

PART V – FINDINGS AND RECOMMENDATIONS - ARE THE STATUTORY PROTECTIONS AND PROGRAMS WORKING?

The sheer number of statutory provisions that apply to the Project Area is daunting, but in itself does not mean that all is well. Instead, an examination of some of the successes and problems identified during the course of this project, as well as the more general successes and problems identified during recent comprehensive assessments of the Project Area, provide insight into whether or not these protections and programs can be considered effective.

A. SUCCESSES AND PROBLEMS NOTED DURING PROJECT

During the course of this project, several successful programs were identified in terms of their potential to protect the resources of the Project Area. In addition, several problems associated with certain regulatory protections, and, more specifically, the manner in which they are implemented, were also noted.

Successful Aspects of Existing Protections and Programs

The following aspects of existing protections and programs, all of which were noted during the course of this project, are deemed successful because they (i) offer adequate protections of the water, wildlife and habitat resources; (ii) offer improvements to the protections or the manner in which programs have been implemented in the past and/or (iii) are being implemented in a manner that is positive for the natural resources involved.

Reduction in Number of Water Quality Management Planning Agencies

Effective in 2008, New Jersey revised its Water Quality Management Planning Rules to transfer responsibility for the development of Wastewater Management Plans from the more than 190 existing planning agencies to the 21 counties in the state. By doing so, DEP hopes to do away with the lengthy review times and the inability of the limited DEP staff to engage in outreach, two problems that DEP attributed to the sheer number of planning agencies involved and that significantly contributed to the Program's failure. It is anticipated that this change will also lead to the development of more regional Plans, i.e., 21 county-wide Plans instead of 190 municipal Plans, and will more readily allow for the consideration of issues on an ecosystem-based scale.

Establishment of Tributary Action Teams

Delaware's Area-Wide Wastewater Management Plans and Water Quality Management Plans are developed and managed by the state's Tributary Action Teams. The Teams are comprised of a combination of citizens and government officials that work with the DNREC's Whole Basin Management Team to implement Pollution Control Strategies in Delaware's four major watersheds: the Schuylkill Valley, the Upper Estuary, the Lower Estuary and the Delaware Bay watersheds.⁸⁴²

Watershed Based TMDLs

Delaware has recently incorporated its TMDL program into its existing Pollution Control Strategies, which are watershed-based plans developed by the state's Tributary Action Teams working in conjunction with the Delaware Whole Basin Management Teams. The merging of these programs will enable the Tributary Action Teams to, on a watershed basis (i) develop plans to achieve the nutrient and bacteria load reductions required by TMDLs and (ii) prescribe specific actions that must be implemented in order for surface water quality standards to be met.

Protection of Priority Wetlands

Upon New Jersey's assumption of Clean Water Act section 404 authority in 1994, the EPA Region 2 issued a list of Priority Wetlands for the State of New Jersey "to focus regional attention on the identification of the most important wetlands in that region," signaling its desire that the program incorporate a regional or ecosystem based approach. The wetlands identified on the list are significant due, not only to their size, but to the fact that they encompass entire wetland systems as opposed to individual or isolated wetlands. The New Jersey legislature incorporated the list into the state's Freshwater Wetlands Protection Act.

Wetlands Monitoring and Assessment Programs

Guidance issued by the EPA in 2003 not only recommended that wetlands be included in each state's water quality monitoring program, but requires states to develop a written monitoring strategy that clearly outlines how by the year 2014 they will achieve a comprehensive assessment of all of its wetlands.

Reduction in Nonpoint Source Sediment and Nutrient Loading

Based on EPA Nonpoint Source Program Activity Measures, both Delaware and New Jersey report significant reductions in sediment and nutrient loading as a result of their Nonpoint Source Management initiatives. According to its most recent Nonpoint Source Program Annual Report, DNREC reported that during the year 2007, Delaware reduced its overall nitrogen loading to surface waters in the state by 185,209 pounds per year. Phosphorus and sediment loading during the same period were reduced by 8,263 pounds and 33,071 tons per year, respectively.

Similarly, New Jersey reported a total cumulative load reduction of 13,580.2 pounds per year of nitrogen, 2,749.0 pounds per year of phosphorus and 890.5 tons per year of sediment for fiscal year 2006. Load reductions in New Jersey for these same pollutants during fiscal year 2005 were 455.1 pounds per year of nitrogen, 85.3 pounds per year of phosphorus and 86.1 tons per year of sediment.

Understanding the Ecology of the Delaware Bay Bottom

Acknowledging that management decisions in and around the Delaware Bay have been made in the absence of adequate information, the Delaware Coastal Programs are currently engaged in the Delaware Bay Benthic and Sub-Bottom Mapping Project. A cooperative effort between the Delaware CMP, DNERR, and the Department of Geology at the University of Delaware, the project will identify and map the benthic habitat and the sub-bottom sediments of the Delaware Bay.⁸⁴³ The participants seek to determine the impacts of dredging on Bay bottom, the identification of critical habitat for a variety of organisms, the identification of the marine life upon which these organisms depend for food, the extent and health of shellfish beds, and examine the effectiveness and longevity of artificial reefs. The fundamental goal of the project is to identify and protect the estuarine biodiversity of the Bay.⁸⁴⁴

Collection and Submission of Performance Measurement Data

In response to criticism for its inability to demonstrate more than anecdotal evidence of the progress of the states' CZMPs in achieving the goals of the CZMA, NOAA adopted the Performance Measurement System. Under the System, each state must collect and submit to NOAA on an annual basis data related to certain elements of their CZMPs, including public access, coastal water quality, coastal hazards and coastal habitat. With respect to coastal habitat, beginning in 2010, states must submit data regarding (i) the number of acres of key coastal habitats created or restored using CZMA funds; (ii) the number of acres of key coastal habitats protected by acquisition or easement using CZMA funds; and (iii) the number of acres of key coastal habitats lost or gained due to activities subject to core CZMA regulatory programs, including mitigation. This data must be collected for each of the following habitats: tidal wetlands; beach and dune; and nearshore intertidal, sub-tidal, and submerged habitat.

Collection of this data will force states like Delaware and New Jersey who admit cumulative and secondary impacts to habitat are a problem but have done little to measure, account for or address such impacts, to begin tracking their extent and location. This information should allow for the development of management measures to address this serious issue.

Recognition of the Importance of Flood Hazard Areas, Riparian Areas and Buffers

In order to minimize increased flooding caused by development, New Jersey amended its Flood Hazard Area Control Act Rules in 2007 to impose a 0% net-fill requirement to all non-tidal flood hazard areas of the State. The new rules also expand the preservation of near-stream vegetation, previously protected within 25 or 50 feet of streams, by implementing new riparian zones that are 50, 150 or 300 feet in width along each side of surface waters throughout the state. The riparian zone width depends on the environmental resources being protected, with the most protective 300-ft riparian zone applicable to waters designated as Category 1 (exceptional) Waters and their upstream tributaries. Certain waters supporting trout, habitats of threatened or endangered species that are critically dependant on the watercourse to survive, or watercourses which flow through areas that contain acid-producing soil deposits, receive a 150-ft riparian zone.

The DEP also amended its Coastal Rules and Coastal Permit Program Rules to incorporate the new flood hazard area and riparian zone standards into the review of all CAFRA and Waterfront Development permits. In doing so, the agency eliminated a gap in the previous rules under which development in tidal areas was not reviewed under the same standards that applied to non-tidal areas.

In Delaware, the DNREC has begun implementation of the Delaware Riparian Buffer Initiative, a watershed level GIS planning module developed through a series of workshops and meetings during which input was received from Conservation Districts, the Delaware Department of Agriculture, the U.S. Fish and Wildlife Service and DNREC staff. The end product was a set of criteria to identify very high, high, medium and low priority areas to target for riparian buffers based upon water quality and wildlife considerations.

Delaware's Tributary Action Team working in the Appoquinimink River watershed established the Appoquinimink River Association (ARA), an environmental nonprofit organization in 2004, to make sure the recommendations of the Team were carried out. Among other things, the ARA has worked with the Town of Middletown to develop and pass a riparian buffer ordinance that ensures protective buffers 100 feet from rivers, streams and lakes, in all of the floodplain and 50 feet from wetlands. The ARA has also worked with landowners to reforest 20 acres of riparian buffers in the watershed and to educate all landowners with buffers on or adjacent to their land regarding the benefits of their maintenance and restoration. To accomplish this, the ARA sent 1000 educational packets to high priority revegetation buffer landowners explaining what riparian buffers are and the advantages to their protection.

Recognition that the Endangered Species Act is Not Enough

Recognizing the need to work towards the conservation of a variety of habitats rather than focusing on individual species, Congress established the State Wildlife Grants Program in 2002. In doing so Congress challenged the states to demonstrate wildlife conservation needs in terms that considered all species and habitats and not just game, sport fish and endangered species. As a condition of funding, each state must prepare a "Wildlife Action Plan" that identifies the species in greatest need of conservation, describes the state's efforts to conserve these species and addresses the "full array of wildlife" and wildlife-related issues in the state.⁸⁴⁵ Congress authorized additional funding in 2008 and 2009 for a competitive State Wildlife Grant Program to encourage the implementation of actions contained in the Wildlife Action Plans. Both Delaware and New Jersey have developed Wildlife Action Plans and have received funding for habitat related projects. However, both states could put these Plans to more effective use.

Increase in NMBCA Funding to Continue Hemisphere-Wide Protections

Despite the fact that 75% of the projects funded under the Neotropical Migratory Bird Conservation Act are implemented outside of the United States, the Senate Environment and Public Works Committee passed a bill increasing annual NMBCA funding from \$6 million annually to \$20 million annually. The legislation, which was prompted by the recognition of several members of Congress that many important and qualifying projects under the Act do not proceed due to lack of funding, awaits further action by the House of Representatives.

Engaging Private Landowners in Habitat Restoration and Protection

Both Delaware and New Jersey have recognized that, because a significant amount of critical wildlife habitat exists on private land, efforts to preserve and protect the habitat must include private landowners. The Delaware DNREC established the Private Lands Assistance Program, for which the agency maintains biologists on staff to provide information and technical assistance to landowners to develop habitat projects and secure financial assistance. The Delaware Landowner's Incentive Program encourages landowner participation in such efforts through cost sharing and conservation easements.

