce the congregation of Canada Geese populations in urban areas. - C	M	OCHD	Ongoing	Base program funding	Habitat and Living Resources	Ocean County Health Dept.
5.11	Sample and analyze water to evaluate fertilizer and pesticide residues introduced into surface water systems. - R	M	RCE	2002-2005	\$25,000 - \$49,750	Human Activities and Competing Uses	See Chapter 12
5.12	Continue publication of "Pesticides for New Jersey" to include site-specific recommendations for the use of pesticides on golf courses and public lands. - PC	M	RCE	Immediately to coincide with the annual update of Pesticides for New Jersey	Estimated to be \$1,000.	Human Activities and Competing Uses	Rutgers Cooperative Extension
5.13	Promote <i>Home*A*Syst for the Barnegat Bay Watershed</i> (RCE, 1998) through widespread distribution. - R	M	RCE	Implement upon availability of funds.	\$7,000 for 1,500 guidebooks	Human Activities and Competing Uses	See Chapter 12
5.14	Periodically examine technical and permit data on small point source discharge permit holders in order to promote and maintain an understanding of their relationship to the overall ecological health of the bay. - R	M	BBEP STAC	To begin immediately after approval of the CCMP	\$1,500/year		BBEP Program Funding

Status: Priority:

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TABLE 5-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
5.15	Periodically examine technical and permit data on the Oyster Creek Nuclear Generating Station in order to promote and maintain an understanding of its relationship to the overall ecological health of the bay. - R	M	BBEP STAC	To begin immediately after approval of the CCMP	\$2,500/year		See Chapter 12
5.16	Eliminate the discharge of boat sewage into the bay by promoting the use of sewage pumpout facilities. - C	H	NJ Clean Vessel Program	Planning for pumpout facilities to begin immediately. Fact sheets to be distributed annually beginning this Spring.	Cost to print and distribute the Barnegat Bay Boaters Fact Sheet \$1,000.	Public Participation and Education Human Activities and Competing Uses	NJ Clean Vessel Program
5.17	Acquire an additional sewage pumpout boat for Barnegat Bay and its major tributaries. - C	H	NJ Clean Vessel Program	To begin immediately upon CCMP approval	Cost of acquiring and equipping a pumpout boat is \$35,000. Annual operation cost is \$22,000		Clean Vessel Act Funding
5.18	Apply to the USEPA for federal designation of Barnegat Bay as a No Discharge Zone. - C	H	NJMSC	Draft application completed.	\$15,000	Habitat and Living Resources Human Activities and Competing Uses	BBEP and NJ Marine Sciences Consortium

Status:

R = Recommendation

C = Commitment

PC = Partial Commitment

Priority:

H = High

M = Medium

L = Low

# WATER QUALITY / WATER SUPPLY ACTION PLAN

TABLE 5-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
5.19	Develop a "Clean Marinas" program to assist marina owners and managers to use their facilities in a manner that employs BMPs to the maximum extent. - C	H	Marine Trades Association of New Jersey	Upon CCMP approval	\$500 initial costs and \$1500 per year, thereafter	Human Activities and Competing Uses	NJDEP and NJ Marine Trades Assn.
5.20	Establish a comprehensive water supply plan for the Barnegat Bay watershed that will guide water supply development, use, and reuse through the year 2040 and, to the maximum extent possible, maintain the natural hydrology of the watershed. - R	H	NJDEP, Division of Watershed Management	Completed four years after CCMP approval	\$500,000 for staff support over 4 years; additional costs not yet determined	Human Activities and Competing Uses	Eligible Federal and State Funding. See Chapter 12
5.21	Develop a workplan and institute controls for management of water demand/water conservation. - R	H	NJDEP, Division of Watershed Management	Complete within two years of CCMP implementation	\$125,000 for staff support over 2 years plus undetermined additional project costs	Human Activities and Competing Uses	See Chapter 12
5.22	Integrate existing shallow groundwater protection programs. - R	H	NJDEP, Division of Watershed Management	Upon initiating, this action will be ongoing	No additional funds are needed for this action.	Human Activities and Competing Uses	No Additional Funding is Required
5.23	Establish a network of three weather stations in the watershed tied to the South Jersey Resource Conservation & Development RISE network. - R	L	South Jersey RC&D	Immediately upon funding	\$6500 per weather station to establish; \$250 per year to operate	Public Participation and Education	See Chapter 12

Status:

R = Recommendation  
 C = Commitment  
 PC = Partial Commitment

Priority:

H = High  
 M = Medium  
 L = Low

TABLE 5-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
5.24	Establish a demonstration project for wastewater reuse, which will be discharged back to the watershed, and which alleviates the need for potable water for irrigation of lawns, golf courses, or other public areas. - R	M	OCUA	Three years from project initiation	Not yet determined	Human Activities and Competing Uses	See Chapter 12
5.25	Assist municipalities in their involvement in the NJDEP Shellfish Waters and Bathing Beaches protection strategies for the Barnegat Bay watershed. - C	H	BBEP	Ongoing	\$500,000		Clean Water SRF and Others

Status: Priority:

R = Recommendation      H = High  
 C = Commitment          M = Medium  
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# WATER QUALITY / WATER SUPPLY ACTION PLAN

## BBNEP WATER QUALITY AND QUANTITY

### Action Plan Objectives:

- Restore and maintain a productive ecosystem with no adverse effects due to pollution;
- Ensure that edible seafood is safe for unrestricted human consumption;
- Minimize health risks to contact water uses;
- Estimate adverse impacts of eutrophication, including hypoxia, resulting from human activities;
- Provide a sustainable water supply to the human population without adversely impacting natural water regimes.

The detailed action items in this chapter are intended to achieve the objectives noted in the text box. Table 5-2 and Figure 5-1 show how the achievement of those objectives will be measured by the specific parameter and monitoring program within the Barnegat Bay watershed and give the timeline for implementation of the action items in this chapter. The monitoring programs listed are those that are currently administered by the referenced agencies. The BBNEP will help coordinate these programs in order that they may serve the purpose of measuring the success of the CCMP implementation.

**TABLE 5-2. Indicators and Monitoring Programs for Measuring Progress toward Objectives.**

Water Quality and Quantity Objectives of the Barnegat Bay Estuary Program	Environmental Indicators of the BBEP	Monitoring Programs for Indicators
Restore and maintain a productive ecosystem with no adverse effects due to pollution.	The measure of success in this objective will be no net increase in phosphorus and nitrogen (P-N) loadings to the Bay over the implementation of the management plan. P-N are good indicators of human impact to the system, and they are readily measured in most areas by existing monitoring programs. Currently, we have an estimated loading of P-N from streams, the atmosphere direct to the Bay surface, and from ground water direct to the Bay. This loading estimate was primarily generated from actual monitoring data, although additional data are needed in some areas. The program will periodically compare these estimates against new estimates to see if the management actions are effective in reducing current loads while the projected population increase occurs. Our objective is to hold the loadings at no net increase while continuing research occurs on the role of nutrients in the Bay.	The loadings of phosphorus and nitrogen to the Bay will be monitored by, or estimated from, data collected in the following programs: <ul style="list-style-type: none"> <li>• <b>Surface Water Quality Data</b>—The NJDEP/USGS cooperative Ambient Surface Water Monitoring Network and the Toms River Nonpoint Source Study.</li> <li>• <b>Ground Water Quality Data</b>—The NJDEP/USGS cooperative Ground Water Monitoring Network.</li> <li>• <b>Atmospheric Deposition Monitoring Data</b>—The National Atmospheric Deposition Program.</li> <li>• <b>New Jersey DEP TMDL Monitoring Program</b></li> </ul>
Ensure that edible seafood is safe for unrestricted human consumption.	The measure of success in this objective will be the status and trends in the acreage of shellfish beds open for unrestricted shellfish harvest. The program goal is to reduce microbial loadings from all sources to the Bay to the point that all shellfish beds can be opened for unrestricted shellfish harvest.	Monitoring will continue through the existing National Shellfish Sanitation Program operated by the Bureau of Marine Water Monitoring, NJDEP.

