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**Ocean Working Group Report
to the
New York Ocean and Great Lakes Ecosystem Conservation Council**

New York's Ocean Resources

New York is an ocean state. It enjoys nearly two thousand miles of tidal shoreline and hundreds of beaches, some of them considered world class. Its ocean ecosystems encompass diverse marine habitats that are home to many important species groups. The State's numerous estuaries - Long Island Sound, the tidal Hudson River, Peconic estuary and Long Island south shore bays - support a commercial marine fishery that had a total economic value in 2006 of approximately \$250 million. New York hosts a wealth of programs, organizations and institutions that focus on its ocean ecosystems and resources, conduct critical ocean research and monitoring, and work to develop new technologies and methods to improve ocean resource management.

New York is also home to one of the biggest ports in the United States, part of a shipping and transportation industry that annually contributes more than \$18 billion in international and domestic economic activity. A large consumer of energy, the State has a growing need to provide more energy facilities and infrastructure, as well as the potential to develop important, ocean-based renewable sources, including wind, solar, and tidal power.

But New York's ocean, and the services it provides, are in trouble, threatened by depleted fish stocks, pollution, destruction of productive habitat, a changing climate, and overuse. The U.S. and Pew Ocean Commissions recommended ecosystem-based management (EBM) to improve the protection and restoration of ocean ecosystems. This report summarizes current challenges New York's ocean faces and opportunities the State has to reverse the general decline in its ocean resources. The report includes recommendations offered by the Ocean Working Group to the Council that recognize the interconnections within and among ecosystems, create a strong scientific foundation for making decisions regarding the management of ocean resources, establish measurable objectives to direct and evaluate performance toward that end, and offer broad opportunities for stakeholder involvement. The recommendations reflect the six EBM principles and address how they should be applied in New York State. EBM is achieved through the thorough integration of these six principles:

- A place-based focus.
- A scientific foundation for decision-making.
- Measurable objectives to direct and evaluate performance.
- Adaptive management to respond to new knowledge.
- Recognition of interconnections within and among ecosystems.
- Involvement of stakeholders.

For the purposes of this report, New York's "ocean" ecosystems include the open ocean, estuaries and estuarine embayments, tidal river systems, intertidal wetlands and mudflats, and areas of submerged aquatic vegetation; the report's study area includes New York's entire upland ocean and coastal watershed.

Ocean Issues

New York's ocean is in a silent state of collapse caused by depleted fish stocks, pollution, and destruction of productive marine habitat. Habitat fragmentation and loss result in species declines, and render natural areas increasingly sensitive to invasive species. Shoreline hardening eliminates fish habitat and prevents migration of natural shorelines and wetlands. Rapidly growing coastal populations affect water quality through steadily increasing loads of nutrients, contaminated sediments, marine debris, and vessel wastes. Many commercial fisheries are in decline, and the sustainability of the industry is unknown.

Deteriorating waterfront infrastructure threatens public access to the shore, and rapid sedimentation in navigation channels and harbors threatens New York's shipping and transportation industry as well as local efforts to revitalize former industrial waterfronts with new, public water-dependent uses. Impending climate change, and its secondary impacts, will exacerbate these existing issues, and will affect many government and economic sectors beyond the traditional resource management interests. Climate change will likely affect the presence and distribution of coastal and ocean species, commercial and recreational fishing, agriculture, and tourism, while sea level rise will disrupt or compromise existing developed areas, transportation systems, water supplies, waste treatment facilities, and shoreline infrastructure.

The interconnectedness of New York's ocean systems requires the State to have a similarly linked management structure. To achieve the New York Ocean and Great Lakes Ecosystem Conservation Act's goal of conservation and restoration of our ocean and Great Lakes ecosystems, the State needs to undertake new initiatives and reforms. Some actions will require groundbreaking steps to further the ability of New York State to view ocean and coastal ecosystems holistically, with coordinated management at a scale appropriate to the ecosystem, mindful of the long-term, cumulative impacts of human activities. If the recommendations called for in this report are acted upon, we will see a resurgence of our ocean resources and the activities that rely on them.

Ocean Governance

International law recognizes several jurisdictional zones in the ocean and authorizes coastal nations to assert certain rights and jurisdiction within these zones. United States law divides authority for oceans between federal and state governments, with most states holding title to submerged lands and the natural resources in such lands and waters from the shoreline out to three miles, and the federal government exercising jurisdiction (which includes the right to explore, exploit, conserve and manage the natural resources, both living and nonliving, of the water column, the seabed, and its subsoil), generally from three miles out to 200 miles. Thus, the territorial limits of New York extend generally three miles offshore of the mean high water along the ocean shore and to the half way point between New York and neighboring states.

There are multiple state, inter-state and regional entities that have management responsibility for the ocean, its coastal areas and upland watersheds. In New York, most of the State's ocean area is part of the coastal zone, managed by the New York Management Coastal Program. The State's coastal estuarine waters - Long Island Sound, the tidal Hudson River, New York/New Jersey Harbor, the Peconic Estuary, and Long Island's south shore bays - are managed by several agency programs through comprehensive management plans. The watershed areas that affect ocean and estuarine waters extend inland across most of the State, and activities throughout the watersheds impact both living and non-living ocean and coastal resources. Multiple state agencies and programs, summarized at the end of this report, cover different portions of these areas, and their efforts are directed at different ocean resources and management issues. These and other jurisdictional lines, however, result in a system of resource management that does not correlate with ecosystem attributes or ecological functions.

Opportunities for Change

New York has an opportunity to build on an existing base of programs such as the New York State Coastal Management Program, the Hudson River Estuary, the New York/New Jersey Harbor, Long Island Sound, Peconic Estuary, and South Shore Estuary Reserve programs to create an integrated ecosystem-based ocean management strategy that expands current protections and boundaries and fills gaps in coverage. Incorporation of EBM principles into existing State programs such as Local Waterfront Revitalization Programs, Regional Coastal Management Programs, the State Open Space Conservation Plan, the Department of Transportation's Environmental Initiative, and comprehensive watershed planning will immediately improve existing management efforts. Further improvements must be supported by a strong, comprehensive research and monitoring program designed to fill information gaps and integrate existing knowledge. Developing and implementing EBM is reliant on increased biological monitoring and the collection and dissemination of good baseline data for ocean and coastal ecosystems. Effective management will require some new statutory or regulatory authority, additional resources, and improved data sharing and coordination among all stakeholders, especially regarding issues subject to interstate or international jurisdiction. This type of coordination and communication must integrate the concerns and resources of more sectors than are traditionally involved in ocean resource management - including agriculture, public health, energy, and transportation.

Ocean Working Group

The New York Ocean and Great Lakes Ecosystem Conservation Council (the Council) is comprised of representatives from eight governmental agencies plus New York's major public institution of higher learning - the Department of Agriculture and Markets, Department of Environmental Conservation, Department of State, Department of Transportation, Empire State Development, New York State Energy Research and Development Authority, Office of General Services, Office of Parks, Recreation and Historic Preservation, and the State University of New York (SUNY). With both the critical need and the opportunity for change in mind, the Ocean Working Group, an advisory group to the Council, convened five work sessions to discuss a host of strategies that might build on existing programs and improve New York's ocean resource management efforts. The Ocean Working Group was charged with building a comprehensive ecosystem-based management strategy for improving ocean health, building knowledge of ocean ecosystems, and developing recommendations on how the Council can apply EBM in the Atlantic Ocean and the estuaries to which it is linked.

The recommendations are organized by the following topics:

- Ocean Spatial Planning and Management
- Ecosystem Protection and Restoration
- Fisheries Management
- Energy
- Navigation and Transportation
- Climate Change
- Education and Outreach
- Governance Structure.

Key Action Items

The Ocean Working Group recommends the following five key action items:

- Establish a regional ecosystem-based management approach for the ocean ecosystem, including marine waters as well as coastal and upland watersheds.
- Enact legislation which authorizes comprehensive Ocean Spatial Planning and Management that would protect valuable natural and economic resources of underwater lands and better manage the use of those resources.
- Fund research projects which will generate critical data necessary to monitor, over time, the physical, biological and chemical parameters of the marine environment and the exploitation of marine species. Immediate needs include 1) developing a New York ocean and coastal observing system, and 2) a pilot marine fishery observer program.
- Strengthen the core competencies of existing state efforts such as the significant coastal fish and wildlife habitat conservation and restoration programs, underwater lands management, shellfish and finfish restoration programs, climate change initiatives, the coastal management program, local waterfront revitalization programs, water quality improvement programs, the state's diverse estuary programs, and ocean literacy.
- Develop an ocean and estuaries health index.

Ocean Spatial Planning and Management

Background

Most navigable bodies of water in New York are State-owned, including the beds of the Atlantic Ocean, Long Island Sound, Great Peconic Bay, Gardiners Bay, and the Hudson River. As such, these waters are subject to the legal principle of the public trust doctrine, which recognizes that certain resources are preserved for public use and enjoyment. Public uses of navigation, commerce, recreation and fishing have been legally protected under this doctrine. The Submerged Lands Act, passed by Congress in 1953, granted title to the natural resources located within three miles of the coastline to states, which includes "oil, gas, and all other minerals, and fish, shrimp, oysters, clams, crabs, lobsters, sponges, kelp, and other marine animal and plant life but does not include water power, or the use of the water for the production of power."