The New Jersey Landowner's Incentive Program, administered through funding provided by the U.S. FWS, awards grants on a competitive basis to individual private landowners to support the recovery of or reduce threats to imperiled species. The Program focuses on the conservation and restoration of grasslands, critical migratory stopover areas in the Lower Cape May Peninsula and projects adjacent to state wildlife areas and other permanently protected open spaces.

State Efforts to Protect Specific Species

Both New Jersey and Delaware rose to the occasion when the efforts of a coalition of conservation groups to protect the dwindling red knot population through the Endangered Species Act were unsuccessful. When the coalition failed to get the red knot listed both through the filing of an emergency petition and the regular listing process, all protection efforts were left up to the states. It was evident that the cause of the severe drop in red knot abundance was the overharvesting of horseshoe crabs, whose eggs provide the red knots with a critical food source during their migration to and from their arctic breeding grounds. In response, both New Jersey and Delaware placed restrictions on the harvesting of crabs during the 2006 spawning season. In the spring of that same year, New Jersey took the urgent step of imposing a state-wide two-year moratorium on the harvesting of any horseshoe crabs. Delaware tried to impose its own moratorium but was unsuccessful due to vehement opposition from the commercial fishing industry. When the initial moratorium was about to expire, New Jersey adopted a new rule that continues the moratorium on horseshoe crab harvesting indefinitely until the horseshoe crab and red knot populations show signs of recovery.⁸⁴⁶ In Delaware, where protections are limited to harvest restrictions, the harvest of female horseshoe crabs was banned all year in 2009, but up to 100,000 male crabs could be taken during the collection season, which extended from June 7 through July 31.

Expansion of Time to Bring Natural Resource Damages Claims

On May 7, 2009, New Jersey adopted the Site Remediation and Reform Act. Prior to the adoption of the Act, the state was required to bring Natural Resource Damages claims against a polluter within five and a half years from the date of the completion of a remedial investigation for the contaminated site in question. With the adoption of the new Act, the state now has five and a half years from the date of the completion of the remedial action for all media – surface water, groundwater, and soil – to bring such a claim. In that the clean up of such sites often take many years if not decades, the Act significantly expands the time frame for bringing Natural Resources Damages claims for many contaminated sites.

Continued Acquisition/Protection of Important Lands Through Existing Programs

Both New Jersey and Delaware continue to acquire and protect lands that are important to water quality, habitat and species protection through their existing conservation programs, including, but not limited to:

- The Delaware National Estuary Program
- The Jacques Cousteau National Estuarine Research Reserve
- The Delaware National Estuarine Research Reserve
- The Cape May National Wildlife Refuge
- The Bombay Hook National Wildlife Refuge
- The Prime Hook National Wildlife Refuge
- The Coastal and Estuarine Lands Conservation Program in Delaware
- The nomination of reserves in Argentina and Chile critical to migratory birds that stop over in the Delaware Bay as Western Hemisphere Shorebird Reserve Network International Sites
- The Delaware and New Jersey Landowner's Incentive Programs
- The New Jersey Green Acres Program

Acknowledgement and Use of Ecosystem-Based Management Techniques

In addition to the programs for the acquisition of important lands listed above, each of which utilize ecosystem-based management techniques, several other protections or programs in Delaware and New Jersey also recognize and/or incorporate an ecosystem-based management approach, including the following:

- Water Quality Management Plans
- Integrated Reports
- Section 309 Enhancement and Assessment
- Section 312 Performance Measurement System
- State Endangered and Threatened Species Lists
- Red Knot NMBCA International Conservation Project
- 404 Permits (when based on Priority Wetlands)
- New Jersey CAFRA/Coastal Rules Section 10 Findings and Coastal Goals
- New Jersey Coastal Ocean Protection Council
- Delaware Tributary Action Teams
- Delaware Whole Basin Management Approach
- New Jersey Climate Change Action Plan
- Delaware Bay Benthic and Sub-Bottom Mapping Project
- Delaware River Basin Commission
- New Jersey and Delaware Wildlife Action Plans
- The South Wilmington and Pea-Patch Island SAMPS in Delaware
- New Jersey Green Acres Program
- Delaware Shorebirds Project

Problems with Existing Protections and Programs

During the course of this project, the following problems were noted with the existing regulatory protections and, more specifically, with the programs in place to implement those protections.

Significant Number of Waters on the Impaired List

Despite the numerous provisions under the Clean Water Act designed to limit point and nonpoint source discharges of pollutants, a significant number of waters are impaired due to the presence of pollutants in excess of established water quality standards. For example, Delaware's most recent Integrated Report lists portions of all 16 of the waters in the Delaware Bay drainage area as being impaired. Further, nearly half of them are impaired due to the presence of toxic chemical components, such as dioxins and furans, arsenic, mercury, PCBs and chlorinated pesticides.

Similarly, as reported in New Jersey's most recent Integrated Report, waters from every Watershed Management Area in the Project Area are impaired. And, like Delaware, the pollutants causing the impairments include pesticides and heavy metals such as DDD, DDE, DDT, PCBs and mercury.

No TMDLS for the Most Dangerous Pollutants

Neither Delaware nor New Jersey has established TMDLs for the most dangerous pollutants, such as for the dioxins, furans, PCBs, pesticides and mercury, which are toxic, bioaccumulative, carcinogenic and, in some cases, teratogenic.⁸⁴⁷ The only exceptions are the TMDLs for PCBs that have been established for certain segments of the Delaware River and the Delaware Bay. However, it must be noted that these PCB TMDLs were not established voluntarily, but were the result of a lawsuit brought by several environmental groups to force the states of Delaware, New Jersey, Maryland, Virginia and Pennsylvania to comply with the Clean Water Act TMDL requirements.⁸⁴⁸ In accordance with a Consent Decree and Settlement Agreement dated July 31, 1997, the U.S. EPA, with the technical assistance of the DRBC, established PCB TMDLs for DRBC Zones 2 – 5 of the tidal Delaware River in December 2003 and for DRBC zone 6, the Delaware Bay, in December 2006.

Inadequate Timeline for TMDL Development

With respect to the timing of TMDL development, the regulations provide that each state must submit the 305(b) list of impaired waters to EPA biennially, and that the list must include a priority ranking for all waters listed that still require TMDLs.⁸⁴⁹ The priority listing must take into account the severity of the pollution and the uses of the waters and must identify the pollutants causing the violations of the applicable Water Quality Standards.⁸⁵⁰ The priority ranking must specifically include the identification of waters targeted for TMDL development in the next two years.⁸⁵¹ Thus, for the most part, the regulations leave it up to the states to determine when and for which pollutants and waters they will develop TMDLs.

Delaware's priority ranking indicates that it does intend to develop TMDLs for some of the aforementioned toxic pollutants over the next several years. Specifically, the 2008 Integrated Report identifies the following TMDL target dates for waters in the Project Area:

Table 18 Delaware TMDL Target Dates for Waters in the Project Area				
Water Body	Pollutant	Year Listed	TMDL Target Date	Years Between Listing and TMDL
Delaware River	Dioxin	2002	2015	13
	Mercury	2002	2011	9
	Chl. Pesticides	2002	2011	9
Red Lion Creek	PCBs	2002	2011	9
	Dioxins	2002	2011	9
Chesapeake and Delaware Canal East	PCBs	2002	2011	9
	Dioxin	2002	2011	9
	Dieldrin	2006	2011	9
	Chlordane	2006	2011	9
Appoquinimink River	PCBs	2002	2011	9
	Dioxin	2002	2011	9
Delaware Bay	Mercury	2002	2012	10
	Dioxin	2002	TBD	Unknown
St Jones River	PCBs	1996	2011	15
	Dioxin	2002	2011	9
	Mercury	2002	2011	9
	Arsenic	2002	TBD	Unknown

As this table demonstrates, the time that has lapsed between a water's appearance on the impaired list for a particular pollutant, and the target date for the development of a TMDL is 9, 10, 13 and in one case as much as 15 years.

New Jersey does not provide dates for the proposed development of TMDLs for any of the aforementioned toxic pollutants in any water bodies. In accordance with the requirements of the federal regulations, DEP's most recent Integrated Report sets forth a schedule identifying the TMDLs it intends to propose and establish in the next two years.⁸⁵² For the years 2008 -2010, DEP is planning to establish TMDLs for phosphorus, Fecal Coliform/E.Coli or Total Suspended Solids for approximately 104 water body segments. Of those segments, three are in the area of concern: sections of Pennsauken Creek (WMA 18), Buckshutem Creek (WMA 17) and Dennis Creek (WMA 17).⁸⁵³

No Water Quality/Wastewater Management Plans and No Guidance for Changes

In New Jersey, as of 2008 only 13 of the more than 190 planning agencies were in compliance with the requirement to submit a Wastewater Management Plan, 63 planning agencies had never adopted a Wastewater Management Plan and 117 Wastewater Management Plans were

significantly out of date. Despite their obvious failure to comply, these agencies continued to apply for and receive a variety of development permits in their planning areas.