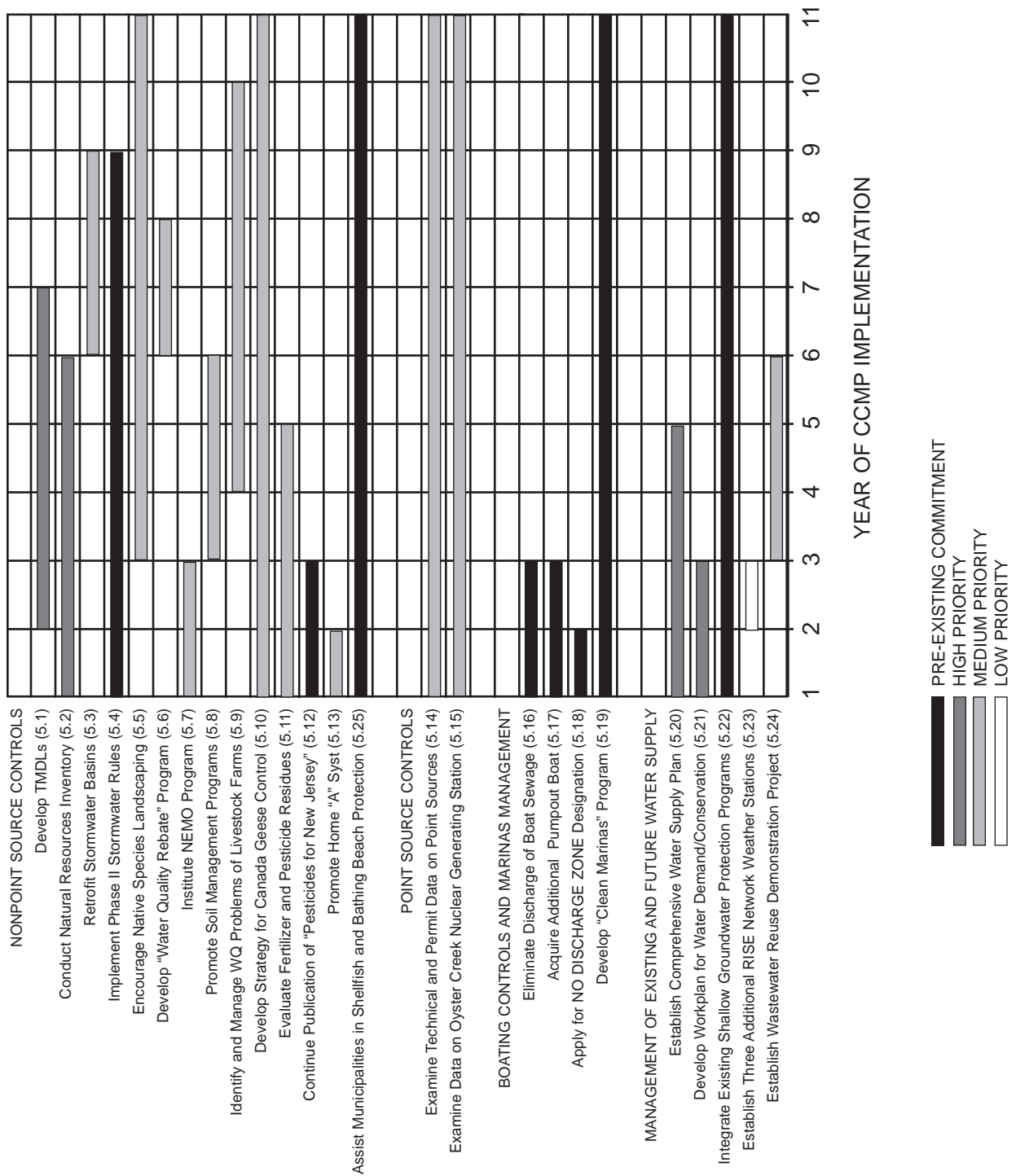
**TABLE 5-2. (continued)**

Water Quality and Quantity Objectives of the Barnegat Bay National Estuary Program	Environmental Indicators of the BBEP	Monitoring Programs for Indicators
Minimize health risks to contact water uses.	For Primary Contact Recreation at Bay Beaches, the measure of success of this objective will be if less than 10 percent of 100 beach days are closed per year. For Recreation Uses of Estuarine Waters, the measure of success of this objective will be if the NJ Surface Water Quality Standard for SE Waters for secondary contact uses is fully supported. This measure is supported if the fecal coliform geometric average was less than 200 MPN/100ml and less than 10 percent of the individual samples exceeded 400 MPN/100ml.	<p>The programs that monitor for these indicators are as follows:</p> <ul style="list-style-type: none"> <li>• <b>Primary Contact Recreation at Bay Beaches</b> —The Cooperative Coastal Monitoring Program Ocean and Bay Beach Closure data collected by the Ocean County Health Department and cooperating health agencies and coordinated by the NJDEP.</li> <li>• <b>Recreation Use of Estuarine Waters</b>—The marine and coastal water quality FC data collected by the Bureau of Marine Water Monitoring, NJDEP.</li> </ul>
Estimate adverse impacts of eutrophication, including hypoxia resulting from human activities.	The measure of success in this objective will be to complete research adequate to understand the role of nutrients and other contaminants that contribute to eutrophication and hypoxia and the effects of these conditions on living resources of the Bay. Once the program has achieved conclusive results on the role of human activities affecting eutrophication and its impact, this objective will be met. If it is determined that there is an adverse impact from eutrophication, new objectives to mitigate the impacts will have to be developed.	This indicator will be monitored by the BBEP Management Committee and the Scientific and Technical Advisory Committee to determine when the indicator has been achieved.
Provide a sustainable water supply to the human population without adversely impacting natural water regimes.	<p>The measure of success in this objective will be to achieve the following measures with associated indicators:</p> <ol style="list-style-type: none"> <li>1. Meet 2040 water demand as measured by the Water Allocation and Safe Drinking Water Program.</li> <li>2. Maintain adequate streamflow to meet aquatic biota needs as measured by stream gauging stations in the watershed with streamflow meeting the requirements identified as a result of Action 5.20.</li> <li>3. No evidence of increase in saltwater intrusion as measured by the Coastal Plain Synoptic and Chloride Monitoring Network operated by the U.S. Geological Survey and NJDEP.</li> </ol>	<p>Water demand will be monitored by programs of the NJDEP's Water Allocation and Safe Drinking Water Bureau.</p> <p>Streamflow will be monitored by the U.S. Geological Survey's streamflow monitoring network.</p> <p>Saltwater intrusion will be monitored by the U.S. Geological Survey's New Jersey Coastal Plain Synoptic and Chloride Network.</p>



# WATER QUALITY / WATER SUPPLY ACTION PLAN

FIGURE 5–1. Water Quality/Water Supply Actions.



## 5.2 WATER QUALITY/WATER SUPPLY ACTION ITEMS

### ACTION 5.1

Development of Total Maximum Daily Loads (TMDLs) for areas listed on the 303(d) list of impaired water bodies.

**SIGNIFICANCE OF ACTION:** Implementation of the TMDL is intended to bring the impaired water bodies into compliance with the Federal Surface Water Quality Standards. At this time the baseline information available is not strong enough to support actual implementation of TMDLs in the Barnegat Bay watershed. Therefore, this action is a commitment to assess the potential need for TMDL development.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** TMDL development and monitoring will be performed by NJDEP (Lead) with input from all stakeholders.

**HOW:** The streams identified in Chapter 2 as potentially impaired waterways (Table 2-5) are located within the Pine Barrens and are naturally acidic with a high dissolved mineral content. These waters support a highly adapted fauna and flora that are unique to the Pine Barrens, of which many species are listed as rare and endangered; yet, because water quality readings of these waters may fall outside the acceptable limits of a typical freshwater system, they may be mistakenly labeled as "impaired." Therefore, the stream data need to be re-examined and compared to other typical Pine Barren streams to determine impairment. If it is determined that these water bodies are, in fact, impaired, the state can begin the process of TMDL development.

**WHEN:** Monitoring and data evaluations are to begin immediately. If TMDLs are necessary it is expected that they will be completed by June 30, 2006.

**WHERE:** Impaired, or potentially impaired, water bodies occur throughout the watershed but are concentrated in the Metedeconk and Toms River subwatersheds in the northern half of Ocean County.

**MEASUREMENT OF EFFECTIVENESS:** Follow-up monitoring by NJDEP for the pollutant(s) of concern will be performed to determine effectiveness of TMDLs should they be necessary.

**COST ESTIMATE:** \$300,000 per TMDL.

**FUNDING SOURCES:** NJDEP will schedule funding as appropriate within its schedule for implementing plans for the state's Watershed Management Areas.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Not yet determined.

### ACTION 5.2

Complete a high-intensity Natural Resources Inventory (NRI) to identify pollution sources from land use information and site conditions.

**SIGNIFICANCE OF ACTION:** The successful completion of a NRI will provide comprehensive baseline information that will assist in achieving many of the water quality and supply action plan objectives; data from the inventory will support strategies to address nonpoint and point source pollution and water supply, and will provide information necessary to allocate resources and target critical areas for implementation.

Specifically, the data will be used to:

- Establish TMDLs at the sub-watershed level;
- Establish flow requirements for streams and into the estuary;
- Compare existing conditions to future build-out scenarios;
- Determine sources of stream impairments;
- Identify specific BMPs for implementation;
- Support water conservation, reuse, and recharge projects;
- Assist in the development of alternative landscape designs;
- Develop soil health restoration activities;

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- Implement Section 402 of CWA (Phase II of Storm Water Rules) for small MS4s: <100,000 people and >1000 people per square mile, including federally owned installations; and
- Target actions and fiscal resources to critical areas.

**STATUS AND PRIORITY:** Recommendation, High Priority.

**WHO:** OCSCD, U.S. Department of Agriculture Natural Resources Conservation Services (NRCS) and Ocean County municipalities (Lead). Other partners, including Ocean County Planning and Health Department (OCPHD), NJDEP, and USGS would be consulted to ensure the data could be used for purposes intended under the various other action items.

**HOW:** The nationally recognized NRCS NRI method will determine the location of specific NPS-impacted sub-watersheds and/or number of primary sampling units (PSUs) needed for statistically significant resource information.

The selected/random PSUs within sub-watershed(s) will coincide with the proposed USGS enhanced stream-gauging network, to accurately reflect the major land use/land cover types (agriculture, forest, urban, suburban, barren land, shore land). On-site data collections will be specific to the land use type. All data points will be located with GPS and all data entered into the GIS system.

## DATA TO COLLECT

**Urban/suburban:** Lot size, percent open space, open space cover, degree of soil profile disturbance, soil bulk density, water source, sewerage system, point source discharges, lawn maintenance (owner or contractor), erosion rate, irrigation type and water source, stream length, water body size, nature/extent of riparian forest.

**Agricultural/forest:** Crop, irrigation used, irrigation type, water source, type of animal, animal density, animal waste handling, land slope, soil type, soil bulk density, conservation treatments, erosion rate, woodland harvesting, stream length, water body size and nature/extent of riparian forest.

**Barren land/shore land:** Erosion rate, soil type, soil bulk density, pH, land cover, point source discharges, land shape, water fetch, land slope, orientation, on- and off-shore traffic.

**WHEN:** It is estimated that an NRI of the Toms River sub-watersheds (beginning with Long Swamp Creek) would begin when funding is available and take two to three years to complete with the addition of one full-time Ocean County staffer. More areas and/or faster turn-around can be accomplished with additional funding/staff.

**WHERE:** The Toms River sub-watershed will be the pilot watershed for the project. The Metedeconk sub-watershed will follow when funds become available.

**MEASUREMENT OF EFFECTIVENESS:** The results will be used to: (1) help determine the priority of actions; (2) measure the effectiveness of actions taken; (3) help to begin the TMDL development process; and (4) help with water supply planning efforts. The number of agencies partnering in the inventory, and the number of projects or actions that use the NRI data, would be tracked and replicated in other watersheds, including the Metedeconk sub-watershed.

**COST ESTIMATE:** For an inventory of this scope, it is estimated to cost \$2,500 per PSU. The total number of PSUs required will depend on the area selected, the detail demanded by other action items, and the level of statistical accuracy desired. Based on current information, it is estimated that \$375,000 will be required for the pilot area.

**FUNDING SOURCES:** No firm commitments. See potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

*Seining at BayFest  
in Berkeley Island  
County Park*



## ACTION 5.3

Retrofit retention or detention basins, and retrofit stormwater basins to increase infiltration and recharge of rainfall runoff.

**SIGNIFICANCE OF ACTION:** As a watershed is developed, the hydrology, hydraulics and pollutant loadings all change in ways that may not have been accounted for when the existing retention/detention basins were designed and constructed. Retention/detention basins are primarily designed to hold excess stormwater runoff generated by a specific development and to release it at a rate that will not adversely affect the receiving water body by causing flooding or severe erosion. Existing retention/detention basins in developments can be retrofitted to reduce the adverse hydrologic, hydraulic, and water quality effects that the developments cause. Increasingly over the last decade, some basins are also being used to provide a measure of water quality treatment either by settlement of suspended solids and/or by using plants to take-up pollutants settled out or in solution.

Keeping the water cycle in balance is a major concern for the watershed program and making provision for the full groundwater recharge of the one-year storm would help address the bulk of stormwater runoff and provide adequate water cycle balance. There are over 1,000 stormwater facilities within existing developments where preventive strategies are obviated. Restoring some level of infiltration and storage in these facilities can effectively reduce impacts from the development and come closer to predevelopment hydrologic conditions for the site. Retrofitting existing basins will implement measures to reduce stormwater runoff volume and peak flow rate maintaining base flows and decreasing the severity of high flow events in streams.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** NJDEP, Division of Watershed Management and OCSCD (Leads), U.S. Geological Survey (USGS), OCPD, and Ocean County Engineering District (OCED).

**HOW:** Stormwater basins can be retrofitted to improve water quality by: improving the settling capacity of the basin, adding vegetation to improve pollutant uptake,

adding BMPs (such as settling chambers or sand filters) into the stormwater collection system to reduce the loading on the basin, reducing the amount of impervious area contributing runoff to the system, or any combination thereof. Some specific recommendations for significantly enhancing the BMP objectives include:

- Modifying the outfall to create a two-stage release to better contain smaller storm discharges while not compromising the structure for controlling larger storm outflow;
- Incorporate a settling chamber in the stormwater system prior to discharging into the basin;
- Eliminating or altering concrete low-flow channels and replacing with meandering stone-lined swales to promote infiltration and/or filtering;
- Eliminating low-flow bypasses;
- Eliminating or altering concrete low-flow channels;
- Incorporating low berms to lengthen the flow path and eliminate short-circuiting;
- Incorporating forebays and micropools at the inlet and outlet, respectively;
- Regrading the basin bottom to create a wetland area near the outlet or re-vegetating parts of the basin bottom with wetland vegetation to enhance pollutant removal, reduce mowing, and improve aesthetics;
- Creating a wetland shelf along the periphery of a wet basin to improve shoreline stabilization, enhance pollutant filtering, and enhance aesthetics; and
- Installing a "floating riser" that will take flow from the top of the temporary pool through a filter, allowing higher sediment trap efficiency in the basin.