Challenges

Although New York's Public Lands Law provides the statutory guidelines for the use and occupation of structures on or over public lands, which are held under the jurisdiction of the Office of General Services, myriad other New York State agencies also have a current, or potential, role in ocean and bottomland planning, management and use. This array of interests and jurisdictions has sometimes resulted in program competition, conflict and wasted resources, which can be mitigated by employing the same resource inventory and long-range planning methods used to address onshore areas. Increased use, activity and development in New York's coastal and ocean areas will require better coordination and integration between programs and agencies, comprehensive resource inventory, and planning.

Opportunities

Ocean Spatial Planning and Management is a process that addresses the many and often conflicting uses of the ocean environment. By analyzing and allocating ocean spaces to particular uses, Ocean Spatial Planning and Management is a comprehensive and adaptive approach that seeks to avoid conflict and

balance the need to promote development and protect the environment. In New York, Ocean Spatial Planning and Management can help to anticipate and effectively address new proposals for uses such as offshore energy development and dredged material management, while protecting ecosystems, underwater archeological resources, and existing ocean uses such as commercial and recreational fishing, shipping and transportation.

To make Ocean Spatial Planning and Management work in New York, decision makers need access to extensive baseline monitoring of biological, oceanographic and other natural, cultural and recreational features and resources. Further, decision makers need more comprehensive, pro-actively developed, scientifically sound policy and guidance that identifies locations or areas appropriate and inappropriate for certain uses and activities. Precedents for Ocean Spatial Planning and Management in New York exist already, e.g., the NYS Significant Coastal Fish and Wildlife Habitats program, which already includes both onshore and open water areas, and comprehensive harbor management planning conducted pursuant to Executive Law Article 42 §922.

Recommendations

Recommendation 1: Initiate comprehensive Ocean Spatial Planning and Management. New York State needs to embark on a comprehensive Ocean Spatial Planning and Management initiative that will protect sensitive ocean natural resources while managing the many vital but potentially conflicting uses of New York's ocean, including access and recreation, navigation, utility corridors, and the need to site alternative energy facilities. A comprehensive Ocean Spatial Planning and Management initiative will require extensive inventory, data acquisition, and modeling efforts to identify high resource-sensitive areas of biodiversity, shipwrecks and underwater archeological sites, and infrastructure-favorable, low resource-sensitive areas. Among the many related benefits, Ocean Spatial Planning and Management will allow New York to explore the feasibility of marine sanctuaries, no-take zones, and underwater diving parks and trails; establish a proactive approach for siting alternative energy and related transmission corridors once siting criteria are clearly established; and encourage the co-location of activities to achieve the most benefit for the least impact.

Lead Agencies: DOS; DEC; OGS; OPRHP
Time Frame: Near term

Recommendation 2: Expand the Office of General Services' transfer of public trust underwater lands. New York should expand its Office of General Services transfer of public trust underwater lands beyond the Hudson River and finalize the MOU between OGS and the state agencies receiving land transfers. Management plans should be developed for such lands, and agency guidelines should be considered that promote the highest and best use for underwater lands, including their use for research, conservation and recreation activities; the protection of shipwrecks and marine archeological sites; and their potential dedication as underwater parks.

Lead Agencies: OGS; DEC; OPRHP
Time Frame: Near term

Recommendation 3: Build on and expand the State's Significant Coastal Fish and Wildlife Habitat Program (SCFWH). As an initial step in Ocean Spatial Planning and Management, the State's Significant Coastal Fish and Wildlife Habitat program needs to be extended to include areas within New York's ocean to allow the State to address critical habitat issues there. Areas for potential designation will

be identified as a result of a comprehensive monitoring effort that includes the biological monitoring aspects of a proposed Ocean and Coastal Observing System (Recommendation 4), as well as more traditional oceanographic methods, for sampling the many life stages of the ocean's diverse biota. It is expected that such areas will include those of high biodiversity, critical spawning grounds, nursery areas, and migratory corridors for fish, marine mammals, and turtles. Both nearshore and offshore sites with documented resource values, known use conflicts and related issues should be selected as pilot study sites. Ocean-based significant fish and wildlife habitats will serve as an essential information layer for the State's Ocean Spatial Planning and Management initiative that will allow planning to meet many priority use and infrastructure needs while protecting and conserving critical ocean natural resources. Expansion of the State's SCFWH program should include exploring the potential of a marine protected area program unique to the State, one that addresses New York's ocean needs and establishes its authority to manage such a program. The Hudson River Estuary SCFWH designations need to be updated to reflect current science and knowledge. Data collection and synthesis to support these updates have already been accomplished. The next step is to conduct the public hearing process needed to adopt these updates as official state maps.

Lead Agencies: DOS; DEC
Time Frame: Near term

Ecosystem Protection and Restoration

Background

Ocean ecosystems in New York State encompass a wide variety of habitats, ranging from the open ocean, nearshore estuarine embayments, tidal river systems, intertidal wetlands and mudflats, and areas of submerged aquatic vegetation (SAV). The protected nature of estuarine embayments makes them good nurseries for finfish, scallops, and several species of sea turtles, and they also provide important overwintering habitat for many species of waterfowl. Seagrasses in New York's remaining SAV beds grow in shallow, quiet waters below the spring low tide level in many of these embayments, and provide important ecosystem value by stabilizing sediments, producing oxygen and detritus, and providing habitat by creating three-dimensional structure on the bottom. SAV beds support abundant populations of small invertebrates, a food source for waterfowl, turtles and fish, and provide nurseries for juvenile finfish. Tidal wetlands, including salt, brackish and freshwater tidal marshes and mudflats, are found in the transition zone between terrestrial and open water ecosystems, and constitute some of the most diverse and biologically productive habitats of the coastal area. Tidal rivers like the Hudson, and their tributaries, encompass a diverse assemblage of habitat types that are influenced by physical structure, chemical characteristics, and biogeography. These habitat characteristics are greatly affected by adjacent land uses and land cover in the watershed, which directly and indirectly influence water quality, species abundance and assemblage, rates and patterns of flow, and sedimentation.

Ocean ecosystems are home to a number of New York State protected species, as well as diverse and important species groups. Protected species include the endangered shortnose sturgeon, Atlantic hawksbill, Atlantic ridley, and leatherback sea turtles, and sperm, sei, blue, finback, humpback, and right whales; and the threatened green and loggerhead sea turtles. Important species groups hosted in New York's oceans and estuaries include waterfowl, colonial waterbirds, seabirds, and shorebirds (such as ducks, herons, terns, plovers, and pelagic species), as well as diadromous, estuarine and commercial marine fisheries species (including shad, herring, killifish, bay anchovy, menhaden, sandlance, bluefish, and flounder), and marine mammals (including seals, whales, and dolphins).

Challenges

Ocean ecosystems, with their diversity of habitat types and supported species, are vulnerable to a variety of impacts, including nutrient loading and contaminant inputs, sediment suspension from overland runoff or dredging activities, shoreline hardening, fragmentation and encroachment of developed areas, and invasive species. Loss of habitat and the increase in invasive species are the two biggest threats to biodiversity in New York State, emphasizing the need to promote comprehensive habitat restoration planning, and to explore existing regulatory barriers to scientifically-sound restoration and enhancement projects. Degradation in the quality of those remaining habitat areas also increasingly impacts populations of ocean and coastal species, in particular, with regard to water quality. As the human population expands on the coast, the infrastructure supporting developed areas results in greater quantities of contaminated runoff, nutrient inputs, sedimentation, and both treated and untreated wastewater. An increased human recreational presence on and in the water also has resulted in ocean degradation by marine debris, vessel waste, and the transport of invasive marine species. Increased data collection, monitoring and information-sharing will be required to effectively manage both protected and unprotected (but characteristic) species in New York's ocean ecosystems. This is especially true in the face of growing coastal population, increasing recreational use, and escalating climate change, all of which will alter the presence and distribution of coastal and ocean species.

Opportunities

New York State has a strong foundation of planning, regulatory and technological tools to manage ecosystem impacts and promote habitat protection and restoration, including the NYS Significant Coastal Fish and Wildlife Habitats program, Local Waterfront Revitalization Programs, the Hudson River Estuary Action Plan, regional coastal management programs, comprehensive conservation and management plans, and local watershed plans. Among these tools, watershed plans provide an effective approach for protecting and improving ecosystem values, beyond water quality alone, at a meaningful level. New York is well-poised to build on the successes of this foundation, and the integration of the principles of Smart Growth and EBM with this foundation will improve local and regional planning, the collection and sharing of information, and expand the participation and involvement of New York State agencies, local governments, and academic and private sector partners in ecosystem protection and restoration.

New York State has created the foundation for an ocean and coastal observing system through the Hudson River Environmental Conditions Observing System (HRECOS), announced by Governor Paterson in May 2008, which is now operational at 6 locations. Advancing this concept, the Council has awarded SUNY Stony Brook's Marine Sciences Research Center substantial funding to seed a project in the Great South Bay to stream observation data, in real time via the web. This pilot will better position New York to be competitive for federal funding to develop such systems. The project can be tailored and expanded to address the State's entire ocean ecosystem, so that New York's network can link with integrated observing systems being developed for the mid-Atlantic region through MACOORA, an organization created for that purpose.

