Description of the Basin

The Atlantic Ocean Basin covers an area of about 914 square miles of New York's statutory ocean territory. The basin only includes the marine portions of the coastal waters; other tidal and estuarine waters of the state are included in the Lower Hudson-Long Island Bays Basin and Upper Hudson Basin sections of the CWCS. These three watersheds are inextricably linked and conservation actions conducted in each should be well coordinated. The Atlantic Ocean Basin is primarily covered by water, but includes the ocean front beaches along Long Island's south shore up to the dune line. A map of the basin boundaries is shown in Atlantic Ocean Figure 1.

The terrestrial areas that form the basin's northern boundary include headland beaches located between Montauk Point and Southampton, and barrier beaches from Southampton to Rockaway Point. The beach-ocean interface provides important habitat for birds, horseshoe crabs, and many other invertebrate species. A significant portion of the Atlantic beachfront in New York is in public ownership, a list of these properties is shown in Atlantic Ocean Table 1.

The New York portions of the western Atlantic Ocean include part of the area of the North American continental shelf called the New York Bight. This triangular area of coastal ocean is an important habitat for hundreds of marine species up and down the eastern seaboard. New York's territorial waters are located within and extend out to three nautical miles from the shoreline of Long Island. The boundary is adjacent to the state boundaries of New Jersey, Massachusetts, and Rhode Island, and borders the federal waters of the United States.

The Atlantic waters of New York range in temperature throughout the year from 37°F to 77°F and averages 57°F. This section of the ocean forms a temperate boundary between the boreal waters of New England to the north and the semi-tropical waters of the mid-Atlantic. It is influenced by the warm Gulf Stream current which flows northward along the Eastern Seaboard into the New York Bight and is deflected eastward by the landmass of Long Island. The ocean salinity within the three miles off Long Island is generally 32 parts per thousand, though it may be lower in areas near inlets or estuaries along the south shore of Long Island or during heavy rains or periods of high discharge from the land.

All marine waters of the state are subject to semi-diurnal tides that move animals and nutrients horizontally in the water column. There are also longshore currents that flow parallel to the shoreline of Long Island from east to west. Longshore currents are the main transport of sand from the headlands of Montauk to the barrier beaches to the west. Sediments in the basin and along its shoreline can move dramatically in response to storm events.

The waters in the basin are up to 20 meters deep and cover a gently sloping sand bottom with rare rocky outcrops. The New York Bight is home to more than 60 marine fish species, though there are few endemic fish species in the Bight. The majority of fish species are seasonal migrants that use the area for reproduction or growth. The large area of the relatively shallow continental shelf and the number of adjacent high-quality estuary systems contribute to the Atlantic Ocean Basin's biological diversity.

DEC has created artificial reefs in the basin to enhance fish habitat on the sandy bottom. Reef sites are found from 2 to 3.3 miles offshore of Rockaway Beach, Atlantic Beach, Long Beach, Jones Beach, Fire Island Lighthouse, Moriches Inlet, and Shinnecock Inlet. The reefs are constructed of a variety of materials including natural rock, concrete blocks, cleaned ship hulls, and armored personnel carriers. Summary information including the reefs, their coordinate locations and principle composition materials is in Atlantic Ocean Table 2. The reef material colonizes with algae, sponges, and other invertebrates quickly and attracts both forage and predatory fishes.

Fish move within the bight seasonally, generally moving inshore (shallower) and north during the summer months and offshore (deeper) and south in the winter seeking shelter from cold temperatures. Other marine species have seasonal migration routes that carry them along predictable paths into and out of New York's waters. In addition to their value as protein for human consumption, concentrations of schooling pelagic fish such as mackerel, butterfish, and squids are important to, and utilized by, an array of predatory fishes, including pelagic and demersal shark species, marine mammals, and piscivorous birds. The actual abundance and proportion of each species of waterfowl varies from year to year. The relative abundance and appearance of waterfowl in the basin is almost exclusively dependent on food source.

Anadromous fish, juvenile American eels, and migratory birds move through the basin to the apex of the New York Bight on their way inland in spring. These species move from the ocean up the Hudson River valley or into the marshes, bays, and streams of coastal New York and New Jersey. The physiographic characteristics of the New York Bight act as a funnel for migrating animals, directing them toward New York Harbor and the mouth of the Hudson River. The migratory birds make the reverse trip in the fall, while adult anadromous fish move back into the ocean soon after spawning. Catadromous juvenile American eels move upstream and may spend several years maturing in fresh water before making the reverse trip to the ocean as adults.