Through completion of the GIS stormwater facility database and the NRI recommended in Action Item 5.2, the OCPB, OCED, NRCS, USGS and the OCSCD target basins for potential retrofitting. Basins will be selected for retrofitting based on their ability to enhance groundwater recharge and improve water quality. The District and NRCS will supervise the installation of retrofits to: construct forebays; remove low flow channels; modify outlet structures including installation of floating risers; reduce soil compaction to encourage

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groundwater recharge; planting of herbaceous and woody plants to filter and absorb nutrients and related practices. Such retrofits will help to protect water quality and to encourage infiltration to reduce runoff volume. Portions of older dry basins can be converted into wet pond marsh systems to minimize nonpoint sources and to help filter the water prior to recharge runoff into groundwater.

**WHEN:** Upon availability of funds, storm drain mapping can be completed within one year, and retrofitting can be completed within a total of five years.

**WHERE:** Priority sites include the Toms River and Metedeconk sub-watersheds. Beyond the five-year time frame, it is expected that this action will be implemented throughout the watershed.

**MEASUREMENT OF EFFECTIVENESS:** Each retrofitted detention basin will be evaluated based on the specific objective for the action. If a basin is retrofitted to enhance flood control, effectiveness will be measured by the change in flow rate from the basin. If the retrofit supports enhanced water quality, monitoring will be conducted by measuring the pollutants of concern in the basin influent and effluent.

Existing stormwater basins are designed to control peak runoff rates and not mimic pre-development watershed hydrology. Improper design of some existing basins may lead to elevation in water temperatures and may accelerate downstream erosion. The cumulative impacts that these site-specific stormwater basins have on the watershed's hydrology and water quality is a concern because many of these basins were installed only to reduce the impacts of site-specific development. To effectively assess whether a specific basin is a candidate for retrofitting, the following must be considered.

Will the retrofit or selected BMP:

- Reduce nonpoint source pollution;
- Encourage groundwater recharge;
- Assist in maintaining base flows; or
- Reduce the severity of potential flooding and downstream erosion?

Monitoring by USGS, and others, as part of the BBNEP's environmental monitoring plan should measure changes in base flow, reduced suspended solids and nutrients in receiving streams. The BBNEP and participating agencies will work to secure the necessary funding.

**COST ESTIMATE:** Based upon data provided by NRI the costs per basin are estimated to be between \$3,000 and \$7,000 per basin. The total number of basins to be retrofitted would be determined by the technical watershed committee. The mapping portion is estimated to cost \$85,000. Approximately 50 basins will be identified using the 303(d) list as a priority.

**FUNDING SOURCES:** No firm commitments. See discussion of potential funding sources in Chapter 12.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Residential maintenance of stormwater management structures is a problem because homeowner associations often do not have the necessary resources for the work. Should the responsibility fall to the public to ensure maintenance, a dedicated funding source must be identified.

### ACTION 5.4

Implement Phase II Municipal Stormwater Rules in the Barnegat Bay Watershed.

**SIGNIFICANCE OF ACTION:** Implementation of the Phase II Rules will reduce the NPS pollution contribution to the bay and its watershed, thereby protecting public health and the natural resources of Ocean County.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** NJDEP Bureau of Nonpoint Source Control (Lead) is the permitting authority by delegation from USEPA. The regulated municipalities, alone or working together with other stakeholders, are responsible for implementing the six minimum control measures of the Phase II Rules. These Rules will be satisfied through the state's own Stormwater Management Rules, which call for implementing BMPs related to Statewide Basic Requirements in a Stormwater Management Plan and a Stormwater Control Ordinance. In addition, optional measures such as wildlife



management may be implemented if the municipality so chooses. Further measures may be required when a TMDL has been specified or when a Watershed Area Management Plan or a Regional Stormwater Management Plan has been adopted for the watershed. BBNEP will assist with public outreach and education.

**HOW:** Permitted municipalities will be required to implement the six minimum control measures, as embodied in the statewide basic requirement for:

- Local public education and outreach;
- Public involvement/participation;
- Improper disposal of waste;
- Floatables and solids control;
- Pollution prevention/good housekeeping for municipal operations; and
- Post-construction stormwater management in new development and redevelopment to be addressed through the required Stormwater Management Plan and a Stormwater Control Ordinance. (Construction site stormwater runoff control will continue to be implemented through Chapter 251 Plan certification by the Ocean County Soil Conservation District.)

**WHEN:** The following schedule is anticipated for the finalization of the rules:

December 8, 1999 -- USEPA rules become final;

October 27, 2000 -- USEPA issues menu of BMPs for regulated municipalities;

December 8, 2002 -- NJ modifies NJPDES rules;

December 8, 2002 -- NJDEP issues general permit(s);

March 10, 2003 -- Regulated municipalities submit permit application.

Program fully implemented.

**WHERE:** All municipalities which operate separate municipal storm sewers and meet the USEPA definition of an urbanized area as determined by the 2000 Census, and those municipalities designated by NJDEP, will be required to obtain a permit. USEPA defines an urbanized area as "a central place (or places) and the adjacent densely settled surrounding area that together have a minimum population of 50,000 and a minimum average density of

1,000/square mile." According to existing Census data and NJDEP's designation of all municipalities regulated under the SIIA, all municipalities in the Barnegat Bay watershed will be required to obtain general permit authorization.

**MEASUREMENT OF EFFECTIVENESS:** The effectiveness of this action will be measured by the number of municipalities achieving compliance.

**COST ESTIMATE:** See Table 5-3.

**FUNDING SOURCES:** Some projects such as construction of new stormwater basins, construction of new storm sewers, replacement of existing storm sewers, purchase of storm sewer maintenance equipment and controls to prevent runoff from salt storage facilities are eligible for loans through NJDEP. The BBNEP will provide the resources necessary for public outreach activities.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Municipalities may need to adopt ordinances in order to implement some of the statewide basic requirements.

## ACTION 5.5

Encourage native species landscaping to minimize water use and fertilizer and pesticide application.

**SIGNIFICANCE OF ACTION:** Among the secondary impacts of development is the creation of artificial vegetative landscapes consisting of alien plant species that require specific applications of fertilizer, pesticides, and water. Such maintenance procedures result in increased pollutant loads in runoff destined for the local tributaries. Artificial landscapes can also attract nuisance wildlife. For example, Canada Geese are attracted to open landscapes of close-cropped lawns. Developments that entail large open spaces requiring landscaping, such as corporate parks or campus-like settings, can be designed using native species that require less maintenance and that recreate a semblance of natural habitat. This would have the salutary effect of providing habitat more conducive to local native wildlife, discourage introduced or nuisance species, reduce long-term maintenance costs, and reduce the load of NPS pollution to the bay and watershed.

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**TABLE 5-3. Percentage of Municipalities Affected and Range of Per Capita Costs for Six Minimum Measures.**

<i>Measure</i>	<i>Percent of Municipalities Expected to Incur Costs</i>	<i>Low-End Range of Per Capita Costs</i>	<i>High-End Range of Per Capita Costs</i>
First Permit Cycle:			
Public Education	39	\$0.02	\$0.34
Public Involvement	100	\$0.19	\$0.20
Illicit Discharge D&E	90	\$0.04	\$2.61
Const. Site SW Runoff Control	83	\$0.04	\$1.59
Post Construction SW Mgt.	4	\$1.09	\$1.09
PP/GH of Municipal Ops.	71	\$0.01	\$2.00
2nd and 3rd Permit Cycles:			
Public Education	39	\$0.01	\$0.34
Public Involvement	100	\$0.12	\$0.12
Illicit Discharge D&E	73	\$0.04	\$2.17
Const. Site SW Runoff Control	80	\$0.01	\$0.83
Post Construction SW Mgt.	4	\$1.09	\$1.09
PP/GH of Municipal Ops.	67	\$0.01	\$1.08

**STATUS AND PRIORITY:** Recommendation, Medium Priority

**WHO:** NRCS (Lead), OCSCD, to provide technical information and guidance for large-scale developments within the watershed.

**HOW:** The agencies will utilize their authorized programs to provide technical materials, guidance, and assistance to the regulated community.

**WHEN:** This action is targeted to be implemented by 2004.

**WHERE:** This action will target areas in the watershed undergoing active development, particularly areas that are environmentally sensitive, such as riparian zones, floodplains, and rare species habitats.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be gauged by the number of developments that choose to employ less-intensive landscaping within their design. Over the long term, the measure of success can include large lawn areas that are converted to a lower maintenance form of landscaping.

**COST ESTIMATE:** Enhanced funding for public education and outreach programs for the agencies is necessary; no estimate is currently available.

**FUNDING SOURCES:** No firm commitments. See potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.6

Develop a financial incentives mechanism, *Water Quality Rebate*, for implementing Best Management Practices on non-federal, non-agricultural lands.

**SIGNIFICANCE OF ACTION:** Current U.S. Department of Agriculture (USDA) cost share programs are available only to agricultural landowners. However, in the Barnegat Bay watershed, the majority of land is owned and managed by residential and commercial owners, who collectively have a tremendous impact on groundwater recharge, bayshore and riverfront areas, NPS pollution, and runoff volume. It is well established that financial incentives are powerful tools for changing behavior. A “water quality rebate” program could be established to provide that incentive to homeowners and commercial property managers and would also offer tremendous public relations potential to educate the public on the watershed project goals.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** OCSCD (Lead) will administer the pilot program initially. However, it would be more appropriate for a public utility to administer the program. OCSCD would provide training to the public utility.

**HOW:** A list of recommended BMPs will be developed based on data from the NRI (Action Item 5.2) and available technical references. The OCSCD will make site visits to develop specific BMP plans for each owner, and follow up with visits to ensure the BMPs have been implemented prior to paying the “rebate.”

Grant money will be needed to fund the start-up of the program. Rebates would be available only to individual citizens, public or private entities such as municipalities or golf courses who have completed the Healthy Soil/Healthy Watershed (HSHW) program (see related Action Item 7.7) and who choose to implement BMPs on areas they manage.

Ultimately, it is hoped that utility authorities and other entities that benefit from the BMPs through reduced costs will fund the program.

**WHEN:** Implement by target date of 2004.

**WHERE:** This action is linked to Action 7.7 and will focus on the municipalities in the Metedeconk and Toms River sub-watersheds.

**MEASUREMENT OF EFFECTIVENESS:** Initially, effectiveness will be measured by the participation rate (percent of eligible households) in the program. Once the administration of the program is turned over to a local utility, the utility could track cost/benefit in water usage and/or water quality at strategically selected monitoring sites following storm surges.

**COST ESTIMATE:** A start-up grant of approximately \$75,000 would be needed to initiate the program and provide the early rebates. This estimate does not include the costs to implement the HSHW program. It is anticipated that the program will become self-sustaining through cost reductions over the long term.

**FUNDING SOURCES:** No firm commitments. See potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.7

Institute the Nonpoint Education for Municipal Officials (NEMO) program within the Barnegat Bay watershed.

**SIGNIFICANCE OF ACTION:** NEMO is a public service program to teach local officials about imperviousness/water quality through local mapping and modeling. Education of these officials supports the water quality goals established in this CCMP.