Recommendations

Recommendation 4: Develop a New York Ocean and Coastal Observing System that uses both automated and traditional oceanographic data collection methodologies to address the State's critical information needs relative to New York's estuarine and oceanic waters. Improving data collection and analysis is the first step toward Ocean Spatial Planning and Management in New York.

The proposed comprehensive data collection system will be a web-based, real-time data delivery system that will track broad physical, biological, and chemical parameters, including sediment quality, toxins, and nutrient inputs from land-based activities; will follow National Ocean Service data collection and dissemination standards and methodologies; and will be implemented with federal, inter-state, academic and equipment manufacturing partners. Data will be captured and managed in a central location as a geo-referenced data system and will be used by agency resource managers, policy analysts, and academics. Symbiotic partnerships will be developed between the scientific community and resource managers to improve grant writing capacity and the relevance of funded research. Such partnerships will both inform and direct hypothesis-driven analyses of ecosystem dynamics and direct management decisions. The system will require long-term, operational commitments from partnering institutions and data users. Physical, biological, and chemical data collected as part of this observing system will be critical to State and federal efforts to manage the commercial and recreational harvest of Atlantic Ocean fisheries in both the short term and in anticipation of species population shifts driven by climate change.

Lead Agencies: SUNY; DEC; DOS
Time Frame: Near term

Recommendation 5: Integrate the principles of EBM with all future Local Waterfront Revitalization Programs. The principles of EBM should be fully integrated with all aspects of local programs to ensure that they address the critical ocean issues of the time, including flooding and erosion; dredged material management; post-storm recovery plans; sea level rise adaptation and defense strategies; sustainable growth, economic development, redevelopment of waterfronts, and tourism; identification and stronger protection of local natural resources; protection of water-dependent uses; protection of public access and recreational use of waterfronts, nearshore and open water areas; and preservation of cultural and historical resources.

Lead Agency: DOS
Time Frame: Near term

Recommendation 6: Review the State's existing coastal management policies to ensure that they fully integrate the principles of EBM. The State's coastal management policies need to fully reflect the principles of EBM.

Lead Agency: DOS
Time Frame: Near term

Recommendation 7: Develop regional coastal management programs, similar to the Long Island Sound Coastal Management Program, for New York's Atlantic Ocean and the Hudson River Basin. These programs should maintain a proper balance between natural resources and accommodating the needs of population growth and economic development in communities. These regional programs would provide a coordinated framework that sets comprehensive policy and planning for preservation, enhancement, protection, development and use of the waterway resources.

Lead Agency: DOS
Time Frame: Near term

Recommendation 8: Implement the recommendations of the five existing estuary programs. Plans have been developed for the Hudson River Estuary, New York/New Jersey Harbor Estuary, Peconic

Estuary, South Shore Estuary Reserve, and Long Island Sound. The recommendations from those plans should be prioritized as part of a regional “action planning” process that would establish priorities based on ecosystem goals and desired outcomes.

Lead Agencies: DEC; DOS; US EPA
Time Frame: Near term

Recommendation 9: Develop an ocean and nearshore habitat restoration plan that establishes a comprehensive strategy for the conservation, protection and enhancement of critical habitats.

Critical habitats include freshwater wetlands throughout the State's coastal watershed, tidal wetlands, and low-lying areas adjacent to tidal wetlands that offer the potential for wetland migration; riverine, ocean and estuarine shoreline habitats, including beaches, protective dunes, maritime forests, and associated buffers; and streams and their corridors throughout the State's coastal watershed. This effort should build on existing plans and programs such as the State Open Space Conservation Plan, the Hudson River and New York harbor restoration plans, and the Species of Greatest Conservation Needs plans; build on and expand the State's Significant Coastal Fish and Wildlife Habitat Program; include the updating of habitat sensitivity maps; and consider the effects of sea level rise.

Lead Agency: DEC; DOS
Time Frame: Near term

Recommendation 10: Create a NYS Ocean and Estuaries Health Index that establishes clear, measurable parameters for assessing each system's ability to provide critical ecosystem services for the human community. The index should provide for the ability to take action or adapt existing management initiatives in an effort to maintain and improve the viability of New York's ocean and estuaries. The index should be developed while considering its potential use throughout the Mid-Atlantic region.

Lead Agencies: DEC; SUNY; DOS
Time Frame: Long term

Recommendation 11: Expand watershed planning to integrate the principles of EBM throughout New York State. This should be fully integrated with the State's Smart Growth Initiative, with its primary focus being land use planning and implementation activities on a watershed basis and land use impacts on hydrology, ground water, surface water quality and the State's estuaries and coastal ocean. This can only be accomplished through close coordination with local governments, as municipalities and counties have broad control over many land-use decisions. Efforts should be closely aligned with the preservation of agricultural lands, unfragmented forests, and parks, with the objective of maintaining upland resilience, biodiversity, and ecosystem integrity.

Lead Agencies: DOS; DEC; Agency Steering Committee; Smart Growth Cabinet
Time Frame: Near term

Recommendation 12: Implement comprehensive storm water best management practices. In recognition of the impacts of polluted stormwater runoff on the State's rivers and streams, estuaries, and coastal ocean, and on the ecosystem services that they sustain and provide, State agencies and local governments should continue to implement the State's Phase II Stormwater Program and other stormwater management efforts to reduce the levels of nutrients and sediment in storm water runoff and

the overall volume of that runoff.

Lead Agencies: DEC; DOT; DOS; OGS
Time Frame: Near term

Recommendation 13: Evaluate sewage treatment outfalls within the watersheds that drain to the ocean. As New York's coastal population grows, the expansion of sewage districts, the development and siting of new centralized wastewater treatment systems, and the analysis of existing and planned outfalls need to be considered within the context of protecting ocean resources and new ocean outfall technology. This effort should include the development of priorities for additional investments in wastewater infrastructure which would address existing impairments to estuarine and marine waters.

Lead Agency: DEC
Time Frame: Near term

Recommendation 14: Expand the NYS Agriculture Environmental Management (AEM) program by incorporating an EBM approach to addressing potential ecosystem benefits through assessment, planning, implementation, evaluation, education, outreach, and training. Maintaining an agriculture that is environmentally responsible and economically sound will sustain farms, especially in coastal areas and ocean watersheds; encourage economic development; and preserve rural quality of life. An expanded AEM program will enhance assistance to regulated agriculture while strengthening assistance to non-regulated farms.

Lead Agencies: DAM; DEC; DOS; SUNY
Time Frame: Near term

Recommendation 15: Strengthen management of agricultural nutrients and waste. Within an expanded NYS AEM program, strengthen agricultural nutrient and waste management by continuing to develop nutrient and waste management plans for farms in high impact locations. Encourage new technologies to handle, treat and use agricultural waste regardless of farm size, including development of on-farm alternative energy production.

Lead Agencies: DAM; DEC; DOS; SUNY
Time Frame: Near term

Recommendation 16: Develop new standards for agronomic and aquacultural practices. Within an expanded NYS AEM program, conduct research, develop new standards and provide technical assistance for agronomic and aquacultural practices, including vineyard management practices to improve long-term economic sustainability and limit potential impacts that agricultural crop production may have on the ecosystem, and for shellfish and finfish aquaculture, including the development of best management practices that address the potentially significant impacts of these growing industries on marine fisheries and benthic communities.

Lead Agencies: DAM; DEC; DOS; SUNY
Time Frame: Near term

Recommendation 17: Provide greater protection to endangered marine mammals, turtles and seabirds through a comprehensive program of research, monitoring, education, and enforcement.

The critical habitat areas for these species should be identified in New York's ocean and be designated as "endangered marine species protection zones" in which human activities, including navigation, are regulated to assure minimal impact to these animals. Related education programs targeting recreational boaters and the fishing industries should be developed on how to identify northern right whales, the most critically endangered marine mammal found in local waters, and the suite of federal regulations in place to protect these whales from human activities. This should include the development of draft legislation authorizing NYS DEC to implement the above recommendations.

Lead Agency: DEC
Time Frame: Near term

Recommendation 18: Establish an acoustic monitoring network. The State should establish an extensive buoy-based acoustic monitoring network, as the basis of a vessel-based listening system, that will provide real-time information on the location and movements of whales and allow ships to reduce speed when in proximity to whales and avoid fatal collisions with them.

Lead Agencies: DEC; Atlantic States Marine Fisheries Commission; Cornell University
Time Frame: Near term

Recommendation 19: The Invasive Species Council should address marine invasive species. Recognizing the enormous threat invasive species pose to both terrestrial and aquatic ecosystems, the NYS Invasive Species Council should implement the recommendations called for in the 2005 final report of the NYS Invasive Species Task Force. Special attention should be paid to port, ballast and climate-related vectors, with a focus on New York/New Jersey Harbor as a source of invasive aquatic species; how invasive species are introduced in the harbor; and what regulatory mechanisms might be needed to control such introductions. The proposed Comprehensive Management Plan (described in both the 2005 Task Force Report and the new state statute) should specifically address the subject of marine invasive species and incorporate the principles of EBM.