In 2008, the DEP adopted significant changes to its Water Quality Management Planning Rules. Among other things, the new rules transferred responsibility for the Wastewater Management Plans from the more than 190 existing planning agencies, most of which were municipalities, to the 21 counties in the state.⁸⁵⁴ The DEP intends for this change to do away with the lengthy review times and the inability of the limited DEP staff to engage in outreach that was associated with the sheer number of planning agencies. The new rules also require that areas with an outdated or with no Wastewater Management Plan must submit a plan or update by April 7, 2009, or all future wastewater service areas in that planning area will be withdrawn until an updated plan is submitted.⁸⁵⁵

A Wastewater Management Plan Status Report is maintained on DEP's website and is updated every two weeks, allowing the progress of each county to be followed as they make their way through the process.⁸⁵⁶ The Status Report demonstrates that, although the April 7, 2009 deadline has come and gone, only one planning agency, Hudson County, has submitted a plan. Concerns have also been expressed about the lack of guidance to this new county-wide approach to Wastewater Management Plans, which may simply lead to the patchworking of municipal Plans instead of a true regional planning effort.⁸⁵⁷

Data Relied Upon by Agencies is Out of Date

Much of the data relied upon by both the DEP and the DNREC regarding their state's natural resources is more than a decade old. More specifically:

- According to the November 2007 Delaware Wetland Monitoring Strategy prepared by the DNREC's Division of Watershed Resources/Watershed Assessment section, the most recent wetland maps for the state are based on 1992 aerial photography.⁸⁵⁸ These maps updated prior U.S. FWS National Wetlands Inventory maps from 1981-1982 using existing soil surveys, land use data, statewide natural heritage data, and color-infrared photo-interpretation.⁸⁵⁹
- The Delaware 2008 305(b) Integrated Report discusses wetland losses that occurred in the state between 1981 and 1992, but provides no information on wetland losses that occurred between 1992 and 2008, a data gap of 16 years.⁸⁶⁰
- New Jersey's Landscape Project is a GIS based system of maps and overlays depicting critical wildlife habitat including emergent wetlands, forested wetlands, forest, grasslands and beach, and is used in management decisions including the review of CAFRA and other development permit applications. However, these maps are based on 1995 land use/land cover data that has been updated using 2002 aerial imagery.⁸⁶¹ A more recent update exists only for the New Jersey Highlands area in the northwest part of the state.⁸⁶²

- The New Jersey 2008 Integrated Report discusses wetland losses that occurred in the state between 1995 and 2002, but provides no information on the status of wetland losses between 2002 and 2008, a data gap of six years.⁸⁶³
- In New Jersey, with certain exceptions, development in Submerged Aquatic Vegetation habitat is prohibited. According to the Coastal Rules, the “detailed maps” that the DEP and applicants rely upon to determine if a project is in such an area are based upon the New Jersey Submerged Aquatic Vegetation Distribution Atlas (Final Report), which is dated February 1980, and on Eelgrass Inventory maps that were prepared by the DEP Division of Fish and Wildlife in 1983.

Wetlands Losses Far Outweigh Mitigation Efforts or Cannot be Compared

In its 2008 Integrated Report, New Jersey DEP reported a net loss of over 12,000 acres of freshwater wetlands between 1995 and 2002. Freshwater wetland losses in the Project Area during that same time period were reportedly as follows: WMA 16, a loss of 868 acres; WMA 17, a loss of 936 acres; and WMA 18, a loss of 1,101 acres.⁸⁶⁴

New Jersey requires compensatory wetlands mitigation for all Individual Permits and for General Permit activities in wetlands that involve the investigation, cleanup or removal of hazardous materials, the closing of landfills, or redevelopment projects.⁸⁶⁵ The DEP typically requires a 2:1 mitigation ratio, meaning two acres restored or created for every one acre disturbed.⁸⁶⁶ Nevertheless, in its 305(b) Report, DEP reported that, since its inception in and around 1998, the Mitigation Bank program in New Jersey has led to total monetary contributions of \$6,187,346.10 from 49 applicants as compensation for a collective loss of only 53.1 acres.⁸⁶⁷ During that same period, the Council has awarded \$6,547,607.16 in wetland mitigation grants from the Wetland Mitigation Fund to preserve over 840 acres of land and restore or enhance nearly 200 acres of wetlands.⁸⁶⁸ This includes mitigation or restoration projects in the Project Area, where 588 acres were preserved or restored in WMA 16, 81.1 acres were preserved or restored in WMA 17 and no such projects were reported in WMA 18.

Taking these numbers at face value, 12,000 acres of freshwater wetlands were lost between the years 1995 and 2002, and, during the years 1989 through 2008, only 1,040 acres were preserved or restored. These numbers show the following discrepancies in the Project Area alone for the same time periods: in WMA 16, a loss of 868 acres with only 588 acres preserved or restored; in WMA 17 a loss of 936 acres with only 81.1 acres preserved or restored; and in WMA 18, a loss of 1,101 acres with none preserved or restored.

These numbers do not add up and do not provide a legitimate comparison of acres of wetlands lost to acres restored or preserved. Thus, New Jersey’s reporting methods do not allow for a genuine evaluation of its wetlands program or of the status of wetlands in the state.

This is also true of the information provided by Delaware in its 305(b) Integrated Report, which allows for no comparison whatsoever. Delaware reports wetland losses for the years 1981 through 1992, but provides information regarding the location and number of acres restored for

the years 2006 through 2008. Like New Jersey, Delaware's reporting does not allow for an evaluation of its wetlands program or of the status of wetlands in the state.

New Jersey Not Utilizing the Authorities and Tools Provided by Statutes

With regard to several of the protections and programs analyzed for this paper, it was apparent that New Jersey is not utilizing them to their full effect or purpose. Such protections and programs include the following, all of which relate to New Jersey's Coastal Zone Management Program:

- **No CELCP Plan or Projects** - The Coastal and Estuarine Land Conservation Program (CELCP) program was created by Congress in 2002 as a means to allow states to protect coastal and estuarine lands considered important for their ecological, conservation, recreational, historical or aesthetic values.⁸⁶⁹ Overseen by NOAA, the program provides state and local governments that develop a CELCP Plan the opportunity to compete for matching funds to purchase such lands outright or obtain conservation easements.⁸⁷⁰ As was noted during NOAA's most recent Section 312 review of the state's Coastal Program, New Jersey has yet to develop a CELCP Plan or submit any proposals for funding. By contrast, Delaware has preserved more than 700 acres through the CELP Program in 2006 and 2007 alone, and has submitted three more proposals since then that are currently being considered.
- **Misallocation of CZMA Funds** - During the Section 312 evaluation, NOAA noted that New Jersey is not correctly allocating the funds it receives under the CZMA. The majority of New Jersey's section 306 implementation funds are being used to supplement state funds for the support of regulation and enforcement staff. This means that the Coastal Management Program, which relies exclusively on federal funding, is then forced to use the remaining 306 implementation funds and a significant amount of its section 309 enhancement funds, for staff. Since NOAA intends for section 309 funds to support program enhancement, the activities of the Coastal Management Program staff supported by these funds are limited. This in turn limits the capacity of the Program to be proactive in addressing current coastal issues, to respond to emerging needs or participate in annual projects funded with 306 monies, such as habitat restoration and community/waterfront planning. The most recent Section 312 evaluation was the second evaluation period during which NOAA observed this deficiency in New Jersey's Program.
- **No Approved Coastal Nonpoint Pollution Control Plan** – In accordance with the requirements of the CZMA, New Jersey submitted a Coastal Nonpoint Pollution Control Plan (CNPCP) to NOAA and EPA for review and approval in July 1995.⁸⁷¹ In 1997, NOAA and EPA conditionally approved the CNPCP, determining that some of the management measures had not been met. DEP made several changes to the CNPCP but, as of this date, not all of the management measures have been met and the program is still only conditionally approved.⁸⁷² Specifically, New Jersey has failed to meet the

management measure regarding the development of a process to inspect on-site sewage disposal systems at a frequency adequate to determine whether the systems are failing.⁸⁷³

- **No Special Area Management Plans** – The CZMA encourages states to develop SAMPs, which are regional plans that can be employed when existing program policies are not working well, or where there is a need to better align coastal policy or address complex multi-jurisdictional coastal issues.⁸⁷⁴ In New Jersey, other than a SAMP for the Meadowlands Area which was developed in the 1970s, this planning mechanism has not been utilized again, nor is it mentioned as a possible means for dealing with coastal issues in the state’s most recent 309 Assessment Document. However, statements made in the 309 Assessment Document indicate that a SAMP may be warranted, particularly to deal with the serious issues facing the Delaware Bay and its environs. For example, DEP identified the threats to the Bay and Delaware River from cumulative and secondary impacts caused by development as a major concern.⁸⁷⁵ DEP also stated that the Delaware Estuary’s location in three different states, each with its own agency with different mandates and objectives, complicated the coordinated management of the estuary.⁸⁷⁶ DEP also concluded that it must develop an enforceable policy to protect the state’s most important natural communities, such as the Delaware Bay beaches that support horseshoe crabs and migratory birds, from the cumulative and secondary impacts associated with development.⁸⁷⁷ These issues seem to be precisely the type for which the SAMP concept was developed.
- **Not Exercising the Authority Under the CAFRA Section 10 Findings and Coastal Goals** – In its Coastal Rules, DEP has two powerful tools that allow it to consider proposed development projects in terms of their regional impacts and whether or not they promote the overall result that the Coastal Management Program as a whole strives to attain. These tools are the CAFRA Section 10 Findings and the Coastal Goals.⁸⁷⁸ Both of these provisions allow DEP to deny or require changes to a project that meets all of the individual applicable Coastal Rules, but does not allow for certain additional findings. Such findings include a determination that the project will not interfere with important natural resources, both on the site and in the surrounding region; that the project will be constructed in such a way that it will not endanger human life or property; or that the project fails to promote and enhance beach and dune systems and wetlands and/or adequately manage natural features to protect the public from natural hazards.⁸⁷⁹ Permits issued by DEP, as well as public statements made by the agency, including statements that the Coastal Rules do not allow it to prevent development in dangerous high hazard FEMA V-zones or “inappropriate development” in areas suited to inland migration of coastal wetlands – the very type of issues these provisions were designed to deal with – indicate that the DEP is not utilizing these important authorities.⁸⁸⁰

It is uncertain why DEP is failing to utilize the five important protections described above, although it could be related to continuous cuts to the agency’s budget and staff. In the last two decades, the DEP staff has been reduced by more than 1,000 employees, a reduction of more than 25%.⁸⁸¹ In addition, over the past several years, the agency has been operating under a strict

hiring freeze rendering it unable to replace the significant number of employees that have retired or left to take other positions. Most recently, in an effort to balance the state budget, DEP has been advised that it will be subject to several mandatory furlough dates upon which employees must take the day off without pay.

State budget documents demonstrate that funding for direct services provided by the DEP will be reduced by approximately 14.7 million, or 6.4%, for FY 2010 as compared to FY 2009. Similarly, appropriations to the DEP will be reduced by approximately 14.8%, a significant reduction given that the agency only accounts for 5% of the state's total operating budget. Overall, it is estimated that the agency faced nearly \$ 47 million in budget cuts in fiscal year 2009.