The dramatic increase in impervious surface cover within the Barnegat Bay watershed during the past half-century has significantly contributed to water quality degradation. Emphasizing the link between water quality and land use, NEMO is a program that teaches local officials about the role of impervious surfaces in the transport and concentration of pollutants. Focusing on local decision makers as

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the key to this link, NEMO brings advanced tools and technology to elected officials, planning board members, and town planners. NEMO's use of GIS modeling enables towns to compare, combine, and analyze multiple layers of information at once, using computer technology, natural resource and municipal databases, and satellite images. The technology can also be used to model the water resources impacts of projected future levels of development, based on zoning build-out analyses, and to allow local officials to plan accordingly.

**STATUS AND PRIORITY:** Partial Commitment, Medium Priority.

**WHO:** Rutgers Cooperative Extension Services of Ocean County (RCE) (Lead) and existing NEMO staff.

**HOW:** The NEMO program uses several delivery methods including a slide presentation that includes local photographs, educational materials, images from GIS, and a video on NPS pollution entitled "Luck Isn't Enough." NEMO also uses the World Wide Web as an information and educational tool. Employing all these tools, NEMO spells out the problem, shows the cumulative effects, and demonstrates potential solutions and results. Data from the NRI (Action Item 5.2) on current local land uses and potential nonpoint pollution sources would be used.

**WHEN:** Once initiated, it is estimated the various NEMO tasks will take approximately two years to fully implement in a small sub-watershed (consisting of a maximum of four municipalities). The target date to begin is 2002.

**WHERE:** The goal is to implement the NEMO program in every municipality in the Barnegat Bay Watershed.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured by the number of municipalities participating in NEMO.

**COST ESTIMATE:** Project expenses would include salaries with fringe benefits, travel, equipment, supplies, and administrative costs estimated at \$65,000 per year.

**FUNDING SOURCES:** The NJDEP is currently funding Rutgers (Institute of Marine and Coastal Sciences (IMCS)) to conduct a build-out analysis of the Barnegat Bay watershed. No other funding sources have been identified at this time.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No changes are required to implement NEMO. However, recommended outcome/solutions may include changes to regulations, ordinances, and policies.

### ACTION 5.8

Promote existing technical and financial assistance programs to implement soil management practices on agricultural lands.

**SIGNIFICANCE OF ACTION:** Modern farming practices contribute to loss of organic matter and structure in soil, and contribute to increased compaction below and within the plow layer. Compacted soils produce more runoff and less infiltration, and are more easily eroded. These factors reduce stream base flow and affect ecological health. Although agriculture is a minor land use within the watershed, it can be managed to increase the surface area available to infiltration, helping to recharge aquifers as well as reducing sedimentation and nutrient runoff.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** NRCS and the OCSCD (Leads) will be responsible for this action with assistance provided by the New Jersey Forestry Service. The Ocean County Agricultural Development Board (OCADB) will also provide assistance as necessary.

**HOW:** Informational mailings on soil compaction and nutrient runoff will be sent to farmland-assessed properties. The Forestry Service will assist by providing mailing lists of properties assessed as farmlands in Barnegat Bay counties and by providing staff time and postage for distribution of the mailings should funding be available. If justified by the NRI data, priority area funding under the Environmental Quality Incentives Program or a Land Treatment Watershed project for the implementation of on-farm conservation practices will be pursued. Practice selection will be based on the Soil Management Systems technical standard.

Environmental Quality Incentives Program (EQIP) was established through the 1996 Farm Bill to offer voluntary conservation assistance to farmers. Nationally, it provides educational, financial and technical assistance to farmers targeted to livestock-related resource problems and to general conservation assistance. The Natural Resource Conservation Service (NRCS) has the leadership role in EQIP and works in conjunction with the USDA's Farm Service Agency (FSA) to establish programs and priorities. NRCS establishes local work groups made up of Districts, NRCS, FSA, Cooperative Extension, DEP and others interested in natural resource conservation. EQIP works to establish priority areas for critical farm conservation needs. Contracts are provided to farmers to provide incentive payments and compensation for conservation practices. Cost sharing can pay up to 75 percent of costs for some practices. Practices can include grassed waterways, manure management, etc. Incentive payments can also be developed to encourage a farmer to install certain management practices such as soil management, nutrient management, Integrated Pest Management, and irrigation.

**WHEN:** Implement following the completion of the Soil Management Systems technical standard. Outreach began in 2002. Priority area funding or additional work could not begin until 2004.

**WHERE:** Watershed-wide, coinciding with areas identified by the NRI.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured against goal of 20 percent of the total number of farms identified in the watershed with soil management plans being implemented over a five-year period.

**COST ESTIMATE:** Costs include preparing and mailing appropriate information at regular intervals over a period of five years. The total number of contacts will be determined by the results of the NRI coupled with farmland assessment records. A rough estimate is \$4,000 per year, or \$20,000 minimum.

**FUNDING SOURCES:** No firm commitments. See discussion of potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.9

Identify the extent of water quality problems emanating from livestock farms and work with livestock producers to reduce runoff from manure stockpiles.

**SIGNIFICANCE OF ACTION:** The Federal Clean Water Action Plan identifies national environmental concerns, such as the toxic microbe, *Pfiesteria*, that are linked to animal feeding operations. The USEPA and the U.S. Department of Agriculture (USDA) have targeted larger Animal Feeding Operations (AFOs), known as Concentrated Animal Feeding Operations (CAFOs), for stricter regulatory control. Under this regulatory requirement the EPA has requested that the NJDEP (and most other states) prepare a statewide strategy that outlines how AFOs and CAFOs will be managed and/or regulated. The NJDEP Commissioner signed the Strategy for Animal Feeding Operations Management in December 2000 and submitted it to the EPA for use in the Federal Unified National Strategy for Animal Feeding Operations. This strategy is consistent with NJDEP's Strategic Planning Goal of Clean and Plentiful Water, as well as the point and nonpoint pollution elimination objectives of both the state's Strategic Plan and the Performance Partnership Agreement with USEPA Region 2.

Preliminary inspections by the NJDEP's Water Compliance and Enforcement (WCE) Office have confirmed that, in some cases, significant pollution is entering surface and ground waters, as a result of poor animal management practices in the state. The first step in the process will be to identify CAFOs through watershed inspections and other means, and then to permit those facilities.



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**STATUS AND PRIORITY:** Recommendation, Low Priority.

**WHO:** The NJDEP Division of Water Quality, Bureau of Nonpoint Pollution Control, Compliance and Enforcement Element, Division of Watershed Management and the NJ Department of Agriculture will work together to achieve state and federal water quality goals related to animal feeding operations. The NJDEP will implement regulatory activities for CAFOs and assist the NJ Department of Agriculture to implement voluntary management measures for other AFOs.

**HOW:** The NJ Department of Agriculture will identify AFOs not classified as CAFOs. NJDEP will follow a multi-faceted approach in identifying and inspecting CAFOs:

- 1) Utilize information provided by the NJ Department of Agriculture and other agencies, existing statistical data and land use inventory databases to identify potential sites. The NJ Forest Service has agreed to provide information (NRI data) to assist in this effort. NRI data will be used as the base for locating the livestock operations in the Metedeconk and Toms River sub-watersheds and will provide necessary information to map these locations;
- 2) When specific discharges or improper animal waste-water management practices are identified by either third-party complaints or local governments, NJDEP will actively investigate those sites; and
- 3) NJDEP, as a function of its watershed management process, will conduct stream surveys and investigations to identify potential discharges of wastes. Where such discharges are identified, NJDEP will actively investigate those sites.

The NJDEP will assist the NJ Department of Agriculture in outreach activities aimed at informing all AFOs of the applicable program requirements. These two agencies will provide educational information to and through agricultural publications, advisory groups, and organizations. Current animal waste disposal methods will be determined through site visits. Upon completion of an inventory, target areas will be prioritized according to relative impact to the watershed. Alternative management practices will be explored for implementation. The NJ Department of Agriculture and the Conservation Program Partnership will promote voluntary implementation of management prac-

tices. AFOs that have a reasonable potential to impact surface and groundwater quality will be the highest priority for the development and implementation of conservation, nutrient, and animal waste management plans and practices. The NJ Department of Agriculture will develop a progress reporting system that will establish the number of facilities that are implementing the necessary management practices.

Storage structures on farms and other BMPs recommended can be costly to install and maintain. The NJDEP will work with the NJDA and NRCS to identify and procure funding to assist the agricultural community in implementing both CAFO and AFO management practices.

**WHEN:** Inventory is targeted for completion by the end of 2003. It is estimated that five years will be needed to contact landowners and involve them in current voluntary programs.

**WHERE:** Specific sites in the Metedeconk and Toms River sub-watersheds will be targeted initially and will be determined from NRI data.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured by the percentage of livestock farms that have implemented BMPs to protect water quality in the targeted watershed. The targeted goal is 100 percent participation.

**COST ESTIMATE:** Planning/implementation costs are estimated at \$50,000 for Year One of this action (2003), and \$4,000 per year for Years Two through Five of post-CCMP implementation. The high cost estimate in Year One is attributable to costs necessary to fund on-site visits, which may involve staff overtime for working non-office hours, as many farmers work full- or part-time off-farm. Cost estimates include preparing and mailing appropriate information at regular intervals over the course of the project period.

Costs to implement onsite BMPs (e.g., storage structures, etc.) or other solutions cannot be estimated at this time. The percentage of cost sharing that can be provided to individual farmers through existing programs will depend on individual farmer eligibility, farm location, structure size, and yearly-appropriated funding levels.

**FUNDING SOURCES:** The NJDA and the Conservation Program Partnership will provide funding to secure accelerated implementation where possible and deemed appropriate. Section 319, US Department of Agriculture, NRCS, other federal funds, and state funds, to the extent available, will be used to support this effort. Loans under the Environmental Infrastructure Financing Program may also be available to provide funding. The NJDA and the NRCS have established a joint State Conservation Cost Share and Federal Environmental Quality Incentives Program which will enhance the implementation of needed management practices.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Not yet determined.

### ACTION 5.10

Develop a management strategy to reduce the congregation of Canada Geese populations in urban areas.

**SIGNIFICANCE OF ACTION:** Canada Geese acclimate easily to urban areas because of a good food supply, access to open water, and good habitat.

The fecal matter from a large flock of Canada Geese contains a large amount of nutrients. It has been determined that four geese are capable of producing as much phosphorus as one septic system. This extra nutrient load can contribute to algae blooms, especially small ponds, lakes and shallow estuarine areas, such as Barnegat Bay. High densities of geese can also elevate the bacterial levels of lakes, ponds and the bay, which results in the closing of swimming areas or restrictions on shellfish harvesting in the watershed. Geese are also a public health concern because they carry known pathogenic microbes, such as *Salmonella*, *Chlamydia*, *Giardia*, and *Cryptosporidium*.

Since the intense grazing of shorelines or adjacent lawns by geese can also create localized erosion problems and bank instability, reduction in Canada Geese populations would also support the goals and objectives of the Habitat and Living Resources Action Plan.

**STATUS AND PRIORITY:** Commitment, Medium Priority.

**WHO:** OCHD (Lead). The BBNEP will work in conjunction with the Monmouth County Health Department, Monmouth County Water Resources Association, and Navesink River Municipalities Committee.