Lead Agencies: DEC; DOS; DAM
Time Frame: Near term

Recommendation 20: Implement the recommendations of the NYS Seagrass Task Force. The NYS Seagrass Task Force should receive the full support of all member agencies and organizations in its effort to establish a framework for reducing the impact of direct and indirect threats to seagrass, and for the restoration and proper management of seagrass. This should include the development of a comprehensive seagrass research, monitoring, and restoration management plan, consistent with EBM principles, for the State's estuarine waters and coastal ocean that establishes the groundwork for specific legal protections for seagrasses and other submerged aquatic vegetation.

Lead Agency: DEC
Time Frame: Near term

Recommendation 21: Assist coastal cleanup efforts. Recognizing the threat that marine debris poses to ocean wildlife, members of the Council should encourage and assist coastal cleanup efforts such as those by the American Littoral Society, which, in 2007 alone, coordinated the efforts of 9,339 volunteers who removed 142,243 pounds of debris along 677 miles of the State's shoreline. Additionally, greater effort should be made to control debris at its diverse sources. In a related effort to address navigation safety,

Council members and local governments need to work together to remove derelict vessels and abandoned infrastructure from nearshore waters.

Lead Agencies: DEC; DOS; OPRHP; DOT
Time Frame: Near term

Recommendation 22: Ensure adequate spill response capacity. Recognizing the potentially harmful impacts of chemical and/or petroleum spills to estuarine and coastal ecosystems, New York State should work within its regulatory authority to ensure that nearshore petroleum and chemical bulk storage facilities have adequate spill protection in place. For areas that fall outside NY's regulatory authority, such as spill prevention, control, and countermeasure (SPCC) plans, NY should use an education and outreach program to encourage the adoption of SPCC plans by facilities that are federally required to do so. This effort should include the development of updated habitat sensitivity maps for the purpose of spill response activities (access, staging, etc.), re-evaluation of the use of dispersants in ocean waters (depths greater than 10 meters), and periodic drills to ensure adequate response to addressing emergency spills.

Lead Agency: DEC; DOT
Time Frame: Near term

Recommendation 23: Update the 1996 Clean Vessel Plan. The State's 1996 Clean Vessel Plan should be updated to more accurately reflect recreational boat traffic and the availability of vessel- and shore-based pumpout facilities. New York State should designate vessel no discharge zones for New York's coastal ocean areas along the south shore of Long Island and south shore embayments, NY/NJ Harbor, and Long Island Sound.

Lead Agencies: EFC; DOS; DEC
Time Frame: Near term

Recommendation 24: Expand the Bird Conservation Area Program. Expansion of the State's Bird Conservation Area (BCA) Program should occur throughout New York's ocean, coastal zone and contiguous upland areas in an effort to integrate bird conservation into agency planning, management and research projects. This effort should include recommendations for designating additional BCAs and the expansion of those areas offshore; completion of management guidance summaries for each newly-designated BCA, consistent with EBM principles; and the development of associated interpretive materials.

Lead Agencies: DEC; OPRHP; OGS; DOS
Time Frame: Near term

Fisheries Management

Background

New York's richness in fisheries is influenced by the characteristics of the New York Bight, coastal estuaries, and the greater continental shelf. Cold water and warm water zones meet in the Bight, resulting in the presence of a wide variety of pelagic and estuarine species, reproducing in nearshore waters and sheltering juveniles in the wetlands and embayments of the coastal area. Many oceanic species are commercially important, and include pelagic species (such as Atlantic herring, Atlantic mackerel,

butterfish, bluefish, and squid, as well as highly migratory tuna, and swordfish), groundfish (such as flounder and hake), and anadromous species (shad, alewife, herring, and striped bass). New York's coastal and estuarine habitats are home to an array of commercial crustacean and shellfish species, including lobster, blue crab, horseshoe crab, bay scallop, oyster, hard clam, and Atlantic surf clam. The tidal Hudson River environment supports a diverse recreational and commercial fishery assemblage comprised of estuarine, anadromous and catadromous species such as striped bass, largemouth and smallmouth bass, American shad, river herring, blue crab, catfish, and Atlantic tomcod, in addition to bluefish, weakfish, and flounder.

Because most Atlantic Ocean fish species migrate through the waters of several states, data collection and management responsibilities are shared among the Atlantic coast states and between these states and the federal government. New York participates in the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Council (MAFMC) in accomplishing this cooperative management.

The State's fisheries provide a high-value protein source for residents of the State and for the global market. Although fisheries management requirements have reduced landings over the past two decades so that the extent of commercial seafood brought to New York docks is now significantly less than it was 50 years ago, the economic importance of New York's fishing industries remains substantial. In 2006, total commercial landings in New York amounted to 33 million pounds, valued at \$58 million, as reported by the National Marine Fisheries Service. Nearly 10% of the 55 million marine recreational fishing trips made on the Atlantic coast of the U.S. in 2006 were hosted in New York, accounting for landings of more than 14 million pounds.

Challenges

Our knowledge of the status of different managed species varies. This highlights the critical need for comprehensive data and survey information that includes priority for both increased frequency and broadened scope for data collection. Sufficient research funding is also necessary.

Opportunities

New York can achieve a sustainable fishery with participation by both the commercial and recreational fishing industries and the improvement of data collection efforts. Development and operation of new fishery observer and licensing programs, for example, can assist in confirmation of landings and by-catch data, assessing gear impacts, and studying population biology. These programs must be supplemented by targeted research and comprehensive baseline monitoring designed to fill the information gaps that impede effective, sustainable management of New York's fisheries resources. For effective management, fisheries laws and regulations need to be enhanced, along with improved data sharing and coordination among all stakeholder groups and at all levels of fisheries management, especially with regard to highly migratory populations subject to interstate and international jurisdiction.

Recommendations

Recommendation 25: Improve current marine research and monitoring programs. Continue the development of a multi-faceted marine research program that includes the following elements: routine fisheries-independent surveys of the abundance and distribution of resource and forage species; commercial fisheries on-board observer program in selected fisheries; effects of fishing gear on habitat and non-fish species; automated Vessel Monitoring System requirement in selected commercial and recreational "for-hire" fisheries; and remote, in situ, acoustic-based system to monitor movements of large

whales and other animals in New York ocean waters. The implementation of a pilot on-board marine fishery observer program would improve information on fish take, population biology, and by-catch. Once its success has been demonstrated, this pilot should be refined and expanded into a permanent, full-time program that will help the State refine its ability to: set take limits for both individual species and specific areas of the ocean; understand fishing-related mortality; help confirm commercial fishery landings and vessel trip reports; and understand population trends for specific species. It also will enable the collection of critical by-catch and fish discard data that could lay the groundwork for informed actions to enhance fisheries management.

Lead Agencies: DEC; SUNY
Time Frame: Near term

Recommendation 26: Develop and implement comprehensive marine shellfish and finfish protection and restoration plans. Achieving the sustainable management of New York's shellfish and finfish resources will only be accomplished with the development and implementation of comprehensive local restoration plans guided by and consistent with federal and interstate fishery management plans while integrating EBM principles. These plans will allow the State to refine its ability to set take limits for both individual species (including species currently not covered) and for specific areas of the ocean. Managers have the responsibility to ensure that any proposed environmental or fishery restoration plan is grounded on a comprehensive and scientifically-sound understanding of the ecosystem under consideration. Estuary and watershed managers need to develop a consensus vision of realistic goals that can be achieved over time.

Lead Agencies: DEC; SUNY
Time Frame: Near term

Recommendation 27: Maintain or expand current ocean trawl surveys which collect baseline data for the comprehensive management of New York's marine fishery species. Several trawl surveys are presently conducted by federal and state agencies, at various depths throughout New York and neighboring state's inshore waters, and on the continental shelf. It is critical to continue these and to expand ocean coverage both spatially and temporally, an effort that would be advanced by New York developing a year round trawl survey out to a depth of 90 feet. Sustain, and augment as appropriate, other existing fish stock monitoring programs since they provide data that is imperative to understanding the current condition of New York's fish populations and the State's response to management actions.

Lead Agencies: DEC; SUNY
Time Frame: Near term

Recommendation 28: Integrate EBM principles with fishery management to achieve a sustainable fishery. In an effort to establish a sustainable fishery, the State should seek improvements in commercial fish harvest data collection and analysis. A change in ocean resource management is needed to promote fairness and conservation while reducing waste and inefficiencies. This can be accomplished through demonstrating the effectiveness of new approaches and different strategies. The effort should correct New York's allocation base and bycatch reduction strategies while instituting a ghost gear retrieval and buyout program that directly pays the fishing community. A program to adopt an EBM approach to fisheries conservation should be piloted with shad and river herring, examining in-river fishing mortality as well as external factors, food webs, habitat and other ecological considerations, bringing other Atlantic

coast states into partnership with this effort. This will build upon the current shad recovery program announced by Governor Paterson in May 2008.

Lead Agency: DEC
Time Frame: Near term

Recommendation 29: Establish a recreational saltwater fishing license program. Establish the parameters for a saltwater fishing license program for recreational anglers on the ocean and the saltwater portion of the State's estuaries. This effort will allow data such as catch rate and other information critical to informing fisheries management to be gathered. Funds collected under the licensing program could be used to improve fisheries management, including direct species management, habitat improvements, and the continuance of the winter flounder assessment. Such a program will be an important element in expanding scientific monitoring and improved record keeping of recreational and commercial harvests, all of which will be essential to a precautionary approach in setting catch quotas.