Limited Authority of the Coastal Zone Act and Beach Preservation Act

Delaware's Coastal Zone Act regulates development in the Coastal Strip, a four-mile wide band of land that parallels the entire Delaware Coastline. The Act was adopted in response to the state legislature's recognition that this area is critical to the quality of life of Delaware's citizens, as is the need to protect the natural environment of the state's bays and coastal areas for recreation and tourism.⁸⁸² However, the Act's authority is limited to "heavy industry" which is prohibited in the Coastal Strip, and other industrial development, which is subject to a permit process.⁸⁸³ No other types of development, such as commercial or residential development, are regulated under the Act.

The Beach Preservation Act was adopted to prevent development and other manmade structures that interfere with the natural movement of its beaches and dunes and seeks to keep construction off of these natural features.⁸⁸⁴ The Act generally defines the beach as the area extending from the mean high water line of the Atlantic Ocean and the Delaware Bay and landward 1,000 feet.⁸⁸⁵ The DNREC has established a Building Line that parallels the coastline seaward of which no construction may take place without a Coastal Construction Permit.⁸⁸⁶ Construction landward of the Building Line but in the beach area, including construction of any structure or the alteration, digging, mining, moving, removal or disposition of any substantial amount of beach or other materials, cannot commence without first obtaining a Letter of Approval.⁸⁸⁷

Together, the Coastal Zone Act and the Beach Preservation Act, prevent heavy industrial development adjacent to the coast, and development that would damage or interfere with beaches and dunes within 1000 feet of the mean high water line. However, this leaves a lot of unregulated development in the overall Coastal Zone and a determination must be made regarding the extent and consequences of this regulatory gap.

Failure of Water Supply Management Programs to Consider Ecological Impacts

Despite the intended protections of the various water supply statutes and regulations, New Jersey's water supplies are currently over allocated. The increasing loss of freshwater inputs to the Barnegat Bay Estuary and the simultaneous increase in salinity demonstrate that ecological concerns are not being properly addressed in the New Jersey Water Supply Master Plan and the Water Allocation Program. This is further demonstrated by saltwater intrusion into public water

supplies, such as in Cape May County, where during the 30 year period from 1960 through 1990 saltwater intrusion forced the County to abandon more than 10 public supply wells, 3 industrial supply wells and more than 100 domestic supply wells. As of 2002, water supply levels in the Cohansey Aquifer were below sea level from the Cape May County town of Burleigh south, and coastal stream flows in the same area were reduced to 80% of the normal rate.⁸⁸⁸

In addition, a recent report prepared by the Delaware River Basin Commission identified ground water stress, defined as where water withdrawals exceed natural recharge, as a significant problem in both the New Jersey and Delaware portions of the Delaware River Basin.⁸⁸⁹ Specifically, the report noted two areas of stress in the Upper Estuary region that are recognized as critical or protected areas: The Ground Water Protected Area in southeastern Pennsylvania, and Critical Area No. 2 in south-central New Jersey overlaying the Potomac-Raritan-Magothy (PRM) Aquifer.⁸⁹⁰ Currently, conjunctive water use (the simultaneous use of ground water and surface water) and regional alternatives to local supplies are easing these two stress areas, but additional problem areas are emerging.⁸⁹¹ Specifically, the DRBC reports that groundwater withdrawals from Delaware are diminishing stream base flows and causing cones of depression in the PRM Aquifer System. Base flows are also a concern in the Salem-Gloucester area and the Maurice River basin in Southern New Jersey.⁸⁹²

Studies by the USGS in New Jersey are being conducted to develop a process that will more accurately identify the capacity of watersheds throughout the state and at the same time quantify the amount of water needed to protect the ecological integrity of the surface and ground water resources within each watershed.⁸⁹³ Based on computer models developed to produce long-term hydrographs for both gaged and ungaged stream sites in New Jersey, it is anticipated that this methodology, known as the Ecological Flow Goals Method, will result in the development of a management tool that will allow the DEP to incorporate ecological goals into its water capacity and water use management decisions.⁸⁹⁴ It is anticipated that such methods could be successfully utilized in other areas, including the already stressed surface and ground water resources of the Delaware River Basin.

Inadequate Federal Protection of Endangered and Threatened Species

In July and August 2005, a coalition of conservation groups filed an emergency petition with the U.S. FWS seeking the listing of the Red Knot as an endangered species under the ESA. The groups consisted of the American Bird Conservancy, the American Littoral Society, Citizens Campaign for the Environment, Defenders of Wildlife, Delaware Audubon Society, Delaware Riverkeeper, National Audubon Society, New Jersey Audubon Society, Sierra Club Delaware Chapter and the Sierra Club New Jersey Chapter (the Coalition).

The petition targeted the *rufa* subspecies of the red knot, a migratory shorebird that makes an 18,000 mile roundtrip journey each year from the tip of South America, where it winters, to the Arctic and back again. Details and documentation provided in support of the petition were extensive and included the finding that there has been an 80% reduction in the red knot population visiting the Delaware Bay over the last ten years. Specifically, the number of birds has dropped from 100,000 birds to approximately 13,500.⁸⁹⁵

By letter dated December 22, 2005, the FWS denied the Coalition's request to list the red knot on an emergency basis. It stated that, based on the information contained in the petition and within its own files, including its belief that the state's of New Jersey and Delaware might take measures to protect the species, an emergency situation did not exist at that time.⁸⁹⁶ The FWS did determine that it would continue to review the Red Knot petition in the context of a non-emergency.

By June 13, 2006, the FWS still had not made a final determination regarding the red knot petition, and the Coalition filed suit in Federal District Court appealing the denial of the emergency petition.⁸⁹⁷ The District Court dismissed the Coalition's claim, determining that the FWS's denial was not reviewable under either the ESA or the Administrative Procedure Act, and that the court therefore did not have subject matter jurisdiction.⁸⁹⁸

While an appeal of the court's decision was pending, the FWS issued a final determination on the petition. It found that the listing of the red knot was in fact warranted, but because the FWS did not have the money to fund the protection efforts, it would not be added to the list of endangered species until the backlog of other candidate species of higher priority was dealt with.⁸⁹⁹

This left any protection efforts up to the states. In 2006, both New Jersey and Delaware placed restrictions on the harvesting of crabs during the spawning season. In the spring of that same year, New Jersey took the urgent step of imposing a state-wide two-year moratorium on the harvesting of any horseshoe crabs.⁹⁰⁰ In November 2006, Delaware followed suit with its own two-year moratorium. Both moratoriums were challenged by the commercial fishermen in their respective states, resulting in Delaware's moratorium being struck down, and New Jersey's being upheld.⁹⁰¹

In 2007, New Jersey adopted a new rule that continues the full closure of the horseshoe crab harvest indefinitely until the horseshoe crab and Red Knot populations show signs of recovery.⁹⁰² In Delaware, where protections are limited to harvest restrictions, the rules vary slightly from year to year. For 2009, the harvest of female horseshoe crabs was banned all year, but up to 100,000 male crabs could be taken during the collection season, which extended from June 7 through July 31.⁹⁰³

Failure of State to Implement Wildlife Protections Mandated by Federal Agency

In 1994, in accordance with Section 7 of the ESA, the EPA consulted with the FWS regarding New Jersey's Surface Water Quality Standards and their protection of one of the designated uses of New Jersey's waters – the maintenance, migration and propagation of wildlife, including threatened and endangered wildlife species. As a result of this consultation, the FWS issued a 1996 Biological Opinion in which it determined that, because of New Jersey's inadequate water quality criteria for DDT, PCBs and mercury, EPA's approval of the Surface Water Quality Standards could result in the incidental taking of individuals from three federally-listed species, the threatened bald eagle, the endangered peregrine falcon and the endangered dwarf wedgemussel.⁹⁰⁴ The Biological Opinion set forth the following non-discretionary terms and conditions that EPA must comply with in order to be in compliance with the ESA:

- By 1999, New Jersey's Surface Water Quality Criteria must expressly prohibit mixing zones in areas with documented occurrences of the dwarf wedgemussel;
- By 1999, New Jersey's Surface Water Quality Criteria must include a provision within its antidegradation policy stating that federally listed species are existing uses under the CWA and that existing and designated uses of New Jersey surface waters, including maintenance, migration and, as appropriate, propagation of all federally listed endangered or threatened species, and the water quality level necessary to protect those uses, shall be maintained and protected;
- By 1999, based on a joint effort, the EPA, the DEP and the FWS must develop numeric wildlife criteria for DDT, PCBs and mercury that are protective of federally listed threatened and endangered species, including the bald eagle and the peregrine falcon, using the Great Lakes Initiative wildlife methodology and all available New Jersey-specific data. In the event that national wildlife criteria for these substances are developed prior to the development of New Jersey-specific criteria, the national wildlife criteria may be adopted by the DEP.⁹⁰⁵

With regard to the wildlife criteria, the FWS also made a point of stating in the nondiscretionary terms and conditions that "If DEP fails to adopt the resultant criteria, the EPA must take appropriate action to promulgate numeric wildlife criteria for the State of New Jersey."⁹⁰⁶

After the Biological Opinion was issued, staff from the FWS, EPA and New Jersey DEP did work together to develop the wildlife criteria which were completed in July 2001.⁹⁰⁷ The DEP formally proposed the adoption of the new wildlife criteria on November 18, 2002, to be finally adopted after an opportunity for public comment by the "sunset" date of November 23, 2003, exactly one year after the proposal date.⁹⁰⁸ The sunset date came and went, and, citing reasons related to the "economic and social impacts" associated with adoption of the criteria, DEP failed to adopt them.⁹⁰⁹ The DEP engaged in numerous subsequent re-adoptions and amendments to its Surface Water Quality Standards, and yet failed to re-propose or adopt the wildlife criteria established by the three agencies for DDT, PCBs and mercury.