**HOW:** Management measures to discourage geese from congregating in urban areas include:

- Install a shoreline barrier, such as a low fence, Mylar tape or some other type of obstruction;
- Install vegetative barriers in landscaped areas consisting of various types of shrubs and grasses to create a visual impediment to geese and discourage their use of these areas;
- Use of swans. Swans with young are very aggressive and tend to keep geese away;
- Implement a no-mow policy by establishing a high grass strip around water bodies and mow only once in late summer or early fall to remove seed heads, a potential attractant;
- Install an 18-inch-high chicken wire fence with two-inch mesh (possibly covered with hedge);
- Use scarecrows, or red, orange or black plastic sheets/flags (1 per 25 feet);
- Twist reflective Mylar tape from stake to stake along the edge of the water;
- Install dead goose decoys;
- Relocate geese to other areas (this can be done in June or July during molting). Geese should be relocated at least 200 miles away to prevent them from returning to original nesting areas;
- Leave the eggs in the nest to prevent the geese from laying more eggs; and
- Work with local municipalities to promote ordinances supporting these management measures.

It is important to note that Canada Geese are a protected species under the Migratory Bird Treaty Act of 1918. Therefore, any actions taken to support the control of the geese populations must be consistent with the guidelines of that Act.

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**WHEN:** Ongoing action by Ocean County Health Department.

**WHERE:** Action will be taken in all applicable areas of the Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** Reduction of nuisance complaints by municipalities and the public in locations where geese typically congregate will measure effectiveness. A reduction in bird-related beach closures due to water quality will also be a useful measure.

**COST ESTIMATE:** Base program funding.

**FUNDING SOURCES:** Initial implementation costs to be borne by the BBNEP, in addition to base program funding.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** New local ordinances are needed to support this action.

### ACTION 5.11

Sample and analyze water to evaluate fertilizer and pesticide residues introduced into surface water systems.

**SIGNIFICANCE OF ACTION:** Pesticides and fertilizers represent a major category of NPS pollution. It would be advantageous to natural resource management to determine the major source of these inputs into the environment. Points downstream from golf courses, suburban new housing developments, and cranberry bogs are to be studied.

The Rutgers Cooperative Extension of Ocean County (RCE) and Dr. Roy Meyers of NJDEP propose a research study to evaluate residues introduced into surface water systems. A 1999 study previously looked at the movement of pesticides applied to a golf course on the surrounding watershed system, confirming cause for concern.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** RCE (Lead) will coordinate sampling and develop recommendations regarding the adoption of BMPs. NJDEP will assess samples and compare data. Georgian Court College will provide student assistance with the research study.

**HOW:** Water samples from waterways and/or Superfund site wells adjacent to a golf course and cranberry bog will be tested on a regular basis to evaluate pesticide/fertilizer residues introduced into surface water systems. Sampling will be intensified following a rain event. Data will be analyzed for levels of pollutants and adjusted for seasonal levels.

Water samples from areas immediately adjacent to suburban housing will likewise be analyzed.

**WHEN:** Sampling will be taken quarterly over a three-year period commencing January 2002.

**WHERE:** Six sites will be determined, preferably at least one from each of the three categories.

**MEASUREMENT OF EFFECTIVENESS:** Data trends will determine the need for further action and identify appropriate remedial measures.

**COST ESTIMATE:** Current estimates are \$25,000–\$49,750 (personnel, travel, equipment, supplies, analytical costs)/year.

**FUNDING SOURCES:** No firm commitments. See potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.12

Continue publication of "Pesticides for New Jersey" to include site-specific recommendations for the use of pesticides on golf courses and public lands.

**SIGNIFICANCE OF ACTION:** Fertilizer and pesticide runoff from golf courses and public lands is a concern to both the public and the turf industry. The potential for a fertilizer or a pesticide to contribute to NPS pollution is a function of rate, timing, application techniques, and the interaction between specific product formulation or chemical properties and the environment in which it is used. Which factor is most significant varies from location to location; however, differences in formulation can greatly affect the impact on the environment. Pesticide and fertilizer technology is constantly improving, and is becoming increasingly complex. Fertilizer technology now offers sophisticated nutrient release mechanisms. With careful timing and by utilizing semi-permeable coatings, polymer urea chemistry, and natural organic byproducts, nutrient availability in the soil can be synchronized with plant needs. Matching the appropriate technology to the site is the key to sustainable development and maintenance practices. Creation of a resource for decision makers to use in selection of fertilizer formulations and pesticide formulations should reduce or eliminate NPS threats from golf course and public lands maintenance.

**STATUS AND PRIORITY:** Partial Commitment, Medium Priority.

**WHO:** The RCE (Lead) publishes "Pesticides for New Jersey"(E045M) each year, which informs users about pesticide and fertilizer products, and recommends rates and timing for applications. RCE would work with the USGS which retains the data and the format for modeling fertilizer and pesticide movement.

**HOW:** The choice of a fertilizer or pesticide formulation is a function of a number of factors: availability, habit, price, practicality, and knowledge. It is critical that decision makers have access to the information needed to understand the relationship between site and product. Attempts at regulation that address rates without recognizing the benefits of formulation modi-

fications can be counterproductive. As an example, the timing of the application and the source of the nitrogen can be more significant than the amount being applied. Similarly, subtle changes in pesticide formulation can affect the behavior of a product in the environment.

The development of site-specific product and formulation recommendations is a complex endeavor. The RCE has substantial experience with developing unbiased recommendations. By reviewing existing data and creating appropriate models, the behavior of both fertilizer components and pesticide products can be predicted across a broad spectrum of environmental scenarios. This process would then allow the risk models to be developed and products to be recommended based on geographic, hydrologic, meteorological, and agronomic parameters.

Circulation of this pesticide document will be part of RCE's established public outreach.

**WHEN:** This project could begin in 2002 and would coincide with the annual update of Pesticides for New Jersey.

**WHERE:** The recommendations would be tailored to site-specific conditions, and would be of value to appropriate areas throughout the Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** A survey of pesticides for New Jersey golf courses and other landscaped public lands which use this document and employ prescribed methods of pesticide applications will be conducted.

**COST ESTIMATE:** Estimates for data review and analysis and development of recommendations have not yet been determined. However, it is anticipated that annual publication costs will be approximately \$1,000 above base program level of funding.

**FUNDING SOURCES:** Funding is already in place for the publication of "Pesticides for New Jersey." Additional funding will be sought from other potential sources identified in Chapter 12, Section 12.8.1.

# WATER QUALITY / WATER SUPPLY ACTION PLAN

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None. Existing laws and regulatory agencies are adequate. Given the litigious nature of society it would be in the best interest of any golf course to follow recommendations created by The State University.

## ACTION 5.13

Widely distribute "Home\*A\*Syst for the Barnegat Bay Watershed," (RCE, 1998), an Environmental Risk Assessment Guide.

**SIGNIFICANCE OF ACTION:** Although Ocean County already maintains a household hazardous waste collection program twice a year, hazardous chemicals are not always disposed of properly, whether through negligence or lack of awareness. Most human activities and residential developments produce polluted runoff and stormwater discharges that contribute to the deterioration of Barnegat Bay's water quality. Measures to reduce contamination need to be suggested and implemented to reduce such degradation. It is important to focus not only on technical solutions, but also on pollution prevention via public outreach. It is also important to focus not only on new development and redevelopment, but also on NPS pollution resulting from existing land uses. The Home\*A\*Syst (H\*A\*S) program is structured to facilitate such individual behavior modification through a voluntary residential pollution prevention program.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**HOW:** H\*A\*S is an environmental risk assessment guide for the home and residential property. The guide conveys useful information about the basics of hydrology, watersheds, and groundwater for the individual homeowner. It also includes site assessment worksheets that landowners can use to increase their understanding of water pollution risks that are unique to their property. Collectively, the document builds a community's capacity for proper environmental management of water resources. Circulating this document at public outreach events will help draw in the public as active participants in reducing hazardous waste.

**WHO:** RCE (Lead) would be responsible for reproduction of the H\*A\*S for the Barnegat Bay Watershed guidebook. The BBNEP's responsibility would be to serve as a marketing consultant, and much more importantly, to potentially provide funding for reproduction of the document.

**WHEN:** Implement upon availability of funds, with a target date of 2003.

**WHERE:** Throughout Ocean County. The 1990 Census indicates 168,147 households in Ocean County, an area nearly coincident with the Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** Initial funding for the H\*A\*S guidebook supported publication of 1,500 copies of the document. Public requests for H\*A\*S during the first year have depleted the entire supply. Requests continue to be received at a similar rate, indicating that the "market is not yet near saturation." Additionally, it is recommended that periodic surveys of home usage kits be conducted, with the first survey being conducted within two years of action item implementation.

**COST ESTIMATE:** \$7,000 for publication of 1,500 guidebooks. Given sufficient funds, RCE could enhance its marketing techniques to distribute the guides.

**FUNDING SOURCES:** Initial funding came from a USEPA Section 319(h) pass-through grant from NJDEP's Office of Environmental Planning. No firm commitments for future funding. See discussion of funding services in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.





## ACTION 5.14

Examine technical and permit data on small point-source discharge permit holders in order to promote and maintain an understanding of the relationship of the discharges to the overall ecological health of the bay.

**SIGNIFICANCE OF ACTION:** The Barnegat Bay watershed is the site of some 20 small point-source discharge permit holders, none of which have been associated with any particular water quality problem. Permitted discharges in the watershed are regulated by state authorities. A principal goal of the BBNEP is to identify and address ongoing human activities that may have detrimental effects in the watershed and estuary. An awareness of actions related to point-source discharges by the BBNEP will help to ensure efficient coordination among the discharges, environmental monitoring efforts, and other Estuary Program activities.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** The BBNEP Science and Technical Advisory Committee (STAC) (Lead) will establish the technical group.

**HOW:** A technical group will assemble on an *ad hoc* basis to examine environmental reports completed by the permittees on small point-source discharge permit holders by industry, government, and independent sources to identify trends in estuary or watershed conditions that correlate with point-source discharges, to identify related issues that need to be addressed by the BBNEP, and to ensure efficient coordination with other Estuary Program activities.

**WHEN:** The re-examination will commence in 2002 at the beginning of the implementation phase of the CCMP. Findings will be reported directly to the Director of the BBNEP.

**WHERE:** This action encompasses the entire Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** The effectiveness of the action will be reflected in the integration of the technical group findings into the monitoring protocol for

the overall Program.

**COST ESTIMATE:** \$1,500/year for a research assistant.

**FUNDING SOURCES:** BBNEP base program funding, or other funding source that has not yet been identified.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

## ACTION 5.15

Periodically examine technical and permit data for the Oyster Creek Nuclear Generating Station (OCNGS) in order to understand its role in the overall ecological health of the bay.

**SIGNIFICANCE OF ACTION:** The Oyster Creek Nuclear Generating Station (OCNGS), a 630 MW (net) electric generating facility located between Oyster Creek and Forked River, affects environmental conditions in the watershed, airshed, and estuary through permitted releases of chemical biocides and thermal discharges. It also directly impacts estuarine organisms via impingement on intake screens and entrainment in plant condensers. In addition, the OCNGS alters water flow in Forked River and Oyster Creek. The OCNGS is by volume the most significant point source discharger to the Barnegat Bay–Little Egg Harbor estuary. Activities of this permitted facility are regulated by federal and state authorities. A principal goal of the BBNEP is to identify and address ongoing human activities that may have detrimental effects in the watershed and estuary. An awareness of OCNGS actions by the BBNEP will help to ensure an efficient coordination among OCNGS activities, environmental monitoring efforts, and other BBNEP activities.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** The BBNEP Science and Technical Advisory Committee (Lead) will establish the technical group; it will coordinate with the NJDEP (NJPDES Permit Program) and with the existing OCNGS Citizens Task Force.

# WATER QUALITY / WATER SUPPLY ACTION PLAN

**HOW:** A technical group will assemble on an *ad hoc* basis to examine environmental reports completed on the OCNGS by industry, government, and independent sources to identify trends in estuary or watershed conditions that correlate with OCNGS information, to identify related issues that need to be addressed by the BBNEP, and ensure efficient coordination with other BBNEP activities. The reports will contain technical and permit data from the zone of monitoring around the power plant and Oyster Creek.