Sea turtles, some invertebrates, and marine mammals also follow seasonal migration routes into and out of the basin. Several species of seals are commonly seen resting on the rocky shores of Montauk and other areas on the south shore and lower New York Harbor in the winter months. Horseshoe crabs move to deep waters of the continental shelf to overwinter and return to coastal beaches and estuaries in the spring to spawn.

The Atlantic Ocean Basin is an economically important area of the state for commercial and recreational fishing, other beach recreation, and commercial shipping. Container ships move through the basin toward New York Harbor, and Port Newark and Port Elizabeth in New Jersey carrying cargo from around the world. Petroleum depots are located throughout the region; within New York Harbor, the Arthur Kill, Long Island Sound, and up the Hudson River. Tankers and barges carry crude oil, home heating oil, and gasoline from the waters of the Atlantic Ocean Basin to the inshore depots.

Shipping needs for the harbor dictated the creation of Ambrose Channel, a significant benthic feature in the basin. The channel was originally completed in

April of 1914 by dredging to a depth of 40 feet at mean low water. The 2,000 foot wide channel extended 38,000 feet from New York Harbor southeast into the apex of New York Bight (Sullivan, 1927). The seaward entrance to Ambrose Channel was marked by a lightship until a fixed light was placed at the channel entrance in the 1960s. Today, in response to increasing container ship drafts in the ports of New York and New Jersey, the US Army Corps of Engineers (ACOE) is deepening the Ambrose Channel to 53 feet at mean low water from the seaward end to the Verrazano Narrows Bridge.

Critical Habitats of the Basin and the Species That Use Them

There are a total of 86 Species of Greatest Conservation Need in the basin, representing 16% of the total SGCN statewide. The species include birds, Crustacea and Meristomata, sea turtles, marine mammals, mollusks, and marine fish. There are no SGCN that are known to have been extirpated from the basin. The full list of SGCN presently found in the basin and their status is shown in Atlantic Ocean Table 3. An analysis of diversity of SGCN in this basin relative to SGCN in the entire state is shown in Atlantic Ocean Table 5.

DEC staff members who compiled the SGCN information in the State Wildlife Grants database were asked to indicate habitats associated with critical life stages and activities for those species. During the analysis for each basin a listing of species occurring in the basin and the critical habitats associated with their life cycle at the system and subsystem level was extracted from the database. The resulting aquatic and terrestrial habitats are summarized in the tables below. The habitat classifications in the database were adapted from the New York Natural Heritage Program's *Ecological Communities of New York State*, Second Edition. In most cases the habitats were simplified from the many vegetative associations listed in the community classifications. In the case of the lacustrine and riverine systems, the subsystems were modified to reflect the classifications most often used by fisheries managers in the DEC, e.g. "cold water-shallow".

Each of these systems and subsystems are further refined into habitat categories in the SWG species database and can be viewed in the taxa reports appended to this strategy. The habitat categories are excluded here for the sake of simplicity, but were considered during the basin analysis. A complete listing of habitat types used in the preparation of the CWCS can be found in Appendix B. The System-Subsystem classes that are listed as critical to species in Atlantic Ocean Basin are listed in Atlantic Ocean Table 4. These critical habitats are not a comprehensive listing of all habitat associations found in the basin, rather they are a subset of habitats deemed critical to SGCN that occur in the basin. The major habitats and the SGCN that use them are discussed below.

The Marine-deep subtidal System-Subsystem is the most critical association to the largest number of SGCN in the basin. This association includes both pelagic and demersal species and several bottom types, though sand bottom is the most prevalent in the basin. These deepwater habitats are used by 66 species ranging in size from whales to marine zooplankton. There are also distinct vertical zones in this association. The surface waters of Marine-deep subtidal areas are highly productive and home to many species of marine zooplankton and the phytoplankton they feed on. Surface waters form an important migratory pathway for marine mammals, sea turtles, and pelagic fish. Wintering waterbirds form large "rafts" of individuals floating in the waters off Long Island during colder months. Greater scaup use the ocean extensively in late winter resting on open ocean waters when the bays are frozen. Northerly prevailing winds in the winter make the near ocean a calm place for waterfowl to form large rafts. Greater scaup will often come into the inlets to feed. The three species of scoters (black, white-winged, and surf) all use the near shore ocean basin as an important migration corridor as well as fall and winter feeding territory.

The Marine-deep subtidal association also has a benthic zone that is home to demersal fish like winter flounder, sharks, skates, rays, and marine crustacea. American lobsters and horseshoe crabs are found in this zone, especially in the winter months. Some fish species, like cunner and tautog use natural and man-made structure on the bottom for feeding and refuge. Many of these species eat both scavenged material and live prey found on and in the bottom sediments.