The DEP did adopt a provision prohibiting mixing zones in areas inhabited by dwarf wedgemussels in 2002.⁹¹⁰ It waited until 2009 to adopt a provision in its antidegradation policy stating that federally listed species are existing uses under the CWA that must be protected.⁹¹¹ However, to date, neither the DEP nor the EPA has promulgated the wildlife criteria for DDT, PCBs and mercury deemed necessary to protect the bald eagle and peregrine falcon. This is so despite a 2007 letter from the FWS stating that "the USEPA and the State continue to be in non-compliance with the Service's Biological Opinion and may be vulnerable to legal challenges."

Inadequate State Protection of Endangered and Threatened Species and Critical Habitat

New Jersey has adopted regulations specifically for the protection of endangered and threatened species and critical habitat. Both the Endangered and Threatened Wildlife or Plant Species Habitats Rule and the Critical Wildlife Habitats Rule are part of New Jersey's Coastal Rules, the substantive regulations by which the DEP's Land Use Regulation Program reviews permit applications under CAFRA, the Wetlands Act of 1970, the Waterfront Development Law as well as Water Quality Certifications and Consistency Determinations.⁹¹²

The Endangered and Threatened Wildlife or Plant Species Habitats Rule states that development of endangered or threatened wildlife or plant species habitat is prohibited unless it can be demonstrated that the habitat would not, directly or through secondary impacts on the site or the surrounding area, be adversely affected.⁹¹³ Such a demonstration must be made through an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment, a formal assessment for which the criteria, standards and substance are mandated by the Coastal Rules.⁹¹⁴ The presence or absence of an endangered or threatened species or its habitat is based upon the information provided by the DEP's Landscape Project maps, documented sightings of species and Natural Heritage Program data.

The Critical Wildlife Habitats Rule applies to specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating.⁹¹⁵ For the most part, whether or not critical habitat exists on site is a determination that must be made on a case-by-case basis with the assistance of DEP's Division of Fish and Wildlife. The Rule further states that development that would directly or through secondary impacts on the relevant site or surrounding region adversely affect critical wildlife habitats is discouraged.⁹¹⁶ Development might be allowed to proceed, however, if the applicant can demonstrate (i) minimal feasible interference with the habitat; (ii) there is no prudent or feasible alternative location for the development; and (iii) the proposal includes appropriate mitigation measures.⁹¹⁷

Despite the strong language used in these rules, including the use of the terms "prohibited" and "discouraged," experience has shown that their application is inconsistent, particularly in terms of the information that DEP accepts from an applicant as proof that a species or its habitat will not be adversely affected. Experience has also shown that, despite the documented presence of endangered and threatened species on a proposed development site, the DEP very rarely denies a permit or requires the realignment of the project.

For example, with regard to a recent CAFRA permit application that was before the DEP, numerous threatened and endangered animal and plant species were identified on and adjacent to the property. The applicant wanted to construct a proposed access road through the site property to divert traffic during the reconstruction of a bridge. There was a viable, cheaper and faster alternative available – a temporary bridge – that for unexplained reasons the applicant did not want to consider.⁹¹⁸ The following table identifies the species present and their current federal and state status:⁹¹⁹

Table 19			
Species Present on Proposed CAFRA Development Site			
Species	Federal Status	State Status	Global Status
Reptiles			
Kemp's Ridley Turtle	Endangered		
Atlantic Loggerhead Turtle	Threatened		
Atlantic Green Turtle	Endangered		
Northern Pine Snake		Threatened	
Amphibians			
Pine Barrens Tree Frog		Threatened	
Southern Gray Tree Frog		Endangered	
Birds			
Black Skimmer		Endangered	
Black Crowned Night Heron		Threatened	
Cooper's Hawk		Threatened	
Barred Owl		Threatened	
Grasshopper Sparrow		Threatened	
Bald Eagle		Endangered	
Osprey		Threatened	
Plants			
Bog Asphodel	C	Endangered	G-2
New Jersey Rush		Endangered	G-2
Pine Barren Boneset		Endangered	G-3

- C = the U.S. Fish and Wildlife Service has sufficient information regarding biological vulnerability and threats to a particular plant species to support a proposal to list it as a threatened or endangered species.
- G-2 = the plant in question is imperiled globally because of its rarity, or due to some other factor making it very vulnerable to extinction throughout its range.⁹²⁰
- G-3 = the plant is vulnerable to extinction throughout its range because it is very rare, is only found locally in a restricted range or because of other factors rendering it extremely vulnerable.⁹²¹

Despite vehement opposition from a number of conservation groups and neighbors due to the presence of these species and their habitat, and the failure of the applicant to demonstrate compliance with either the Endangered and Threatened Wildlife or Plant Species Habitats Rule or the Critical Wildlife Habitats Rule, DEP issued the permit,

The DEP has also admitted on several occasions that it is not adequately protecting critical natural areas. For example, in its most recent Section 309 Assessment, it identified several areas where this is a problem, including the Delaware Bay, New Jersey's remaining upland forests and New Jersey's critical wildlife habitats, and stated:

“Increased development in the estuary drainage areas threatens these resources. Throughout the coastal zone, upland forests are being converted to developed land, which fragments contiguous forest areas diminishing the forests' habitat

value. Upland forests also benefit air and water quality, and improve the quality of life for residents. Areas that are critical to maintaining wildlife, particularly for wildlife wintering, breeding, and migrating, need greater protection.”⁹²²

Although the DEP stated in its section 309 Enhancement and Assessment document that it needed to develop a policy or rule to address this problem, no such rule or policy has been adopted in the three years since.

In Delaware, there are no regulations specifically designed to protect endangered and threatened species or critical habitat.⁹²³ Instead, the DNREC’s Wildlife Section must wait until it is consulted by other DNREC Divisions, such as the Division of Water Resources, seeking to enforce the habitat-related provisions of their regulations. For example, the Wetlands Regulations, Subaqueous Lands Regulations and Marina Regulations all of which are under the purview of the Division of Water Resources, address habitat to varying degrees. When a permit is sought under these regulations, the Division of Water Resources requests a consultation from the Division of Fish and Wildlife with regard to habitat issues, allowing Fish and Wildlife the opportunity to suggest changes or conditions to the project that allow for habitat protection.⁹²⁴

The protection of vulnerable species and their habitat is a significant problem in New Jersey and Delaware that must be addressed. Neither state has a policy that identifies the circumstances under which a project cannot be permitted due to its impact on species or critical habitat. Further, due to the lack of updated and accurate data and mapping, neither state appears to be aware of the status or extent of critical habitat within its boundaries. This leaves the regulated community and those interested in species protection wondering at the number of species or acreage of critical habitat that must be adversely affected before a line will be drawn.

No Tracking or Consideration of Cumulative Impacts

Both New Jersey and Delaware have identified cumulative and secondary impacts caused by land use development decisions as a major issue of concern in their coastal areas.⁹²⁵ However, neither state has articulated how it intends to deal with these concerns, nor does either appear to have a method for tracking the cumulative impacts to natural resources that occur as development permits are issued.

Under the NOAA Performance Measurement System each state must continually collect certain data and submit it to NOAA on an annual basis. Most prevalent in these data collection requirements is that on coastal habitats, which must be submitted beginning in the year 2010 and includes the number of acres of key coastal habitats created or restored using CZMA funds; the number of acres of key coastal habitats protected by acquisition or easement using CZMA funds; and the number of acres of key coastal habitats lost or gained due to activities subject to core CZMA regulatory programs, including mitigation. This data will force states like Delaware and New Jersey to begin tracking the extent and location of these impacts and will allow for the development of management measures to address this serious issue.

B. SUCCESSES AND PROBLEMS IN THE PROJECT AREA AS DETERMINED BY RECENT IN DEPTH ASSESSMENTS

Two organizations dedicated to the analysis and protection of the Project Area recently issued reports gauging the state of the Delaware Estuary and identifying the progress each has made in the management of this unique resource. They are the Partnership for the Delaware Bay Estuary, which released its State of the Delaware Estuary Report 2008, one of a series of similar publications issued by the Partnership every three to five years, and the Delaware River Basin Commission, which released its State of the Basin Report 2008, the first of its kind from the DRBC. These documents reveal much about the successes and failures of all of the programs designed to protect and manage the Estuary and warrant further attention to determine if they have any common conclusions regarding the health of the Estuary and actions that need to be taken for further improvements.

The State of the Delaware Estuary 2008

This report measures the health of the Estuary through the use of environmental indicators, which are specific, measurable markers used to assess whether the overall environment is improving or worsening over time.⁹²⁶ The more-than-20 environmental indicators used in the report were defined through a collaborative effort between the Partnership, the DRBC, the EPA and four Universities representing each of the states in the Delaware Basin: Cornell University, Penn State University, Rutgers University and the University of Delaware.⁹²⁷ Indicator data was collected from a variety of sources, most prevalent being that collected for the DRBC's concurrent State of the Basin Report.

The State of the Estuary report is intended to present a broad picture of the health of the Estuary, as well as provide recommendations in the form of "Actions and Needs" intended to, among other things, improve the future monitoring and reporting of indicator data.⁹²⁸

Where appropriate, the report summarized the status and trend of each indicator in an effort to convey whether the status of each indicator is generally positive or negative, and whether the indicator status is trending towards improvement or degradation.⁹²⁹ The indicators are presented in categories, including watershed indicators, water quality indicators, and natural resources indicators. The following is a summary of some of the most significant indicators discussed in the report.

Watershed Indicator – Population

Since 2000, the population of the Estuary has increased by 7%, including an increase of 11% and 12% in the Upper and Central Basin, respectively.⁹³⁰ Some population declines also occurred during this period, the most prevalent being in Philadelphia, Pa., which declined by 5%. The following nine communities had population increases greater than 5% between 2000 and 2005: Middletown, Smyrna, Odessa, Bowers Beach, Frederica, Leipsic, and Dover, Delaware; Coatesville, Pennsylvania; and Bridgeton, New Jersey.⁹³¹

Watershed Indicator – Water Use Patterns

Basin-wide water use has remained fairly constant over the past decade. The overall increase in population has been offset by a decline in industrial water use and increased conservation.⁹³²

Watershed Indicator – Land Use

The Delaware Estuary is comprised of 6,827 square miles, of which nearly 54% is developed and 46 % is comprised of forests, wetlands and small water bodies. Many of these natural areas are reportedly “severely fragmented.”⁹³³ Between 1996 and 2001, nearly 52 Square miles, or 11 acres per day, was developed, resulting mostly in the loss of forests. The report indicates that the status of this indicator is negative and trending towards degradation.