**WHEN:** The examination will commence at the beginning of the implementation phase of the CCMP. Findings will be reported directly to the Director of the BBNEP.

**WHERE:** Oyster Creek, Forked River, and nearby portions of Barnegat Bay.

**MEASUREMENT OF EFFECTIVENESS:** The effectiveness of the action will be reflected in the integration of the technical group findings into the monitoring protocol for the overall Program.

**COST ESTIMATE:** \$2,500/year for a research assistant.

**FUNDING SOURCES:** BBNEP base program funding, or other funding source that has not yet been identified.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

## ACTION 5.16

Work to eliminate the discharge of boat sewage into the bay by promoting the use of sewage pumpout facilities.

**SIGNIFICANCE OF ACTION:** Eliminating discharges by promoting the use of pumpout facilities will further reduce bacterial contamination of shellfish waters, bathing beaches, lakes, and drinking water supply intakes, resulting in increased public health protection. The number of sewage pumpout facilities can also be used to support the designation of No Discharge Zones (See Action Item 5.18).

In 1992, Congress passed the Clean Vessel Act (CVA) to reduce overboard sewage discharge by providing funds for the construction, renovation, operation, and maintenance of pumpout stations for holding tanks and dump stations for portable toilets. Federal funds provide up to 75 percent of all approved projects with the remaining funds provided by the state or marinas. A secondary goal of the CVA is to provide information and education to boaters about the advantages of pumpout stations.

Under CVA regulations, any boat with an installed toilet is required to have one of three types of certified Marine Sanitation Devices (MSD), whether it treats the sewage and discharges it, or holds the sewage for future disposal.

Boat sewage dumped into Barnegat Bay and its tributaries threatens aquatic vegetation, fish, shellfish beds, and other wildlife species, not to mention public health. The nutrients, microorganisms, and chemicals contained in human waste from boats have a negative impact on coastal and inland waterways, resulting in a decrease of marine life, as well as contamination of bathing areas and shellfish beds.

Recent efforts to reduce water pollution have resulted in the resurgence of blue crabs, clams, oyster beds, finfish, and other wildlife in coastal waters. The proper use of pumpout facilities can continue to increase fish and shellfish populations and protect recreational uses for all to enjoy.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** NJ Clean Vessel Program (Lead), NJDEP Fish and Wildlife, NJ Marine Trades Association, NJ Sea Grant Advisory Service, National Clean Boating Campaign.

**HOW:** The BBNEP will work with the marina and boating industries to encourage and promote fuller use of sewage pumpout facilities. In conjunction with the National Clean Boating Campaign, the BBNEP will develop and distribute the following information, in the form of a "Barnegat Bay Boater Fact Sheet," to owners of boats, marinas and other appropriate facilities and venues including:

- NJ Clean Vessel Program;
- National Clean Boating Campaign website; and
- U.S. Fish and Wildlife National Pumpout Hotline.

**WHEN:** Meet with cooperating agencies during the start of the spring 2001 boating season to plan next steps. Develop “Barnegat Bay Boater Fact Sheets” by spring 2001 and distribute annually to marinas, yacht clubs, and boaters by Memorial Day. This is an ongoing activity.

**WHERE:** This action targets Barnegat Bay, Little Egg Harbor and all tidal waters flowing to these embayments.

**MEASUREMENT OF EFFECTIVENESS:** Successful distribution of “Barnegat Bay Boater Fact Sheet” to marinas, boat yards, yacht clubs, trade organizations, boat dealers and press/media, followed by monitoring the use of available pumpout facilities and the installation of new ones.

**COST ESTIMATE:** Print and distribute the Barnegat Bay Boaters Fact Sheet, \$1,000.

**FUNDING SOURCES:** NJ Clean Vessel Program, \$50,000 annually, of which a portion is available for public outreach materials.

NJ Clean Vessel Program, in conjunction with NJ Fish and Wildlife, have committed to developing information pertaining to the Clean Vessel Program, assist in the development of the Clean Marinas Program, and distribute funds through the Clean Vessel Coordinator for pumpout and dump station construction in the estuary.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.17

Acquire two additional sewage pumpout boats for Barnegat Bay and its major tributaries.

**SIGNIFICANCE OF ACTION:** One of the goals of the BBNEP is to reduce nonpoint source pollution and protect public health. One way to accomplish this is to obtain an additional mobile sewage pumpout boat on the Bay similar to the one currently in operation off Tice’s Shoal near the Borough of Seaside Park, and to develop a public information program to promote use of the pumpout boat. It is the overall objective of this action

to encourage county and local governments to consider the acquisition of pumpout boats to be used in areas where there is heavy boat traffic, which results in the dumping of sewage from boats’ holding tanks overboard. Silver Bay and Tuckerton are being considered as areas that would benefit from a pumpout boat.

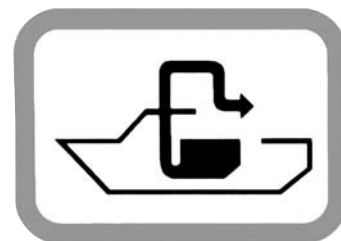
**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** The NJ Clean Vessel Program (Lead) will coordinate with other state and county agencies and local government as appropriate, to foster acquisition and use of pumpout boats.

**HOW:** Commitments are currently being negotiated with appropriate local officials. Technical assistance and a 13-minute slide show of the Tice’s Shoal pumpout boat will be provided to educate and encourage acquisition and use of additional pumpout boats in Barnegat Bay tidal waters. One new vessel per year will be purchased over the next two years.

**WHEN:** This program will commence at the beginning of the implementation phase of the CCMP.

**WHERE:** Local marinas, boat basins and local and county governments in Ocean County will be supplied with information on the pumpout boat program.



## WATER QUALITY / WATER SUPPLY ACTION PLAN

**MEASUREMENT OF EFFECTIVENESS:** The results of the May to October 1999 pumpout boat use at Tice's Shoal resulted in a total of over 8,000 gallons removed from the area on summer weekends. The public cooperated with the pumpout boat as a convenient and practical method of reducing the volume of boat sewage in specific areas of the bay. Monitoring of the number of gallons of sewage pumped will indicate degree of success of the pumpout boat. Over time, the annual increase in the number of gallons pumped will be a continuing measure of success.

**COST ESTIMATE:** The current cost of acquiring and equipping a pumpout boat is about \$35,000 and operation of a boat for a season is approximately \$22,000 for captain and boat operations. Public outreach will be provided by the NJ Clean Vessel Program. The Barnegat Bay sewage pumpout boat (the first of its kind in New Jersey) was purchased with funds provided under Wallop-Breaux legislation, which authorizes the US Fish and Wildlife Service (USFWS) to award federal CWA Section 106 grants for that purpose.

**FUNDING SOURCES:** Federal funding through the Clean Vessel Act is available for one new boat in 2000 and the NJ Clean Vessel Program committed to supporting the maintenance of the pumpout boat for five years.

**REQUIRED REGULATORY ORDINANCE, OR POLICY CHANGES:** Other than fulfilling all federal and state regulations pertaining to the purchase of pumpout boats utilizing federal CVA funding, no new regulations, ordinances, or policy are required.

### ACTION 5.18

Apply to the USEPA for federal designation of Barnegat Bay as a No Discharge Zone.

**SIGNIFICANCE OF ACTION:** Vessel discharges in the shallow, poorly flushed waters of Barnegat Bay result in coliform bacteria pollution and can contribute to the closure of shellfish beds and bathing beaches, as well as to the general impairment of the bay's recreational resources. In an order to provide federal, state and local officials with the authority to prohibit the

disposal of vessel-generated sewage into the bay, the waters of Barnegat Bay should be designated a No Discharge Zone. This designation will help protect and enhance the natural resources of the bay. In addition, this designation would also satisfy Action Plan 4.27 of the 1993 Barnegat Bay Watershed Management Plan.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** The NJ Marine Sciences Consortium (NJMSC) (Lead) will be assisted by the Ocean County Vocational and Technical School (OCVTS).

**HOW:** The NJMSC will gather the necessary information to prepare an application that NJDEP can submit to the USEPA on behalf of the citizens in the Barnegat Bay watershed.

**WHEN:** The completed draft application was submitted to the USEPA by NJDEP in May 2000, and the application is pending approval.

**WHERE:** The No Discharge Zone application will cover the navigable waters of Barnegat Bay, Manahawkin Bay, Little Egg Harbor Bay, and their tributaries.

**MEASUREMENT OF EFFECTIVENESS:** Designation of Barnegat Bay as a No Discharge Zone will be the ultimate measure of success of this action.

**COST ESTIMATE:** Approximately \$15,000 will be needed to complete a survey of the boating population using Barnegat Bay.

**FUNDING SOURCES:** The BBNEP will provide funding for the project and the NJMSC will provide necessary matching funds.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None required—authority is provided under Section 312 of the CWA.

## ACTION 5.19

Develop a "Clean Marinas" program to assist marina owners and managers to use BMPs.

**SIGNIFICANCE OF ACTION:** The program will help to restore and maintain a productive ecosystem with no adverse effects due to pollution, and ensure that edible seafood is safe for unrestricted human consumption. This can be accomplished by targeting marinas for participation in a "Clean Marinas" program, aimed at reducing pollutant discharges to shellfish waters.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** NJ Marine Trades Association (Lead), National Clean Boating Campaign, NJDEP, NJ Pollutant Discharge Elimination System (NJPDES), NJ Clean Vessel Program, and NJ Sea Grant Advisory Service.

**HOW:** The BBNEP will work with the marina and boating industries to develop a Barnegat Bay "Clean Marinas" program for new and existing marinas. It will also develop an award program to designate facilities showing substantial progress on implementing Best Management Practices as a "Clean Marina." Designated marinas will have implemented pollution prevention measures addressing the siting, design and/or operation of the facility, and shall address both point and NPS of pollution. The NJ Marine Trades Association, in cooperation with NJDEP, will provide technical guidance. New and expanding marinas and boat yards are subject to stormwater permitting requirements implemented through the NJPDES permit program, including implementation of pollution prevention measures. Since marinas are located at the water's edge, assistance will be given to help all marinas comply with permitting requirements.

*Components of this program are:*

1. Use BMPs which have proved to work in other marinas, are cost effective, easy to do, based on existing technology, and can help improve and protect water quality;

2. Once BMPs have been selected, all marina staff will be educated about "Clean Marina" techniques; and
3. Once staff receive training on the BMP program, they will educate customers and solicit their help in making the marina a cleaner environment and protecting its waters from marina-related pollutants.

**WHEN:** Implementation began in 2002.

**WHERE:** Barnegat Bay, Little Egg Harbor and all tidal waters flowing to these embayments.

**MEASUREMENT OF EFFECTIVENESS:** The success of this program will be measured by the number of facilities in Barnegat Bay designated as a "Clean Marina." The target number is at least five new "Clean Marinas" per year.

### COST ESTIMATE:

Item 1. Develop and distribute "Clean Marina" checklist and BMP information to marinas: \$500;

*Source: N.J. Marine Trades Association, NJDEP, Division of Watershed Management.*

Item 2. Provide permanent signs for marinas designated as "Clean Marinas": \$1,000/year; and

*Source: NJDEP, Division of Watershed Management.*

Item 3. Promote Public Education Program: \$500/year.  
*Source: BBEP.*

**FUNDING SOURCES:** See above. In addition, NJ Fish and Wildlife will provide limited information and Education Program staff time to work with the responsible agencies to develop the Clean Marinas Program.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.