Lead Agency: DEC
Time Frame: Near term

Recommendation 30: Strengthen State fisheries laws and their implementation. The Legislature should grant broader authority to DEC over all regulated marine species in New York so that the management of the State's fishery can be more closely attuned to the resource. Giving New York's marine fisheries management agency the broad authority to adopt those regulations necessary to achieve conservation goals is essential if the State's marine fisheries are to be preserved and sustained in the 21st Century. Enhanced regulatory authority must be matched with adequate agency staffing in order to have the capacity to implement the existing, as well as additional, responsibilities. State marine fishery laws should be reviewed for potential revisions that would make clarifications and improve consistency with interstate and federal fishery management plans and policy.

Lead Agency: DEC
Time Frame: Near term

Recommendation 31: Ensure that aquaculture is consistent with EBM principles. In recognition of the growing importance of shellfish and finfish aquaculture, New York should develop a policy that mandates the integration of EBM principles with aquaculture and that acknowledges the real and potentially significant impacts of the industry on marine fisheries and benthic communities.

Lead Agencies: DEC; DOS; OGS; DAM
Time Frame: Near term

Energy

Background

New York State is the fourth largest energy user in the U.S., but only 13% of the total primary energy requirements are met from in-State resources, which include hydroelectric power, crude oil and natural gas production, and biofuels derived from wood, wastes, and agricultural products. There are no

petroleum refineries in New York, thus consumers rely on external sources for 100% of refined petroleum fuel products. New York State Energy Research and Development Authority (NYSERDA) forecasting for the 2000 - 2021 period predicts that New York's aggregate demand for petroleum products will rise moderately, with increases in the use of motor gasoline (22.4%) and decreases in residential heating oil (28.9%); demand for natural gas will increase 37.9% (including a 61.0% increase in demand for natural gas for electric power generation); and total electricity use will grow 22.9%.

Challenges

As New York's energy demands increase, its existing generation facilities are aging, necessitating the siting of new facilities. Many types of existing and proposed energy facilities (power generation facilities, petroleum and liquified natural gas storage and pipeline facilities, electric distribution systems, renewable or alternative energy technologies), affect land and water use and natural resources in New York's ocean and coastal areas, often requiring a complex and lengthy array of local, state and federal approvals.

Opportunities

New York is well-poised to be a leader in alternative energy production in large part due to its vast ocean resources and the potential to site significant energy generation facilities there. Wind farms have already been constructed around the State, and new proposals for wind energy facilities, tidal turbines, solar power generation and other renewable energy projects are being encouraged. New York's Renewable Energy Task Force aims to reduce electric energy demand 15% by 2015, and have alternative clean renewable sources provide 25% of the State's electrical power by 2013. While the impact of all types of energy facilities must be considered when siting, increased attention should be paid to the reduction in pollutant emissions that is achieved by choosing alternative energy options. Analysis of these avoided impacts and the existing barriers to alternative energy development, identification of shared criteria for use in the review of energy project siting proposals, and establishment of an improved information sharing and inter-agency review process are the key elements needed to support a comprehensive, progressive, ecosystem-based energy plan. This type of comprehensive planning is inextricably linked with efforts to increase biological monitoring and the collection and dissemination of baseline data for ocean and coastal ecosystems. The State is also working to expand the number of conservation-based programs to reduce energy needs and improve efficiency, as well as programs that will reduce the need for imported gas and oil and replace them with renewable sources.

Recommendations

Recommendation 32: Integrate EBM principles with energy planning. The principles of EBM need to be fully integrated with the State's efforts to plan for the future energy needs of New Yorkers, encourage renewable energy generation, and advance comprehensive energy conservation.

Lead Agencies: NYSERDA; DEC; DOS; OGS
Time Frame: Near term

Recommendation 33: Take a proactive approach on the siting of energy facilities and related infrastructure. New York should use Ocean Spatial Planning and Management to take a proactive approach on the siting of energy facilities, energy transmission corridors, and the development of alternative energy sources, including tidal, wave, current, wind and solar. A proactive approach should include developing comprehensive criteria for energy generation and transmission corridor siting in the ocean that covers, but is not limited to, impacts on ocean habitats and biota; visual aesthetics; navigation;

recreation; local and regional economies; and historic, cultural and archeological resources; and determining the most suitable areas for alternative energy generation; keeping such areas under State control, and putting those areas out to bid for alternative energy development; evaluating the significance of energy generation from tides and currents in terms of energy delivered versus space and user conflicts; and evaluating the overall costs and benefits of alternative energy generation, including the potential harm to marine life.

Lead Agencies: NYSERDA; DEC; DOS; OGS; OPRHP; DOT
Time Frame: Near term

Recommendation 34: Establish siting data for wind turbines that is integrated with Ocean Spatial Planning and Management. Critical baseline data relative to the siting of wind turbine facilities need to be established and integrated with the proposed State comprehensive Ocean Spatial Planning and Management initiative. This effort should include the development of comprehensive wind maps for New York's coastal ocean; an inventory of port facilities and available infrastructure that could potentially support the construction of turbine components and serve as a staging area for the construction of wind turbine farms; the identification and 3-D modeling of offshore bird migration corridors; and the mapping of utility transmission corridors.

Lead Agencies: NYSERDA; DEC; DOS; OGS
Time Frame: Near term

Recommendation 35: Create interagency collaboration in energy facility siting process. Create a formalized framework for interagency input and dialogue during the siting/permitting process for energy facilities and related activities. This effort should be coupled with improving access to information and relevant studies during analysis of energy projects.

Lead Agencies: NYSERDA; DEC; DOS; OGS
Time Frame: Near term

Recommendation 36: Establish policy guidelines relating to energy extraction. While New York maintains a moratorium on gas and oil drilling in the area of the Outer Continental Shelf within the State's jurisdiction, the State should establish clear policy guidelines regarding the extraction of energy from the State's offshore economic zone and the federal leasing of offshore tracts on the Outer Continental Shelf for oil and gas exploration.

Lead Agencies: NYSERDA; DEC; DOS; OGS
Time Frame: Near term

Navigation and Transportation

Background

The Port of New York, encompassing seven cargo terminals in the metropolitan New York/New Jersey region, is the largest port complex on the east coast of North America and the third largest port in the United States. The Port is the nation's largest handler of petroleum products and its third largest container port. In 2007, a record 5.3 million twenty-foot equivalent units were processed; loaded containerized cargo volume rose 7.6%, and the value of cargo increased 11%, exceeding \$166 billion. The Port

generates more than \$18 billion in international and domestic economic activity annually and more than \$2.2 billion in State and local taxes. At New York, the Hudson River provides the link from the Atlantic Ocean to the 524 mile NYS Canal System, allowing commercial traffic to proceed through to the Great Lakes, Finger Lakes, Lake Champlain and the St. Lawrence River.

Challenges

This commercial activity can occur only if navigation channels and berthing areas remain accessible through regular dredging to remove accumulated sediments. The Port encompasses approximately two dozen separately authorized and maintained federal navigation channels, the depths of which vary from 8 to 50 feet, generating 2 to 4 million cubic yards of sediment annually from maintenance dredging. Past and present pollution, however, have impacted dredged material management for many of these channels. The tidal Hudson River is a year-round navigable waterway, with channel depths of 32 to 34 feet from New York City north to the turning basin at Albany; decreasing to 27 feet to the Federal Dam at Troy. Depths of many former working harbors and marinas have become shallower, rendering them less accessible for maritime transportation and commerce. Sediment contamination resulting from former industrial uses on these working waterfronts, the high cost of contaminant testing, and the difficulty of disposing of even mildly contaminated sediments, however, influences decisions about dredging and removal activities in support of local redevelopment and revitalization efforts based on new, water-dependent uses, including those associated with growing recreation and tourism economies. Increasing public access to water-dependent recreation is a high priority for New York, and solutions must be found to regulatory and other barriers that inhibit the establishment of appropriate new marinas, launches and docking infrastructure.

In many areas, navigation and transportation are increasingly threatened by conversion of working waterfronts to other land uses, as maritime industrial infrastructure deteriorates and the value of waterfront property rises. Critically important to shipping and transportation is the availability of maritime facilities and support services, including pier infrastructure, moorings, dry docks, and tug and barge services. Privately owned pier infrastructure in the Port amounts to 35,000 linear feet of berthing, about half of which is considered to be in "good" condition. Thirty-five percent of this infrastructure is in "fair" condition, and 13% needs repair; the estimated cost of upgrade to "good" condition ranges from \$50.5 to \$101 million. There is currently a shortage of dry-dock facilities in the Port of New York, with a potential revenue loss of \$50-\$150 million, as well as an erosion of the maritime industry's support base and the Port's standing and reputation.