Water Quality Indicator – Water Health

Criteria to support drinking water and recreational activities were met in all DRBC Zones, although a portion of Zone 4 had insufficient data. Fish advisories limited consumption due to “legacy contaminants,” which stay in the system a long time, degrade slowly, and bioaccumulate in fish.⁹³⁴ Although every zone had at least one fish-consumption advisory, many of these were specific to certain fish in certain areas. Water quality met standards for supporting aquatic life in Zones 3 and 6, but not in Zones 2, 4, and 5. Based on the current criteria used by DRBC, aquatic life was affected by temperature problems in Zones 2 and 4, and low levels of dissolved oxygen affected some samples from Zone 5.⁹³⁵

Water Quality Indicator – Dissolved Oxygen

Dissolved Oxygen in the Upper Estuary routinely meets the minimum criteria set by the DRBC, although this is not the case for the Lower Estuary, particularly near Reedy Island.⁹³⁶ As a result, this segment of the Estuary is listed as impaired and the development of an associated TMDL is targeted for 2019. Nevertheless, dissolved oxygen levels are on an upward positive trend in that, until the mid 1980s, the Estuary routinely failed to meet dissolved oxygen levels, particularly in the summer, preventing fish from migrating through the river. Caused by sewage, the installation of better wastewater treatment systems dramatically reduced the occurrences of low dissolved oxygen, and migratory fish returned to the area.⁹³⁷

Water Quality Indicator – Contaminants

Fish consumption advisories exist for waters in every Estuary state and along the Delaware River for, among other things, PCBs, mercury, dioxins/furans, and chlorinated pesticides including DDT.⁹³⁸ However, data collected since 1988 indicate that some contaminants may be decreasing in fish in certain areas near the Delaware-Pennsylvania border. Decreasing trends are also evident for some of these contaminants that impact other organisms, such as eagles, although resident species such as white perch and channel catfish are not showing a decrease in PCB levels.⁹³⁹

Of particular concern are what the Partnership refers to as “emerging contaminants,” meaning an array of chemicals that are still unregulated in water quality programs, but that are significant due to their persistence, bioaccumulation and potential toxicity. Such contaminants include pharmaceuticals, flame retardants such as polybrominated diphenyl esters, insecticides, plasticizers, nanoparticles and resistant pathogens.⁹⁴⁰ Assunpink Creek, a tributary to the Delaware River, was part of a national U.S. Geological Survey study from 1999 through 2000 that measure pharmaceuticals, hormones, and other organic wastewater contaminants in 139 streams nation wide.⁹⁴¹ Of the 96 analytes tested for, 40 were detected in the Assunpink at low levels (1 to 500 parts per trillion), including pharmaceuticals, plasticizers, surfactants and insecticides.⁹⁴²

Water Quality Indicator – Nutrients

Current nutrient conditions do not typically cause harmful algal blooms or low dissolved oxygen levels in the Estuary. In general, total nitrogen and total phosphorus levels are higher in the urban river region near the head of the tide, but decrease as you get closer to the mouth of the Bay.⁹⁴³ Long term data shows that, by 1980, the Upper Estuary showed a very large decrease in phosphorus, likely due to improvements in sewage treatment and the discontinuation of phosphorus detergents.⁹⁴⁴ A similar but smaller nitrogen decrease was noted as of 1990.⁹⁴⁵ Although nutrient levels in the Delaware Estuary are reportedly higher than in other estuaries, the report concludes that concentrations are stable and there is currently “no evidence of major effects resulting from nutrients.”⁹⁴⁶

Natural Resources Indicator – Eagles

Bald Eagle populations in the Delaware Estuary watershed are considered a success story and on an upward trend. In 2004, 96 nests were identified in the Basin as compared to 44 in 2001.⁹⁴⁷

Natural Resources Indicator – Shad

Despite the serious decline in shad as compared to historical levels, the report nevertheless reports that shad in the Estuary are on an upward trend.⁹⁴⁸ Sewage facility upgrades and increased dissolved oxygen levels have resulted in more shad returning to the estuary and efforts to remove obsolete dams and the installation of fish ladders have reopened approximately 165 stream miles for shad migration.⁹⁴⁹

Natural Resources Indicator – Atlantic Sturgeon

Despite increased management measures and harvest restrictions, this state endangered species has not yet rebounded and is characterized as continuing on a downward trend.⁹⁵⁰ While the population of shortnose sturgeon in the Estuary appears stable at approximately 13,000 fish, Atlantic Sturgeon are estimated to be less than 1,000, a number which the report estimates as being closer to 100 across the Estuary.⁹⁵¹

Natural Resource Indicator – Shorebirds

Aerial surveys conducted in Delaware Bay and South America, as well as bird counts made in Canada, show that shorebird populations, particularly the red knot, have declined significantly during the past 30 years.⁹⁵² Up to 100,000 red Knots would visit the Delaware Bay each year in the 1980s, a number that declined to 13,500 in 2006. Although in recent years restrictions have been imposed on the harvest of horseshoe crabs to build up the food supply for these birds, the crabs take 9 to 12 years to reach spawning age, so the food supply has not yet increased.⁹⁵³

Natural Resource Indicator – Oysters

Although at a fraction of their historic levels, oyster populations in the Estuary are carefully managed to maintain and increase abundance through controlled harvests, disease mortality and recruitment.⁹⁵⁴ After an unprecedented seven years of low recruitment by juvenile oysters, 2007 marked a return to average levels. Optimism is high that continued management will result in an oyster population that will continue to support commercial harvests.⁹⁵⁵

Natural Resource Indicator – Tidal Wetlands and Wetland Buffer

The status of both of these indicators is essentially negative and they are both identified as being on a downward trend.⁹⁵⁶ A 1992 to 2001 land cover study showed wetland loss throughout the Estuary except along the New Jersey side of the Delaware Bay where extensive marsh restoration may have offset this trend.⁹⁵⁷ A more in-depth analysis over the preceding decade showed that approximately 12% of tidal marshes were lost and the proportion of degraded marshes almost doubled.⁹⁵⁸

Most buffer habitat in the Upper Estuary is already built out and unavailable for conversion to or landward migration of tidal marsh. The Delaware side of the Delaware Bay has the greatest potential for landward migration due to its smaller slopes, which make it easier for migration to occur, and the most undeveloped lands.⁹⁵⁹ The least opportunity for restoration or migration is in the Upper Estuary, where freshwater tidal marshes are rare and threatened.⁹⁶⁰

Actions and Needs

Actions and Needs identified by the Partnership include:

- Water Use – Careful management of water supplies must continue. A better understanding of agricultural water demand is needed and the potential increase in water demand related to large power-generating facilities must be carefully planned for and managed.⁹⁶¹
- Land Use – Newer aerial photo methods are necessary to improve accuracy and timeliness of information. Land use assessments should be enhanced with more readily available and consistent datasets to be shared among the states in the region and land use studies should be coordinated throughout the Estuary.⁹⁶²

- Protected Lands - Development of a complete assessment of all protected lands within the Estuary that includes, but is not limited to, Forests must be completed. The use of conservation easements, land trust tools and management tactics that provide incentives for the protection of more lands must be employed. These efforts would be enhanced by a natural capital assessment of the ecological services and functions of such lands.⁹⁶³
- Water Quality – A comprehensive reassessment of water quality standards is needed to reflect changing conditions in the watershed.⁹⁶⁴
- Nutrients – A better understanding of the impacts of high nutrient concentrations, other than eutrophication, is necessary as is the need to continually define the relationships between nutrients, water clarity, algal growth and dissolved oxygen to determine the levels of total nitrogen and total phosphorus necessary to protect aquatic resources.⁹⁶⁵
- Freshwater Macroinvertebrates – Although New Jersey, Delaware and Pennsylvania monitor macroinvertebrates in the Delaware Estuary’s watershed, they all report their findings differently, limiting Estuary-wide or watershed based assessments. Interstate coordination is necessary to facilitate standardized reporting.⁹⁶⁶
- Tidal Wetlands – Coordinated monitoring and assessment programs between the three Estuary states are needed to regularly track the extent and condition of tidal marsh in the Estuary. A better understanding of the factors that promote healthy tidal marsh and their overall ecology is also necessary.⁹⁶⁷
- Tidal Wetland Buffer – Areas suitable for restoration should be identified throughout the Estuary and new policies and restoration strategies developed to facilitate the landward migrations of marshes.⁹⁶⁸

Overall, the Partnership’s report presented a picture of mixed environmental conditions, with some major improvements to water quality, such as dissolved oxygen levels and wastewater treatment, the resurgence of some species, such as eagles, but the continued decline of others, including the Atlantic Sturgeon. It also identified certain natural resources that are seriously threatened, including wetlands and wetlands buffers, and pointed to some new and emergent issues that must be dealt with, such as emerging contaminants, natural capital and marsh migration. In addition, the Partnership noted several problems that could be alleviated through better coordination and consistent reporting between the Estuary states, including through the coordination and updating of land use/land cover data and the standardized reporting of reports on macroinvertebrate monitoring.

The State of the Basin 2008

In addition to the DRBC, several organizations assisted with the assemblage and assessment of information for the State of the Basin report, including the University of Delaware, Rutgers University, Penn State University, Cornell University, the Partnership for the Delaware Estuary, the New Jersey Water Science Center of the U.S. Geological Survey, and the U.S. EPA Regions II and III.⁹⁶⁹

The report is designed to serve as a benchmark of current conditions in the Basin, and as a point of reference for gauging progress towards management goals. It is also intended to present a methodology for measuring and reporting future progress in water resource management, and as a guide for adjusting monitoring and assessment programs.⁹⁷⁰

The information presented in the report is broken into four broad categories – hydrology, water quality, living resources, and landscape – and evaluates each based upon a series of environmental indicators.⁹⁷¹ In addition, each category features a new and emerging issue and discusses its impact on that category, such as the impact of climate change on hydrology, the impact of contaminants of emerging concern on water quality, the effect of invasive species on living resources and, in the landscape category, the importance of valuing the basin’s “natural capital.”⁹⁷²

The DRBC defines an environmental indicator as being a measurement, value or statistic that provides an approximate gauge of the state of the environment.⁹⁷³ Ideal environmental indicators are relevant, sensitive to change, easy to measure with low error rates, and cost effective and may help evaluate the effectiveness of an environmental management program.⁹⁷⁴

The following is a summary of some of the environmental indicators analyzed by the DRBC in each of the four broad categories. For the most part, this summary focuses on indicators that were not highlighted above in the summary of the Partnership’s State of the Estuary Report.