# WATER QUALITY / WATER SUPPLY ACTION PLAN

## ACTION 5.20

Establish a comprehensive water supply plan for the Barnegat Bay watershed that will guide water supply development, use, and reuse through the year 2040 and, to the maximum extent possible, maintain the natural hydrology of the watershed.

**SIGNIFICANCE OF ACTION:** The watershed area of the BBNEP includes the portions of the state experiencing the most rapid increase in population growth. This population growth is dependent on a sustainable supply of water. The state's Water Supply Master Plan has identified the Barnegat Bay watershed as an area of significant water supply deficit by the year 2040. At the same time, the withdrawal of potable water for this area is almost totally consumptive to the watershed, as most of the wastewater is discharged to the ocean resulting in reduced streamflow and saltwater intrusion. Additionally, current modifications to the landscape change the natural hydrology of the watershed by reducing recharge and increasing runoff. A comprehensive water supply plan is required for the watershed in order to ensure that all of the important human and ecological needs are met.

**STATUS AND PRIORITY:** Recommendation, High Priority.

**WHO:** The NJDEP, Division of Watershed Management (Lead) will coordinate the effort. Other contributing parties will be: USGS, OCPD, OCSCD, OCUA, IMCS and Jacques Cousteau NERR (JCNEER), Purveyors of the Barnegat Bay watershed, USDA-NRCS and the NJ Forestry Services (NJFS).

**HOW:** A plan will be completed that is accepted by all parties and provides for definite measures to ensure a sustainable water supply for the population and the ecology of the bay and watershed. The BBNEP will provide the forum for discussion.

**DETAILED STEPS:** In order to make this plan a reality, there are a number of steps that need to be accomplished, involving numerous agencies and parties. The execution will require an overall workplan and budget, which should be developed by the NJDEP, Division of Watershed

Management. After the workplan is in place, the following technical efforts need to be accomplished:

### 1. Establish a Forum on In-stream Flow

**Requirements:** The NJDEP needs to establish an ongoing forum on in-stream flow requirements in the coastal plain of New Jersey. This forum would assemble information on the ecological, recreational, industrial, agricultural, and public supply uses and requirements for stream flow in the coastal plain. It would debate the relative merits of the various uses and would provide guidance to NJDEP programs on the freshwater in-stream flow requirements that meet the state's needs. The NJDEP should convene the forum with representation from the agricultural community, freshwater and estuarine ecologists and hydrologists, recreational users, water supply purveyors, county and state planners, county soil conservation districts, industrial users and the public-at-large. The objective would be to develop freshwater flow requirements for all in-stream uses and for the receiving water bodies.

### 2. Determine In-stream Flow Requirements for Barnegat Bay Estuary:

It is recommended that USGS and IMCS lead an effort to develop interim freshwater in-stream flow requirements while the above forum develops the final flow requirements. These two partners will need substantial input from the NJDEP, NRCS, NJ Pinelands Commission (NJPC), the OCPD and OCSCD. Local interests will also need to be inventoried in this effort. Since the NRI action item (Action Item 5.2) inventories resources and identifies sources of NPS pollution, this will be an essential prerequisite to this action. Therefore, the NRI will have multiple benefits that include the inventory of and planning for water supply actions. It is estimated that this step will take two to three years.

### 3. Establish a Monitoring Program for Saltwater

**Intrusion:** Saltwater intrusion continues to be a major concern along the New Jersey coastal plain aquifers. The current monitoring network is inadequate for providing early warning, or out-post monitoring for movement of chlorides. This is particularly true in the area of Barnegat Bay. The NJDEP and USGS will work together to propose a monitoring network for water use and saltwater intrusion in the surficial and confined

aquifers in the Barnegat Bay region. It is estimated that this step will take six months.

4. **Inventory Water Availability, Withdrawal, Use, and Discharge Information:** A detailed inventory will be developed of water availability, withdrawals, uses and ultimate discharge. This information will serve in part as the basis for developing future recommendations on water supply alternatives. The NJDEP will take the lead on this effort with major input from the USGS. The OCPD, OCUA, and the area purveyors will provide assistance and feedback. It is estimated that this step will take nine months.
5. **Establish Water Withdrawal Thresholds and Action Triggers:** A series of water withdrawal thresholds will be established while the investigations are continuing. The thresholds will be used to control continued water supply development and prevent adverse or irreversible impacts to the environment while the sustainable water supply levels and practices are being established. During this step, population projections and water use estimates will be refined. The NJDEP will take the lead on this step, with assistance from the USGS. The OCPD will provide assistance. It is estimated that this step will take one year.
6. **Integrate Constraining Factors with Water Supply Projections:** All of the constraining factors on water supply development will be integrated with the projections for future water supply demand. Projects will be carried through to the year 2050. The NJDEP and the OCPD will take the lead on this step. This step is estimated to require three months.
7. **Develop Water Supply Alternatives:** This step involves the thorough evaluation of alternative sources of water for present and future demand. The NJDEP will take the lead on this step with input from the area water-supply purveyors. The OCPD will assist. It is estimated that this step will take one year.
8. **Evaluate Water Conservation, Reuse, and Recharge Technologies:** In this step, the alternatives for water conservation, wastewater and gray water reuse, stormwater recharge, alternative landscape design and soil health measures will be evaluated for implementation. The NJDEP will

take the lead on this step with assistance from the NRCS, the OCPD, OCSCD, OCUA, and the USGS. Three years is the estimated time required for this step.

9. **Evaluate Institutional Arrangements and Financial Analysis for Alternatives:** Various institutional arrangements for implementing the alternatives and the conservation, reuse, and recharge measures will be evaluated. The NJDEP will take the lead on this step. The OCPD will assist. This step is estimated to take two months. The financial analysis is generally conducted by a consultant hired by the NJDEP and will require approximately four months to complete.
10. **Select Water Supply Alternatives:** Using all the outputs from steps 1 to 9, decision-makers will select a set of water supply alternatives for implementation. The NJDEP and the water supply purveyors of the area will take the lead on this step. The OCPD will assist. Selection of an alternative will take six months.

**WHEN:** The entire action is expected to be completed within four years of CCMP approval.

**WHERE:** This action encompasses the entire Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** Completion of an approved Barnegat Bay Watershed Supply Plan in four years.

**COST ESTIMATE:** Minimum staffing needs would be about two full-time personnel for each of four years at a cost of approximately \$500,000. Additional cost estimates would be developed during the course of action implementation.

**FUNDING SOURCES:** Federal, state, and other sources identified in Chapter 12 may each contribute partially to this action. See Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No legislation is required for the studies. Legislation may be required to implement the recommended actions based on the studies.

# WATER QUALITY / WATER SUPPLY ACTION PLAN

## ACTION 5.21

Develop a workplan and institute controls for management of water demand/water conservation.

**SIGNIFICANCE OF ACTION:** The watershed area of the BBNEP, as with every other portion of the state, is subject to drought. Drought is caused by prolonged periods of below-normal precipitation and drought warnings and emergencies can be called on the grounds of agricultural impacts, water supply, and environmental factors. In addition to this normal susceptibility to drought, this watershed has a significant population with shallow irrigation wells for residential and commercial/recreational use. Increased use of shallow groundwater during drought conditions further depletes the baseflow of streams in the watershed and, therefore, reduces the freshwater inflow to the estuary. One of the goals of the BBNEP is to maintain a balanced hydrologic cycle in the watershed and estuary. In order to achieve this goal, demand must be controlled and water conserved during periods of drought.

**STATUS AND PRIORITY:** Recommendation, High Priority.

**WHO:** NJDEP, Division of Watershed Management (Lead) in cooperation with the USGS, OCPD, OCSCD, purveyors of the Barnegat Bay watershed, NRCS.

**HOW:** Convene all responsible agencies to discuss and carry out the following steps.

**DETAILED STEPS:** To successfully complete this plan, there are a number of steps that need to be accomplished involving numerous agencies and parties. The execution will require an overall workplan and budget, which should be developed by the NJDEP, Division of Watershed Management. The following are general technical actions that should be planned and implemented by convening all responsible agencies:

1. **Evaluate the Opportunities for Water Supply Interconnections between Adjacent Public Supply Systems:** Significant advantages can be gained from interconnecting adjacent public water

supply systems. The largest advantage is that purveyors withdraw water from different sources, each of which varies in its susceptibility to drought conditions. By having interconnections between various systems, water could be moved from sources that are more "drought-proof" to those that are very susceptible to drought. It is recommended that the NJDEP undertake a study to determine if significant advantage could be gained by inter-connecting the water supply purveyor systems in the watershed. It is estimated that this step would take nine months.

2. **Assessment of Irrigation Systems in the Barnegat Bay Watershed:** It has been suggested that irrigation systems play a very large role in water usage during the growing-season months and particularly during droughts. As such, it would be prudent to conduct an assessment of irrigation systems in the watershed to verify this usage. The assessment would include:

- Developing an inventory of irrigation systems and the sources from which they obtain their water;
- Estimating the amount of water used for irrigation, by source;
- Developing an educational component on how residents and commercial establishments can reduce the amount of irrigation water used through measures like proper site planning and use of soil moisture information; and
- Linking this action to Action Item 5.23 for exploring long-term water supply alternatives. Irrigation water would be a prime candidate for re-use of treated wastewater.

It is recommended that OCSCD take the lead on this effort with major input from the NJDEP, the NRCS, and the OCPD. Local interests will have to be inventoried and accounted for in this effort. Data from the NRCS effort under the NRI will be essential to this process. The time frame for this assessment is estimated at two years.

**3. Develop Public Service Announcements (PSAs) for Water Conservation, Water Demand Management, and Drought Awareness:** It is recommended that the BBNEP develop PSAs that identify the need for water conservation and water demand management. These announcements should be particularly tailored to include information on the impacts that occur to a freshwater/estuarine system from consumptive use of fresh water and reduction in freshwater inflow to the estuary. The Citizens Advisory Committee (CAC) of the Barnegat Bay National Estuary Program should identify an entity to produce the PSAs. The time frame for this effort is estimated at nine months.

**4. Evaluate the Potential to Reinstate Conjunctive Use of the Potomac-Raritan-Magothy Aquifer System in the Barnegat Bay Watershed During Periods of Drought:** As an emergency measure, the NJDEP should evaluate the potential for utilizing the Potomac-Raritan-Magothy (PRM) Aquifer System in the watershed area as a safe water supply during periods of drought. Under this action, the PRM would only be utilized during the period of time that the drought warning and emergency are in effect. After the drought has abated, the PRM would then be left to recover. The NJDEP would have to evaluate the technical, financial and regulatory viability of this action. The NJDEP would take the lead on this action, with major input from the USGS, the OCPD, and the local water supply purveyors. This information will also serve in part as the basis for recommending future actions on water supply alternatives. The time frame is estimated at one year.

**WHEN:** Establishing a plan for the Barnegat Bay watershed that will control water demand and conserve water to the maximum extent possible by 2003.

**WHERE:** This action encompasses the entire Barnegat Bay watershed and all associated water source areas.

**MEASUREMENT OF EFFECTIVENESS:** Successful completion of the workplan will determine effectiveness.

**COST ESTIMATE:** Minimum staffing needs would be about one full-time worker over two years, or approximately \$125,000. Additional costs would be developed during the detailed action steps.

**FUNDING SOURCES:** No firm commitment. See discussion of potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY ORDINANCE, OR POLICY CHANGES:** Legislation may be required for implementation of the actions from the studies. Specific changes will be determined once the workplan is complete.