Opportunities

As one of the biggest ports in the United States, the Port of New York enjoys the enviable position of being a world class example of a "Green Port". But its existing working waterfronts, and the maritime support services they house, must be protected, maintained and revitalized if we are to preserve New York's maritime economy and culture and be a world leader. Navigation and transportation stakeholders must, in turn, play a role in achieving New York's air and water quality goals. Waterborne transportation, shipping and their associated infrastructure, however, are not environmentally benign. Vessels need to exchange ballast water, potentially affecting water quality and introducing invasive species. These vessels and their service facilities also generate waste and air emissions. The volume of commercial trucking associated with port services and transporting goods to their final destination aggravates traffic congestion, and long idling times contribute to poor local air quality and noise concerns. As noted, maintenance of navigation channels and berthing areas can mobilize contaminants and sediment. To effectively balance the economic benefits generated by New York's shipping and transportation sectors, with the need to protect and improve ecosystem quality, better planning and agency coordination are

needed. The standards for operating "Green Ports" must be developed and implemented through appropriate agreements or regulations.

Recommendations

Recommendation 37: Develop statewide strategy for dredged material management and regional sediment and dredged material management plans. As part of New York's Ocean Spatial Planning and Management initiative and in an effort to keep New York's ports, harbors, and water-dependent businesses and recreational facilities viable, a statewide strategy for dredged material management, including regional sediment and dredged material management plans, needs to be developed. Based on EBM principles, these plans need to establish ways to coordinate efforts of the diverse agencies with jurisdictions related to dredging, develop improvements in permitting to streamline the process, encourage the public/private partnerships necessary to establish economically-viable dredged material processing facilities for the beneficial re-use of dredged material, and develop standards, criteria, and guidelines for its beneficial re-use, including beach and marsh nourishment and restoration, and guidelines for upland disposal of dredged materials in instances where there are no other options.

Lead Agencies: DEC; DOS; OGS; DOT
Time Frame: Near term

Recommendation 38: Map and integrate critical navigation zones with the Ocean Spatial Planning and Management initiative. Navigation corridors, associated buffer areas, lightering zones, and areas to be avoided need to be mapped and integrated with New York's Ocean Spatial Planning and Management initiative. This effort should also anticipate the expansion of these navigation areas and associated servicing needs; the identification and designation of areas where exchange of ballast waters would be permitted but regulated; and the mapping of areas of historical dredged spoil disposal.

Lead Agencies: DEC; DOS; OGS; DOT
Time Frame: Near term

Recommendation 39: Require ports to develop comprehensive plans to reduce emissions. In an effort to create 'green harbors' in New York's ocean district, ports should develop comprehensive action plans that establish goals to reduce emissions, solid and sanitary wastes from their facilities and associated activities.

Lead Agencies: DEC; DOS; OGS; DOT
Time Frame: Near term

Recommendation 40: Prepare harbor management plans to address surface water use conflicts. Harbor management plans need to be developed for all ports and harbors in an effort to achieve a balance among the diverse commercial and recreational uses of harbors and environmental protection goals.

Lead Agencies: DOS; DEC; OGS; DOT
Time Frame: Near term

Climate Change

Background

The Northeast Climate Impacts Assessment team predicts that, if the current pattern of high emissions of greenhouse gases continues, by 2100 New York summers will feel like those currently experienced in Georgia and South Carolina; even if emissions are immediately lowered, New York summers are predicted to become like those currently experienced in western Virginia. Rising sea level, associated with global warming, is expected to increase the frequency and severity of damaging storm surges and permanently inundate low-lying coastal areas in New York State.

Challenges

These changes will pose challenges for State and local governments in maintaining critical infrastructure and preserving ecological, economic, and public health, as coastal communities adapt to increased flooding, shoreline migration, extreme heat, increased rainfall, reduced air quality, and outbreaks of vector-borne diseases. The impacts of climate change and sea level rise are likely to affect many sectors of New York's government and economy by disrupting or compromising transportation systems, water supplies, waste treatment facilities, and shoreline infrastructure. Shifts in the biogeochemical attributes of New York's coastal ecosystems, along with a redistribution of species and habitats, will impact agriculture, commercial and recreational fishing, and tourism. The DEC Office of Climate Change, the Division of Coastal Resources, NYSERDA and the Sea Level Rise Task Force have already begun to address these challenges.

Opportunities

The DEC, DOS, and NYSERDA already have existing planning and management tools in place that are guiding New York's agencies and communities in adapting to climate change. In order to successfully meet the challenges of climate change, all levels of government need to participate in long-range planning that includes analysis of impact scenarios and the development of adaptation alternatives. Existing efforts such as Local Waterfront Revitalization Programs, the Hudson River Estuary Action Plan, regional coastal management programs, comprehensive conservation and management plans, and local watershed plans are important springboards for this effort. Integration of more sectors and issues - including agriculture, public health, energy, and transportation - will increase the utility of these and other such tools and advance New York's EBM directive. These efforts will rely on baseline monitoring and data collection that cover broad, multi-jurisdictional geographic areas. Also, emphasizing both the protection and restoration of natural shorelines and wetlands now will assist over the long term in minimizing the impacts of sea level rise, and will help protect human populations and landward coastal infrastructure.

Recommendations

Recommendation 41: Develop climate change impact scenarios. Continue the development of climate change and sea level rise impact scenarios and, for each scenario, devise strategies that broadly address the multiple alternatives involved in adapting to sea level rise, including managed retreat. Such strategies will need to establish new policies for post-storm redevelopment, the threats to agriculture, plant communities, private infrastructure, existing public infrastructure and the siting of future infrastructure, site-level project planning, wetland conservation, migration and restoration, shoreline building setbacks, building elevations, and guidelines for and alternatives to shoreline hardening, including incorporating artificial habitats within hardening projects. An important element of this will be the development of a pilot study that explores the feasibility of various adaptation and defense alternatives.

Lead Agencies: NYSERDA; DOS; DEC; OGS; SUNY

Time Frame: Near term

Recommendation 42: Participate in developing recommendations of the NYS Sea Level Rise Task Force. Appropriate Council members should be active participants in shaping the recommendations of the NYS Sea Level Task Force to ensure they relate to ecosystem-based management objectives.

Lead Agencies: DEC; DOS; NYSERDA; OGS; SUNY
Time Frame: Near term

Recommendation 43: Monitor trends in ocean and estuary conditions. A critical component of New York's automated Ocean and Coastal Observing System will be to monitor trends in sea level, temperature, salinity, ocean acidity, and currents in the State's ocean and estuaries, in an effort to determine how climate-driven changes in marine and estuarine systems will cause shifts in fish populations, marine habitats, and the spread of invasive plant and animal species and pathogens. Monitoring will be critical to determine the impacts of these shifts on State and regional economies, infrastructure, businesses, and recreation. This should include the establishment of sentinel coastal monitoring stations for climate change, done in conjunction with the ocean observing system.

Lead Agencies: DEC; DOS; NYSERDA; OGS; SUNY
Time Frame: Near term

Recommendation 44: Study the potential need for desalination for municipal water supplies. Recognizing that saltwater intrusion threatens some municipal water supplies on Long Island and in the Hudson River Valley, the potential need for desalination should be studied in order to meet the demand for drinking water, along with the anticipated impacts of desalination on estuarine species and land use practices.

Lead Agencies: DEC; DOH; DOS; NYSERDA; OGS; SUNY
Time Frame: Near term

Education and Outreach

Background

New York hosts a wealth of programs, organizations and institutions with a focus on ocean and coastal ecosystems, including three National Estuary Programs (New York/New Jersey Harbor, Long Island Sound, and Peconic Estuary), the South Shore Estuary Reserve, the NYS Hudson River Estuary Program, the Hudson River National Estuarine Research Reserve, and the Coastal Management Program. Nonprofit partners such as the Natural Resources Defense Council, Hudson River Foundation, Regional Plan Association, Metropolitan Waterfront Alliance, and Scenic Hudson, conduct resource and program assessments, planning, community outreach, and stewardship activities, while educational institutions such as the Marine Sciences Research Center at SUNY Stony Brook, Stevens Institute of Technology, Columbia University and Rensselaer Polytechnic Institute conduct research and monitoring and work to develop new methods and technologies for information sharing and management.

Challenges

These working partners can only achieve so much absent participation and commitment by the public-at-large to long-term ocean stewardship. The general public, however, often lacks the kind of place-based knowledge and environmental literacy necessary to create and sustain stewardship. Archaic and uncoordinated information delivery mechanisms, and rigid, sector-focused learning systems, are often cause for low public awareness of the interplay of ocean issues and ocean resources.

Opportunities

Public awareness of New York as an ocean state has grown dramatically as a result of diverse education programs offered through the public and private sectors, and new programs geared toward expanding ocean stewardship and place-based knowledge continue to emerge through public/private partnerships. At the New York Harbor School, a small public high school, students study the maritime culture, history, and environment of New York City along with its surrounding waters. River Summer is an interdisciplinary and multi-institutional summer field course exploring the Hudson River watershed that is organized by the Environmental Consortium of Hudson Valley Colleges and Universities. Expanding the coverage and increasing participation in these and other new education and stewardship programs is a logical next step and will be critical for sustaining and improving ocean ecosystems management across generations. Using new and emerging media to improve information delivery and public participation will also increase awareness of the links between ocean ecosystems and the many public, economic and cultural benefits they support.