Category I – Hydrology

In this category, the report analyses the following environmental indicators: water flows, salt line location, water use efficiency, water use, water supply sources, areas of groundwater stress and flood damage.⁹⁷⁵ The report essentially agrees with the Partnership’s assessment that water uses are being met, but need to be carefully and continually anticipated and monitored.⁹⁷⁶ With regard to other select indicators, the report found:

- Salt Line Location – The salt line plays an important role in the DRBC water quality and drought management programs. Upstream migration of brackish water during periods of low flow and drought can increase salt concentrations in public water supplies. The report concludes that the status of this indicator is very good, and drinking water intakes in the tidal River are well protected.⁹⁷⁷
- Groundwater Stress – Stress on this resource occurs when water withdrawals exceed natural recharge. Two areas of stress are noted in the Upper Estuary region, and are recognized as critical or protected areas: The Ground Water Protected Area in southeastern Pennsylvania and Critical Area No. 2, in south-central New Jersey overlaying the Potomac-Raritan-Magothy (PRM) Aquifer.⁹⁷⁸ The current status of this indicator is fair, in that conjunctive use and regional alternatives to local supplies are easing these two stress areas, but additional problem areas are emerging.⁹⁷⁹ Specifically, groundwater withdrawals from Delaware are diminishing stream base flows and causing

cones of depression in the PRM Aquifer System. Base flows are also a concern in the Salem-Gloucester area and the Maurice River basin in Southern New Jersey.⁹⁸⁰

- Flood Damage – This indicator is rated as poor by the DRBC, due to the increase in property loss and the filing of repetitive flood insurance claims in recent years. Before 2004, FEMA reported a total of 317 repetitive loss properties in the Basin. Since then, there have been three main stem Delaware River floods, occurring in 2004, 2005 and 2006, bringing the number of repetitive flood properties up to an additional 1,949.⁹⁸¹ As of January 2008, \$235 million has been paid out to 2,266 repetitive loss properties, with the highest concentrations being in Bucks, Montgomery and Northampton, Pa.; and Warren, Hunterdon and Mercer, N.J.⁹⁸²

Category II – Water Quality

In this category, the report analyses the following environmental indicators: nutrients, dissolved oxygen, water clarity, metals/copper, fish consumption advisories, pesticides, toxics/PCBs, support of designated use/tributaries, trends in tributary water quality, and support of designated use/Delaware River and Bay. Like the Partnership, the DRBC concluded that nutrient levels are steady and dissolved oxygen levels have greatly improved with improvements to wastewater treatment. Focusing on indicators that were not summarized above in connection with the Partnership's State of the Estuary report, the DRBC found:

- Fish Consumption Advisories – The status of this indicator is poor, given that fish consumption advisories exist for water bodies in all four Basin states and on the main stem of the Delaware River.⁹⁸³ American eel and carp caught throughout the main stem should not be eaten at all, and no fish should be consumed from upper Zone 5.⁹⁸⁴ Contaminants found in fish tissue in the Basin which have resulted in consumption advisories include: PCBs, Mercury, Dioxin, Chlorinated Pesticides, Dioxins/Furans, Dieldrin, DDT, Chlordane and Toxaphene.⁹⁸⁵
- Toxics/PCBs – This indicator is also rated as poor based upon the persistence of these toxic chemicals in the Basin's water, sediment and fish tissue.⁹⁸⁶ As part of the development of TMDLs for PCBs in Zones 2006, the sources and fate of PCBs have been extensively analyzed. The current sources of PCBs to the tidal river are:
 - Nonpoint sources – 25%
 - Point sources – 18%
 - Non-tidal river above Trenton, Schuylkill River, other tributaries – 34.5%
 - Contaminated sites – 11%
- Designated Use/Tributaries – This indicator is rated as fair based on the fact that 37% of Basin stream miles do not meet the required conditions to support their designated uses. The presence of fish consumption advisories is a major contributing factor to the number of waters that are listed as impaired in the Basin.⁹⁸⁷

- Designated Use/River and Bay – The status of this indicator ranges from poor, due to fish consumption and aquatic life uses, to good, for drinking water and recreational uses.⁹⁸⁸ The status of designated uses in the various DRBC Zones are as follows:
 - Aquatic Life Use – supported in Zones 3 and 6; Zones IA and 1E do not meet the pH criteria; Zones 2 and 4 do not meet temperature criteria; In Zone 5, approximately 17% of samples did not meet the 24-hour average dissolved oxygen criteria.
 - Drinking Water Use – supported in all applicable Zones;
 - Primary Contact Recreation – supported in all applicable Zones except Zone 4 below river mile 81,8, where there is insufficient data to draw a conclusion.
 - Fish Consumption Use – not supported in any Zone due to fish advisories limiting consumption of at least one species of fish.⁹⁸⁹

Category III – Living Resources

In this category, the report analyses the following environmental indicators: Macroinvertebrates, Freshwater Mussels, Oysters, Horseshoe Crabs, Shorebirds (Red Knot), Louisiana Waterthrush, Bald Eagle, Striped Bass and Weakfish, Atlantic Sturgeon, Shad, and the Brook Trout. It also looked at the emerging issue of invasive species.

- Mussels – The DRBC rates the status of this indicator as very poor, in that more than 75% of the freshwater mussel species have some special conservation status.⁹⁹⁰ Although the most recent comprehensive mussel survey in the region was conducted between 1909 and 1919, recent state surveys and anecdotal information suggest that all native mussel species are impaired to some extent, with most being severely depressed or extirpated.⁹⁹¹ The leading causes of mussel decline are habitat and water quality degradation.⁹⁹²
- Louisiana Waterthrush – The only obligate headwater riparian songbird in the Basin and the eastern United States, the Louisiana waterthrush is a biological indicator of riparian songbird populations and fresh water wetland habitat conditions.⁹⁹³ The current status of this indicator is fair, with the report noting that this species is very sensitive to polluted waters and loss of forested riparian habitat. As of 2002, the abundance of these birds appears to be decreasing in much of the Basin, coinciding with increased development and land use changes.⁹⁹⁴
- Striped Bass and Weakfish – This indicator gets a mixed review from the DRBC, with a good/restored for the Striped Bass and a fair/declining for the Weakfish. Current populations of striped bass are reportedly substantial, attributed to water quality improvements, particularly to dissolved oxygen levels, and limits on striped bass harvests until 1998.⁹⁹⁵ Water quality improvements also benefited the weakfish, whose numbers increased with improved abundance between 1994 and 2002. However, the species has

declined in recent years, a trend that may be related to the increase in striped bass and the possible predation of weakfish by the striped bass.⁹⁹⁶

- **Invasive Species** – Invasive species are species that are introduced from outside of an ecosystem and that have characteristics that allow them to dominate and limit the diversity of species within the invaded area.⁹⁹⁷ They have an advantage over native species due to their capacity to reproduce, grow or expand their range faster than their native counterparts, a circumstance often promoted by a lack of natural predators or diseases. Today, there are reportedly very few locations in the Basin that are undisturbed by invasive plants, with estimates of ecological damage and control costs topping \$137 billion nation wide.⁹⁹⁸ The following is a list of the invasive aquatic and terrestrial plants and animals that are established in, or threatening the forests, waterways, and riparian areas of the Delaware River Basin:
 - **Forest** – Hemlock Woolly Adelgid, Gypsy Moth, Chestnut Blight, Dutch Elm Disease
 - **Aquatic** – Northern Snakehead, Flathead Catfish, Common Carp, Chinese Mitten Crab, Zebra Mussel, Rusty Crayfish, Asiatic Clam, Rock Snot, Eurasian Water-Milfoil, Curly Pondweed, Water Chestnut, Hydrilla, Yellow Floating Heart
 - **Riparian** – Japanese Knotweed, Purple Loosestrife, Poison Hemlock, Lesser Celandine, Dames Rocket, Mile-a-Minute-Weed, Porcelainberry, Japanese Hops, Multiflora Rose, Oriental Bittersweet, Burning Bush, Amur Honeysuckle, Reed Canary Grass, Common Reed, Japanese Stillgrass, Princess Tree, Tree-of-Heaven

Category IV – Landscape

In this category, the report analyses the following environmental indicators: population growth and distribution, population density, land use 2001, land consumption, dams, forests, wetlands, and tidal wetland buffers. In this section, the report also discusses the importance of, and methods for, valuing natural landscapes. Like the Partnership report, the Basin report determined that the population in the basin increased by approximately 6% between 1990 and 2000, that the rate of wetlands loss has slowed in the past decade but continues, and that restoration strategies to facilitate the landward migration of marshes must be developed.⁹⁹⁹ The DRBC also found the following with regard to additional environmental indicators in this category:

- **Land Use** – As of 2001, 55% of the Basin landscape was dominated by forest cover, 26% was in agricultural use, 15% was developed land and only 4% was wetlands.¹⁰⁰⁰ Land use differs significantly depending upon the watershed, with the Upper and Central Region watersheds dominated by forests, the Lower region watersheds exhibiting a higher percentage of developed land and the Bay Region watersheds dominated by agriculture and containing most of the wetlands.¹⁰⁰¹ Changes in land use in the Basin between 1996 and 2001 are summarized in the following table:¹⁰⁰²

Table 20 Land Use Changes in the Delaware River Basin 1996 - 2001		
Land Use	Change Square Miles	Change Acres
Developed	70.75	45,283
Agriculture	-18.41	-11,781
Forest	-48.29	-30,909
Wetlands/Water	-3.48	-2,230
Barren	-1.21	-772