## ACTION 5.22

Integrate existing shallow groundwater protection programs.

**SIGNIFICANCE OF ACTION:** Groundwater in the shallow unconfined aquifer system of the Barnegat Bay watershed provides an important source of water supply for the growing watershed population. This groundwater also feeds streams that flow into the bay, and some groundwater seeps directly into the bay. As a result, the quality of groundwater can also affect the water quality of the bay. The shallow, unconfined aquifer system is vulnerable to contamination from human activities, especially in areas where overlying soils are sandy and highly permeable. Contaminants from human activities at the land surface can enter the aquifer system and can then migrate to water supply wells or to the bay. Actions designed to protect groundwater quality for water supply objectives and actions designed to protect groundwater for estuary protection objectives can be mutually beneficial, and should be coordinated, to the extent practicable, with ongoing efforts to achieve a comprehensive approach to resource protection.

**STATUS AND PRIORITY:** Recommendation, High Priority.

**WHO:** NJDEP, Division of Watershed Management (Lead), USEPA, USGS, OCHD, Municipalities of the Barnegat Bay watershed, water-supply purveyors.

**HOW:** Specific steps for integrating groundwater programs will be developed by cooperating parties, and a plan to protect groundwater supplies developed by linking the following efforts. The data collected will be entered into the NJDEP GIS.

# WATER QUALITY / WATER SUPPLY ACTION PLAN

Additional steps may be identified in conjunction with results of ongoing groundwater protection efforts.

- 1. Integrate New and Ongoing WQ Studies:** Recent state legislation authorized establishment of a project to assess the quality of water resources and contaminant sources in the Metedeconk River and Toms River sub-watersheds and to recommend actions that will address identified problems. The project is being conducted by the USGS in cooperation with the NJDEP, and is expected to provide more detailed information about the distribution of contaminants present in shallow groundwater. Results of this study, due in 2003, and other ongoing and future studies of groundwater quality should be integrated with results from other protection programs and reflected in CCMP action items, as appropriate.
- 2. Integrate Source Water Assessment Program and Other Groundwater Program Results:** As part of the implementation of the 1996 Amendments to the Safe Drinking Water Act, efforts are under way nationwide to assess the sources of all public drinking water supplies. Results of the assessment in New Jersey will include a comprehensive inventory of potential contaminant sources, which may provide valuable information about potential water-quality concerns for the bay. The results of the Source Water Assessment Program (SWAP) for New Jersey should be integrated with results from other groundwater protection programs and reflected in CCMP action items, as appropriate.
- 3. Coordinate Protection Programs:** Groundwater protection programs that are administered at the state, county, and municipal level, as well as those instituted by water-supply purveyors, should be coordinated at the watershed level to the extent practicable: examples of such programs include Superfund, the groundwater discharge permitting process; groundwater monitoring programs; well testing programs; and well head protection zoning ordinances. As new information or program elements emerge, coordination meetings should be held, as appropriate, with participation by the BBNEP.

**WHEN:** Beginning in 2003, this action, which targets protection of water supplies and estuarine water quality, will be conducted on an ongoing basis.

**WHERE:** This action encompasses the entire Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** A draft protection plan should be produced within three years. The measure of effectiveness will be the comprehensiveness of program integration and the area of the Barnegat Bay watershed covered by it.

**COST ESTIMATE:** No additional resources are required for this action.

**FUNDING SOURCES:** No additional funding is required.

**REQUIRED REGULATORY ORDINANCE, OR POLICY CHANGES:** To be determined. Legislation may be required for implementation of actions that result from the various ongoing protection efforts.

## ACTION 5.23

Establish a network of three weather stations in the watershed tied to the South Jersey Resource Conservation & Development (RCD) Resource Information Serving Everyone (RISE) network.

**SIGNIFICANCE OF ACTION:** Weather data from local weather stations can be used by residents, farmers, and land managers to efficiently schedule appropriate irrigation cycles tied to local real time weather conditions. An existing network of weather stations, including one station in Toms River, already provides irrigation data to hundreds of South Jersey farmers, golf course managers, and professional weather forecasters. The addition of two stations in the Barnegat Bay watershed would provide additional highly localized data.



If the effectiveness of irrigation water use by the largest users (residential and commercial areas) can be increased, the total demand for water during peak times will decrease. Less water being used means savings to water utilities (taxpayers), and less need to create new water supplies. It also means slower draw down of aquifers, and less direct discharge to streams and stormwater facilities.

**STATUS AND PRIORITY:** Recommendation, Low Priority.

**WHO:** South Jersey RCD (Lead), OCSCD, the BBNEP Public Outreach Program would assist in educating users.

**HOW:** South Jersey RCD has a process in place for locating and establishing weather stations once funding is secured. An education and outreach plan for each user group (farmers, suburban homeowners, corporate campuses, golf courses) would promote the concept and benefits of irrigation scheduling. Data collected by this network can be made available to the public at no additional cost.

**WHEN:** Commence immediately upon funding. Targeted for 2002.

**WHERE:** Stations would be set up to maximize spatial coverage within the watershed.

**MEASUREMENT OF EFFECTIVENESS:** The number of users accessing the weather station data through the existing Internet site will be tracked to determine the effectiveness of the broadcasting. Water utility data can be used to monitor water use before and after weather station data installation so as to measure the effectiveness of the action item. A goal for the action is to increase by 30 percent the number of institutional (government, park, school, etc.) water users that practice irrigation scheduling techniques based on real weather and soil moisture data.

**COST ESTIMATE:** \$6,500 per weather station to establish; \$250 per year to operate. The BBNEP Public Outreach Program would cover public outreach costs.

**FUNDING SOURCES:** No firm commitment. Funding could come from among the potential funding sources identified in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

### ACTION 5.24

Establish a demonstration project for wastewater reuse; wastewater will be discharged back to the watershed, alleviating the need for potable water to irrigate lawns, golf courses, or other public areas.

**SIGNIFICANCE OF ACTION:** The population growth within the Barnegat Bay watershed will be dependent on a sustainable supply of water. Presently, almost all wastewater (50+ million gallons per day of freshwater effluent) is discharged into the ocean, slowly lowering the groundwater levels and degrading the health of the Barnegat Bay ecosystem. The 1999 drought focused the attention of, and sensitized the general public to, the importance of wise use of water resources, a concern already recognized in the August 1996 Statewide Water Supply Plan.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** OCUA (Lead), NRCS, NJDEP, NJPC, Ocean County Board of Chosen Freeholders, OCSCD, Township of Berkeley, and the Ocean County Parks Department.

**HOW:** Divert a portion of the OCUA Central Wastewater Treatment Plant effluent through a tertiary new treatment process. Pump the final treated effluent for use in irrigating existing and future golf courses near the facility.

**WHEN:** Complete necessary treatment and distribution infrastructure planning by 2003.

**WHERE:** The demonstration project will occur within the Toms River and Cedar Creek sub-watersheds.

## WATER QUALITY / WATER SUPPLY ACTION PLAN

**MEASUREMENT OF EFFECTIVENESS:** Qualitative and quantitative evaluations of effectiveness will need to be conducted by independent agencies and/or universities. These measures will include reductions in the use of potable water for lawn irrigation, golf courses, etc., resulting from establishment of the demonstration project.

**COST ESTIMATE:** Not yet determined.

**FUNDING SOURCES:** No firm commitments. See potential funding sources in Chapter 12.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** NJPDES permit changes will be necessary.

### ACTION 5.25

Assist municipalities in the NJDEP Shellfish Waters and Bathing Beaches protection strategies for the Barnegat Bay watershed.

**SIGNIFICANCE OF ACTION:** It is a goal of the BBNEP to ensure that edible seafood is safe for unrestricted human consumption and to minimize bathing beach closures. New Jersey's stringent water quality monitoring program has resulted in the upgrading of thousands of acres of shellfish-producing waters in Barnegat Bay alone over the past ten years. The shellfish resources of Barnegat Bay (i.e., clams and mussels) currently support a commercial fishery with a dockside value in excess of \$3 million, as well as an important recreational fishery. Bathing beaches are also a significant recreational resource to the watershed's year-round residents and support and attract more than \$1.5 billion in tourism revenues for Ocean County, primarily focused on the ocean beaches. However, pollution, habitat destruction, the tremendous demand for seafood, and in some cases, other environmental factors have placed a heavy burden on these seafood and recreation resources.

Both of these significant economic and recreation resources are vulnerable to impairment from the same environmental and human health impacts: primarily bac-

terial and pathogen loadings. The hard clam harvest has experienced a steady decline over the past 50 years, and short-term closure of recreational bathing beaches has been a chronic problem, though the trends for bathing beaches have shown a great improvement over the last ten years.

To ensure that shellfish or contact recreational uses of bathing waters do not endanger the public health or jeopardize commercial fishing and recreational interests, it is essential that these resources be protected from point and NPS of pollution. Protection demands that a comprehensive assessment and identification of pollution sources be undertaken cooperatively by state and local agencies.

The Sanitary Survey, in conjunction with an Intensive (land-based) Survey where appropriate, includes a watershed assessment and land use analysis to determine potential point and NPS of pollution originating from:

- Sewage treatment plants and other sanitary sewage facilities;
- Treatment plants not meeting NJDEP's permit condition;
- Septic system failures;
- Urban/suburban stormwater runoff;
- Marina and boating-related discharges; and
- Agricultural waste.

Point sources are not major contributors of pollution to Barnegat Bay, since all treated municipal wastewater is discharged through ocean outfalls; though nonpoint sources continue to be a threat.

Subsequent to the identification of pollution sources in a watershed, efforts will focus on the degree of contamination from all sources, the potential for improving, upgrading, and/or preventing further degradation of shellfish and recreational bathing waters, and implementation of a comprehensive action plan for pollution control throughout the watershed.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** NJDEP, with the cooperative support of BBNEP, OCHD and municipalities.

**HOW:** The BBNEP will serve as a forum to serve county and local governments. The objective of this action plan

is to ensure that the existing shellfish and recreational bathing water quality planning and management strategy is fully comprehensive. The identification of nonpoint pollution sources, and the institution of mitigative measures for their control by state and local cooperative action, will be performed in conjunction with the regulation of new and existing point sources of pollution management activities by appropriate governmental agencies and private concerns.

The implementation of point and/or nonpoint source pollution controls will be coordinated by the NJDEP through its watershed management program. Integral components of this shellfish and recreational bathing beach water quality management plan include:

1. Point Sources Controls;
2. Malfunctioning Septic Systems; and
3. Urban/Suburban Stormwater Runoff.

**WHEN:** Ongoing.

**WHERE:** Barnegat Bay and Little Egg Harbor.

**MEASUREMENT OF EFFECTIVENESS:** Follow-up monitoring of the Barnegat Bay and its tributaries will continue to be conducted at least six times a year by the NJDEP (Bureau of Marine Water Monitoring and the Cooperative Coastal Monitoring Program) to determine whether the quality of shellfish waters and their tributaries has improved as a result of new management practices. Measurement of effectiveness will be carried out in conjunction with a reclassification survey of the shellfish growing waters by the Bureau of Marine Water Monitoring that will be implemented to determine if upgrading of the waters is warranted. Monitoring trends in the annual number of beach closures will provide a measure of effectiveness for actions targeting recreational beach waters.

**COST ESTIMATE:** \$500,000 for all activities.

**FUNDING SOURCES:** Clean Water State Revolving Fund (CWSRF), 319(h), WRAS, 6217, Environmental Infrastructure Trust (available) to municipalities for stormwater remediation (Structural BMPs).

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None.

# Ocean County Wetlands Map