Expanding public access to the shoreline and to water-dependent recreational opportunities must be part of any stewardship-building strategy. Direct access to and use of ocean resources can be a more powerful learning tool than any curriculum. New York is currently actively engaged in providing new and/or improving public water-dependent recreation, including marinas, launch and dock sites, fishing and swimming areas, and waterfront pedestrian and bike paths. Continuing this work will be essential in sustaining New York's future ocean management.

Recommendations

Recommendation 45: Issue a periodic report card on the status of New York's ocean and estuaries.

A report card, targeted toward the general public, should be issued on a periodic basis and describe the status of New York's ocean and estuaries and their ability to provide critical ecosystem services for the human community. The report card should include nutritional guidelines and updated fish consumption health advisories. Existing report cards, such as the ones issued by the Long Island Sound Program and the Hudson Estuary Program, can form the basis of continued reporting for these waterbodies.

Lead Agency:	Council
Time Frame:	Near term

Recommendation 46: Initiate an ocean literacy campaign. A formal public awareness, information and education campaign should be launched that expands overall ocean and estuary literacy, environmental stewardship, and place-based knowledge among New York residents. This program should identify and use core concepts to promote public awareness that New York is an 'ocean state', and to inform related interpretive and educational efforts of nonprofit organizations like the NYS Marine Education Association and State agencies. The effort should include expanding the marine component of 'I Fish NY' by increasing the number of and participation in public saltwater fishing clinics (which range

from children's events to crab fishing and adult surf casting), and in-school and on-board programs on food web interactions, and fish form and function adaptations, for students.

Lead Agencies: OPRHP; DEC; DOS
Time Frame: Near term

Recommendation 47: Expand environmental education programming on State-owned lands.

Establish mechanisms to take advantage of the large number of visitors at lands administered by the Office of Parks, Recreation and Historic Preservation and by the Department of Environmental Conservation. These should include the creation of informational kiosks promoting EBM principles and public awareness of New York as an ocean state; the installation of wayside interpretive signs and exhibits that focus on the natural history of the ocean environment, the impacts people have on the ocean, and what they can do to protect it; and the enhancement of exhibits at the Theodore Roosevelt Nature Center at Jones Beach, and at other State Park environmental centers, to focus on the ocean environment and related issues.

Lead Agencies: OPRHP; DEC
Time Frame: Near term

Recommendation 48: Develop and implement training of agency professional staff and stakeholders in EBM principles and tools. Training programs should be developed and offered to both professional staff in State agencies and local stakeholders that will allow them to view their roles and responsibilities in the context of ecological relationships to New York's ocean and estuarine resources and associated uses, and to integrate EBM principles into their work.

Lead Agencies: DOS; DEC; SUNY
Time Frame: Near term

Governance Structure

Background

The diversity of missions among the nine members of the New York Ocean and Great Lakes Ecosystem Conservation Council highlights the potential for both conflict and redundancy in New York's existing oceans governance structure. Ocean issues involve these nine New York State entities, as well as local governments and regional organizations (such as the Atlantic States Marine Fisheries Commission, Mid-Atlantic Fishery Management Council, and New York's three National Estuary Programs, one National Estuarine Research Reserve, and two State estuary programs), and federal agencies including the National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and Environmental Protection Agency.

Challenges

This multi-layered governance structure can generate conflict among different jurisdictions and stakeholder interests, and cooperative management decisions are often undermined by individual actions at the State or local levels. There is also significant potential for redundancy, with separate programs developing similar tools, projects, and data sets aimed at solving the same problems.

Opportunities

Formation of the Council has been a critical first step toward integration of EBM principles with existing agency efforts. Full integration of EBM principles into existing agency efforts and programs will require comprehensive review of the many activities affecting oceans, both within and outside of New York State, and the creation of new, progressive models of ocean governance.

Recommendations

Recommendation 49: Formalize Ocean Working Group. The future role of the Ocean Working Group should be formalized as the primary vehicle for coordinating the implementation of the ocean-based recommendations of the Council and assuring the comprehensive integration of EBM principles into the activities of New York State agencies. The working group's actions would be diverse, and include but not be limited to a review of the mission and programs of the Council's agencies, identifying potential conflicts as well as areas of collaboration; and overseeing the alignment of current State government efforts to address ocean issues. The working group will also be critical in a comprehensive review of potential changes to current wetlands laws, regulations and policies to address loopholes in existing laws and regulations, improve policies regarding habitat restoration, improve coordination between federal, State and local levels. The Ocean Working Group should be expanded to include the Port Authority of New York/New Jersey; estuary program managers; the chairs of the stakeholder and science advisory committees; and NYS Education Department.

Lead Agency	Council
Time Frame:	Near term

Recommendation 50: Establish a regional ecosystem-based management approach for the ocean ecosystem, including the marine, coastal and upland watersheds. An organizational framework should be established which would develop an action plan for the ocean on an integrated ecosystem-based approach, including ocean waters under New York's jurisdiction. This should be developed jointly by stakeholders and NYS agencies, in conjunction with the managers of existing estuary programs. The action plan should include long-range goals and short-range targets that would be incorporated into agency work plans, budget processes, and performance measures. This effort should include the conducting of outreach workshops that include federal, state, and municipal officials, public advocacy and not-for-profit groups, scientists, industry, and estuary program to formulate the action agenda and establish priorities.

Lead Agency	Council
Time Frame:	Near term

Recommendation 51: Coordinate Estuary Programs. The Hudson River Estuary Program, the NY/NJ Harbor Estuary Program, the Long Island Sound Study, the Peconic Estuary Program, and the South Shore Estuary Reserve should coordinate their efforts to integrate EBM into estuary management; strengthen estuarine science and the dissemination of information; coordinate goals, priorities, and responses to regional issues; standardize research and monitoring methodologies; and leverage funding.

Lead Agencies:	DEC; DOS; US EPA
Time Frame:	Near term

Recommendation 52: Convene the leaders of Mid-Atlantic and New England states to address regional governance of the ocean. Leaders from the states of North Carolina, Virginia, Maryland,

Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, and Massachusetts need to establish a mechanism by which these states can develop a common vision for regional governance of the Mid-Atlantic Ocean from Chesapeake Bay to Cape Cod that will allow participating states to coordinate and carry out large scale, regional coastal and ocean initiatives.

Lead Agency: Council
Time Frame: Near term

Recommendation 53: Establish a permanent ocean fund. Establish a permanent ocean fund that will allow the State to improve fishery research, data collection, management, enforcement, habitat restoration, and transitional buyback and community development programs, and that will support the transition to a sustainable marine fishery.

Lead Agency: Council
Time Frame: Near term

Recommendation 54: Establish an ocean grant program. The establishment of an ocean grant program will facilitate the implementation of the Council’s recommendations by municipalities, counties, and educational institutions. This effort should include examination of existing agency grants programs for ways they may be made more applicable to ocean issues.

Lead Agency: Council
Time Frame: Near term

New York Ocean and Great Lakes Ecosystem Conservation Council

The New York State Legislature, in passing the New York Ocean and Great Lakes Ecosystem Conservation Act (Article 14 of the State's Environmental Conservation Law), established the New York Ocean and Great Lakes Ecosystem Conservation Council. Eight of the State's governmental agencies plus its major public institution of higher learning constitute the nine member parties to the Council. A core principle of ecosystem-based management is to affect a transition within the regulatory environment that fosters interagency collaboration and compromise, results in a decision-making process based on an holistic understanding of ecosystems, balances competing uses, and remains adaptive and responsive to change over the long term. EBM has been evolving within New York State agencies and is a driving philosophy behind such entities as DEC’s Hudson River Estuary Program, the South Shore Estuary Reserve of DOS, State Park’s Environmental Management Bureau, DAM’s Agricultural Environmental Management, and Green Leadership In Transportation and Environmental Sustainability at the Department of Transport.

The following paragraphs briefly summarize the various functions and goals of each agency in order to set the appropriate context for the recommendations contained in this report.

NYS Department of Agriculture and Markets

The mission of the Department of Agriculture and Markets (DAM) is to foster a competitive New York State food and agriculture industry to benefit producers and consumers.

The goals of the Department are to encourage economic development in the State's agricultural and food industry; assure consumer safety and protection with respect to food, milk, and other commodities sold in the State; and encourage the appropriate use of agricultural resources to protect the environment and preserve productive agricultural land.

Agriculture and food production are an important economic strength in New York. The State is a leader in dairy production and apple growing, and its climate and soils produce high quality fruit and wine grape crops. New York is among the top producers in the United States for numerous agricultural commodities.

NYS Department of Environmental Conservation

The New York State Department of Environmental Conservation (DEC) administers numerous programs authorized and governed by the State's Environmental Conservation Law and certain federal laws with the overarching goal of "*conserving, improving, and protecting New York State's natural resources and environment.*" Operating from headquarters in Albany and nine regional offices, more than 3,500 DEC staff pursue programmatic and permitting activities to protect and enhance New York State's environmental quality and wealth of natural resources.

The DEC is responsible for the management of living marine resources and their habitats within the marine and coastal district of New York State. The Division of Water carries out numerous programs to improve and maintain water quality in the ocean and Great Lakes ecosystems. The Division of Lands and Forests plays a key role in conserving the forested landscape and protecting shoreline properties through acquisition. The Division of Bureau of Marine Resources is divided into three major program areas which deal with finfish and crustaceans, shellfish, and marine habitat protection.