- Land Consumption – The status of this environmental indicator is rated as fair based on the fact that the per capita amount of land being developed is increasing.¹⁰⁰³ In 1995, the cumulative result of historic land development was 0.151 acres of developed land per person. From 1995 to 2000, the Basin’s population increased by 166,980 people, and developed land increased by nearly 71 square miles, or 42,280 acres.¹⁰⁰⁴ The land consumption ratio for this period was 0.271 acres per person, or nearly double the historic average.¹⁰⁰⁵
- Forests – Although forest is still the predominant land cover in the Basin, forested land decreased by approximately 50 square miles – more than 30,000 acres - between 1996 and 2001.¹⁰⁰⁶ The greatest loss was in the Central Region, in the Lehigh Valley and Delaware drainage watersheds of Pennsylvania, which are undergoing substantial population growth and development.¹⁰⁰⁷ Of the 6,263 square miles of forest remaining, only approximately 782 acres, or 11%, are protected via their status as state or federal forests, forest preserves or gamelands.¹⁰⁰⁸ Due to the fact that the Basin continues to lose forested land that is important to the areas water resources, the DRBC rates the status of this environmental indicator as fair.¹⁰⁰⁹
- Valuing Natural Landscapes – In considering this as a potential project in the Basin, the DRBC referred to the 2002 Natural Capital Project undertaken in New Jersey by the DEP.¹⁰¹⁰ Based on the recognition that the components of the natural environment provides long term benefits to individuals and to society as a whole, such resources can be viewed as capital assets or, collectively, as “natural capital.” Among the conclusions drawn by New Jersey’s project were that the state’s ecosystem assets are worth at least \$26 billion per year in goods and services; the present value of these New Jersey resources are estimated to be at least \$850 billion; and, in general, areas containing wetlands, estuaries, tidal bays and beaches have the highest ecosystem service values on a per acre basis.¹⁰¹¹ Examples of ecosystem goods and services in the Basin are as follows:

- **Ecosystem Goods** - Farm products, fiber and food, commercial fish, raw water, saw timber, fuel wood, game animals, and minerals
- **Ecosystem Services** – Climate regulation, soil creation, habitat, flood mitigation, pollination, air quality, water quality, nutrient cycling, recreational and aesthetic experiences, and other functions that would require money to replace.¹⁰¹²

Summary of Basin Conditions and Recommendations

With regard to the status of water resources, the DRBC commission gave the Basin an overall assessment of fair, based on the combined ratings of all of the indicators. A summary of the status of each of the four major categories assessed is set forth in the table below.

Table 21			
Summary of Environmental Indicator Status by Category			
Category	Good	Fair	Poor
Hydrology	4	2	1
Water Quality	3	5	2
Living Resources	2	5	5
Landscape	0	2	3
Total	9	14	11

The report made many recommendations for the continued and better assessment, monitoring and management of the Basin, including the following:

- **Water Use/Supply** – Evaluate and execute long term supply alternatives.
- **Flood Damage** – Improve floodplain mapping and management; evaluate potential impacts of climate change.
- **Nutrients** – Establish criteria for the protection of aquatic life.
- **Dissolved Oxygen** – Continuous monitoring needed throughout the Basin, particularly on a 24 hour basis as levels tend to be higher during the overnight hours.
- **Fish Consumption** – Implement TMDLs for targeted toxics; Monitor additional toxic compounds in water and fish tissue and identify their sources.
- **Toxics/Pesticides** – Regular sampling protocols are needed for these compounds; Additional research is required to determine effects levels and set criteria.
- **Toxics/PCBs** – Continue Monitoring, source identification and removal; Revise and implement TMDLs.
- **Benthic Macroinvertebrates** – Standardize reporting indices between states and other entities.

- **Land Use** – Enhance capacity for landscape change analysis by improving coordination, collection, timeliness and accuracy of land use/land cover data; Improve Basin-wide monitoring of land use changes; increase frequency of data collection and analysis and synchronize with census.
- **Land Consumption** – Obtain current and accurate data on population, land cover and development trends for more efficient use of land and water resources.

C. RECOMMENDATIONS

There are many opportunities for interested persons or organizations to become involved and advocate for better protections and programs in the Project Area. Such efforts would benefit not just the Project Area, but the resources of the entire states of Delaware and New Jersey. Some of the more significant opportunities are identified in the following list of recommendations.

- **Support and Expand Existing Ecosystem Based Management Approaches** - Support and highlight as examples existing ecosystem based management approaches, such as Delaware’s watershed based TMDL program, New Jersey’s move to county-wide Water Quality Management Plans, Delaware’s Tributary Action Teams and Whole Basin Management Approach, the Delaware River Basin Commission and the New Jersey Coastal and Ocean Protection Council;
- **Realize the Full Effect and Potential of Regulatory Protections and Programs that Allow for an Ecosystem Based Management Approach** – Emphasize and advocate for the implementation of regulatory protections and programs that provide for or allow an ecosystem based management approach, but are not being used to their full effect and potential, including but not limited to, the application of surface water quality standards and TMDLs, section 404 dredge and fill permit programs, the CAFRA Section 10 Findings and Coastal Goals, the Coastal and Estuarine Lands Conservation Program, the use of Special Area Management Plans, and the New Jersey and Delaware Wildlife Action Plans;
- **Support and Expand Programs that Engage in the Acquisition of Important Lands** - Support and highlight as examples the successful implementation and management of programs that have resulted in, and continue to engage in, the acquisition of important lands to protect water quality and critical habitat of specific ecosystems, such as the Delaware National Estuary Program, the Jacques Cousteau National Estuarine Research Reserve, the Delaware National Estuarine Research Reserve, the Cape May National Wildlife Refuge, the Bombay Hook and Prime Hook National Wildlife Refuges, the Delaware and New Jersey Land Owner Incentives Programs, and projects funded under the Neotropical Migratory Bird Conservation Act, such as the International Red Knot Conservation Project of Delaware, New Jersey, Argentina and Chile.

- **Establish TMDLs for Toxic and Bioaccumulative Contaminants** - Advocate for the expeditious establishment of TMDLs for toxic and bioaccumulative contaminants such as PCBs, heavy metals, pesticides and hydrocarbons, and for the inclusion of waters impaired due to the presence of these contaminants on the next New Jersey and Delaware priority list of impaired waters.
- **Oppose the Segmented Use of Water Quality Criteria and Antidegradation Standards** – Advocate for the consistent application of water quality criteria and antidegradation standards, such as New Jersey’s Category 1 standards, throughout entire waterways instead of to only certain segments of those waterways. Cessation of this practice is particularly critical in river systems where the Category 1 segments are located downriver of those subject to the less protective standards. Under such circumstances, the waters subject to the lesser protections are continually flowing into the Category 1 segments, making the degradation of these exceptional waters inevitable.
- **Establish a State Priority Wetlands List** – Advocate for the development of a Priority Wetlands List by both the states of New Jersey and Delaware. The lists could be similar to the Priority Wetlands for the State of New Jersey developed by the EPA in 1994 to guide the DEP in its assumption and implementation of the CWA Section 404 Program. Much if not all of the work necessary to identify state Priority Wetlands can be accomplished by New Jersey’s and Delaware’s ongoing efforts to complete a comprehensive assessment of all of their wetlands by 2014, as is required by Section 305(b) of the Clean Water Act. New Jersey and Delaware should then be encouraged to incorporate the Priority Wetlands List into their respective wetlands regulations. However, instead of just prohibiting or limiting General Permits in Priority Wetlands as New Jersey did in 1994, the issuance of Individual Permits in such wetlands should also be highly restricted.
- **Support the New Jersey Coastal and Ocean Protection Council** - Advocate for the appointment and confirmation of the rest of the members of New Jersey’s Coastal and Ocean Protection Council. Work with the Council to identify all opportunities for ecosystem based management approaches to be incorporated into the state’s programs and work towards the implementation of such approaches.
- **Create a Delaware Coastal and Ocean Protection Council** - Advocate for the appointment of a Coastal and Ocean Protection Council or similar entity in Delaware to identify all opportunities for ecosystem based management approaches to be implemented in its programs and work towards the implementation of such approaches.
- **Insist Upon the Use of Timely and Relevant Data** - Advocate for the states’ development and use of timely and relevant data in their management decisions, including data related to the status and extent of wetlands, wetlands buffers, land use and land cover, critical habitat and submerged aquatic vegetation.
- **Promote the Use of Compatible Data Reporting** - Advocate for the states’ reporting of compatible data to allow for a valid assessment of existing programs including, but not

limited to, data regarding wetland losses and wetland restoration and mitigation efforts from comparable time periods.

- **Advocate for the Protection of Critical Habitat and Imperiled Species** - Advocate for the states' immediate establishment of policies or regulations designed to protect critical habitat and imperiled species, emphasizing the more effective use of their Wildlife Action Plans and funding available under the State Wildlife Grants Program to assist in this effort.
- **Advocate for the Consideration of Secondary and Cumulative Impacts** - Advocate for the states' collection and consideration of data pertaining to secondary and cumulative impacts of development upon water quality, vulnerable species and their habitat in all management programs and permit decisions.
- **Enforce Existing Statutory Mandates** - Consult with the New Jersey DEP to determine the reasons why it is not utilizing the authorities and tools provided by statutes and, therefore, in some cases, not meeting the mandates of these statutes, as is demonstrated by its lack of a Coastal and Estuarine Land Conservation Program Plan, its misallocation of CZMA funds, its lack of an approved Coastal Nonpoint Source Pollution Control Plan, its failure to utilize Special Area Management Plans, its failure to utilize the CAFRA Section 10 Findings and Coastal Goals to prevent "inappropriate development" in its Coastal Area, and its lack of Water Quality Management Plans. If these deficiencies are due to budgetary constraints, work with the agency to reestablish its priorities.
- **Implement Recommendations of the DNEP and DRBC** - Review the findings and recommendations of the State of the Delaware Estuary Report 2008 and the State of the Basin Report 2008 to determine additional actions necessary for the enhanced protection and monitoring of the Project Area.