Finfish and Crustaceans

This program monitors and develops management recommendations for the principal finfish and crustacean species of the State. Because nearly all these species migrate through the Atlantic Ocean waters of several states, data collection and management responsibility is shared among the Atlantic coast states and between the states' and federal governments. The DEC works with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council in accomplishing this cooperative management.

DEC staff sample fish populations through a series of seine surveys and trawl surveys in the western bays, the southern shores of Long Island, and Peconic bays. In addition, a series of surveys of recreational and commercial fisheries is undertaken to collect data for species management. The program has ongoing projects which deal with public access to the marine waters and the development of artificial reefs.

Shellfisheries

The agency's work with shellfish is comprised of two program units: shellfish resource management and shellfish sanitation. The resource management unit is responsible for the maintenance of the State's bivalve mollusk resource. Management plans are developed and implemented for the harvest of specific shellfish species. This program also oversees the shellfish transplant program and mariculture.

The sanitation program exercises sanitary control of the harvest, handling and processing of shellfish to provide adequate public health protection for the shellfish consumer. Water quality monitoring is conducted in the State's shellfish growing areas. Areas with unacceptable bacteria levels are closed to shellfish harvesting. Shellfish inspectors regularly inspect shellfish processing and wholesale shellfish dealers' facilities to ensure that they are in compliance with federal and state requirements.

Marine Habitat Protection

Marine Habitat Protection administers New York's Tidal Wetland Act, which involves the review of proposed activities that may impact tidal wetlands, including construction of buildings, dredging, and filling activities. It also administers New York's Protection of Waters and federal Clean Water Act Section 401 Water Quality Certification permit programs, which typically involve dredging and filling activities (including dredged material disposal) within the wetlands and marine waters of the state. Marine Habitat Protection also provides technical assistance to other regulatory programs like the Oil Spill Unit and Solid and Hazardous Materials to help prevent and correct adverse impacts on the marine environment.

NYS Department of State

The New York State Department of State (DOS), as successor agency to the former State planning agencies, has a principal responsibility within State government for addressing general issues regarding the location and management of land and water uses and development. This responsibility is exercised both directly through programs such as the Coastal Management Program, the Smart Growth Initiative, and the Appalachian Regional Commission, and indirectly through its responsibility to assist and guide local governments in the exercise of their responsibility to manage land and water use and development.

The Department's Division of Coastal Resources (DCR) is responsible for administration of the State's Coastal Management Program and oversight of the State's Coastal Policies. These were established under the authority of the State's Waterfront Revitalization and Coastal Resources Act of 1982 (Article 42, Section 913 of New York State Executive Law).

The Division of Coastal Resources also works with local governments and communities to advance the public's beneficial use and enjoyment of its waterfronts and waterways while seeking to balance appropriate use with the protection of valuable, and often highly sensitive, coastal environments. The Division coordinates the development and approval of Local Waterfront Revitalization Programs, providing communities with a critical tool to define a local vision for their waterfront. In addition, DCR offers technical and financial assistance for plans and projects that serve to expand public access, reinvigorate urban waterfronts, redevelop brownfields, restore habitats, and strengthen local economies.

DCR continues to expand collaborative relationships through numerous statewide and regional initiatives designed to maintain and improve quality of life within and beyond the coastal area.

NYS Department of Transportation

The New York State Department of Transportation (DOT) is charged with developing and coordinating comprehensive transportation policy for the State. DOT works to ensure that those who live, work, or travel in New York State can take advantage of a safe, efficient, balanced, and environmentally sound

transportation system.

DOT facilitates the development and operation of transportation infrastructure and associated services for highways, railroads, mass transit systems, ports, waterways and aviation facilities. The Department develops and updates long-range, comprehensive statewide master plans for balanced development of public and private commuter and general transportation facilities. In addition, DOT administers a public safety program for railroads and motor carriers engaged in intrastate commerce, directs state regulation of such carriers in matters of rates and service, and provides oversight for safe operation of bus lines, commuter railroads, and subway systems.

DOT is making a greater effort to control debris at its sources in recognition of the fact that floating debris can cause significant negative impacts marine and estuarine ecosystems. The agency has been installing solid/water separators, often called vortex separators or swirl concentrators, on many new projects. On Long Island, for example, these devices prevent floatables, cups, and bottles from reaching Great South Bay or other estuaries. DOT's Long Island Region also conducts spring and fall litter sweeps. These week-long efforts are conducted by teams including DOT, local public works agencies and community offender programs. Additionally, DOT is addressing the environmental impacts of snow and ice control and the agency's responsibility to ensure safe winter travel.

Empire State Development Corporation

The Empire State Development Corporation (ESD) is New York State's lead economic development agency. The agency, co-headquartered in Albany, Buffalo and New York City, is supported by a network of 18 satellite offices throughout New York State and around the world. ESD is comprised of dedicated professional staff who strive to provide businesses with the highest level of assistance and service in order to encourage continued economic investment and prosperity in New York State.

During the past ten years, progressive economic development strategies, coupled with bold financial and tax incentives, have resulted in a new era of business growth for the Empire State. ESD works closely with businesses to build or relocate new facilities, expand their operations and workforce, and enter new markets and international arenas. ESD also offers a wide selection of financial assistance, investing hundreds of millions of dollars in private and public economic development projects statewide to help revitalize neighborhoods, create and retain jobs, and attract hundreds of thousands of visitors.

NYS Energy Research and Development Authority

The New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 under Article 8, Title 9 of the State Public Authorities Law. NYSERDA works to develop energy-efficiency programs, conducts energy and environmental research and development, and provides technical and planning assistance to all sectors to guide decision-making and implement energy efficiency programs.

NYSERDA also manages the Western New York Nuclear Service Center at West Valley; coordinates the State's activities involving nuclear energy, including the regulation of radioactive materials and the

monitoring of low-level radioactive waste generation and management; and finances projects aimed at energy savings and cost reduction for ratepayers.

NYSERDA's Environmental Monitoring, Evaluation, and Protection (EMEP) program aims to increase the understanding and awareness of the environmental impacts of energy choices and emerging energy options, and to provide a scientific, technical foundation for formulating effective, equitable, energy-related environmental policies and resource-management practices. The EMEP program focuses on critical information needs and research gaps surrounding electricity-related environmental issues relevant to New York.

NYS Office of General Services

The New York State Office of General Services (OGS) provides a broad range of support services, pursuant to Article 2 Section 3 and Article 6 Section 75 of the Public Lands Law, that facilitate the operations of State government and assist local governments, public authorities, and public and private agencies. The OGS Bureau of Land Management in the Real Estate Division is responsible for issuing licenses and permits for use of state-owned lands, including underwater lands. The Bureau is comprised of three units: the Submerged Lands and Natural Resources Unit, the Survey and Mapping Unit, and the Appraisal, Inspection and Marketing Unit.

The Submerged Lands Act of 1953 granted to the State broad authority over natural resources within its jurisdiction, including oil, gas, minerals, and aquatic animal and plant life. Other items considered under the Act include artificial reefs, dredge disposal and borrow pits, and power cables. Structures such as wind generators, gas lines, and tidal turbines may become issues in the near future. OGS conducts coordinated review of all proposed uses of underwater lands with other state agencies including DOS, DEC, and OPRHP.

NYS Office of Parks, Recreation and Historic Preservation

The Office of Parks, Recreation, and Historic Preservation (OPRHP) works to provide safe and enjoyable recreational and interpretive opportunities for New York State residents and visitors, and encourages responsible stewardship of the State's natural, historic, and cultural resources. The OPRHP, authorized under the Parks, Recreation, and Historic Preservation Law (PRHPL), provides guidance for planning, development, operation, organization, and other matters as they relate to the State parks.

Stewardship is fundamental to OPRHP activities, as outlined in the PRHPL (Article 3.01, Declaration of Policy) which states that "stewardship of the natural, ecological, historic, cultural, and recreational resources within the state park, recreation, and historic site system is a primary responsibility of the state." OPRHP offers financial assistance for the planning, development, and maintenance of existing parks and recreational facilities; historic preservation of properties listed on the National or State Registers of Historic Places; preservation and restoration of eligible lands, water, or structures within a New York State Designated Heritage Area; and for the acquisition of permanent easements or fee title to lands, waters or structures designated for public recreational enjoyment and/or for conservation or preservation. OPRHP coordinates with other state agencies, local governments, and private land owners to preserve, restore, and enhance natural resources and the overall experience for park visitors.

SUNY School of Marine and Atmospheric Sciences

The School of Marine and Atmospheric Sciences (SoMAS) at the Marine Sciences Research Center of the State University of New York at Stony Brook is its center for oceanographic and atmospheric research, education, and public service. The primary focus of SoMAS is on research designed to increase understanding of the processes that characterize the coastal ocean and atmosphere, and applying research to solve problems resulting from society's uses and misuses of the environment.

SoMAS employs an interdisciplinary approach toward understanding these complex systems, integrating atmospheric science, marine biology, and chemical, biological, geological and physical oceanography to address the following topical areas: conservation and management of marine resources; environmental modeling and prediction; patterns and impacts of climate change; environmental health and contaminants; and biogeochemical transformation of energy and elements.

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