The Marine-shallow subtidal System-Subsystem association is critical habitat to 17 SGCN in the basin. The shallow subtidal zone is the area of the basin between the intertidal beach and open water up to 2 meters deep, and also has varying bottom types. This association corresponds to the statutory definition of Littoral Zone in the New York State Environmental Conservation Law. SGCN particular to this System-subsystem association include common, least, and roseate terns, small fish, and blue crabs. The terns use this zone for feeding on small fish like sand lance. Skates and rays use this zone to feed on mollusks found there. This is also the zone where mating horseshoe crabs pair up on their way to the beach in the spring. Harlequin ducks use the inlets predominately to search for mussels on rock structure.

Most of the beach area of the basin has been designated as important bird areas (IBA) by Audubon New York within 9 sites listed in Atlantic Ocean Table 6 (Audubon New York, 2004). The beach area between the dune line and the intertidal beaches on the oceanfront are breeding habitat for common tern, least tern, and plovers. There are several dry beach zones and types found in Terrestrial-coastal, Terrestrial-maritime, and Terrestrial-open upland System-subsystem associations. Collectively, these associations are critical habitat for 18 SGCN. The intertidal beach is resting and feeding habitat for transient shorebirds like red knot. They stop on Long Island during their spring migration to feed on the eggs of horseshoe crabs laid in intertidal burrows on the beach.

Overall Trends in the Basin

The basin has supported commercial shipping and fishing since the first settlements by European colonists in the 15th century. Fishing for cod and other groundfish is even thought to pre-date European settlement in New England. The major modifications to the basin have occurred through dredging in the nearshore area and conversion of the adjacent coastal areas through development, coastal manipulation and shoreline stabilization. These modifications constitute some of the most serious threats to the continuing viability of salt marshes, beaches and dunes and their dependent species. There are losses to salt marshes for unknown reasons that require further investigation. The basin has been used for dredged material disposal, including contaminated sediments from the harbors in the New York and New Jersey ports since the mid-1800s.

Historically, most of the material dredged from the port was disposed in and around an area called the New York Bight Dredged Material Disposal Site, commonly referred to as the Mud Dump Site, which was designated for dredged material disposal by the US Environmental Protection Agency (EPA). There were approximately 6 locations chosen to receive a wide range of refuse from the harbor and city, including municipal garbage, cellar dirt, floatable materials, and dredged materials. The materials disposed of in the various locations were mixed indiscriminately in the beginning and shoaling began to occur in one of the locations, leading to segregation of the materials. All of the disposal mounds were visible in hydrographic surveys taken between 1845 and 1934.

From 1914 to 1977 a single location was reserved for mud dumping from navigational dredging projects. The ACOE estimates that more than 200 million cubic yards of dredged material was disposed of in that period at the Mud Dump Site. After a lengthy regulatory process, the EPA developed a plan to remediate the potential adverse environmental effects of the materials disposed of at the Mud Dump Site. In 1997, the EPA de-designated the site, and simultaneously re-designated the site and the surrounding area as the Historic Area Remediation Site, or HARS. Dredged material that meets EPA's current "Category 1" standards will be used to cap existing sediments which exhibit a potential for adverse effects.

Other physical alterations of the basin bottom have occurred through navigational dredging and sand and gravel mining. Sediments that accumulate in the Ambrose Channel are much finer-grained muds than the naturally occurring sands of the basin. The combination of highly organic sediments and abrupt changes in depth lead to reduced dissolved oxygen in the channel bottom. The same effects are found in some sand borrow areas in the basin. These borrow areas are used to obtain sand for beach nourishment projects along the barrier beach complexes in the basin.

Fishing has been a commercial enterprise in the basin for centuries. As fishing technology progressed, catch rates began to exceed the reproductive capacity of many commercially harvested species. Negative environmental effects to the benthic nursery areas for juvenile fish have occurred as a result of advancements in fishing gear. Other effects include coastal habitat loss and degradation, contaminants, and impingement and entrainment by power generating stations. These effects are discussed in further detail in the Lower Hudson-Long Island

Bays section of the CWCS. As over-exploited fisheries become unprofitable or closed by regulation, new fisheries are developed.

According to National Oceanographic and Atmospheric Administration (NOAA) research vessel surveys, the abundance index for northeast demersal fishes declined by nearly 70% between 1963 and 1974 (Anderson et al., 1999). Demersal species in the surveys primarily include flounders, fish in the cod family, dogfish, goosefish, and skates. Pelagic fishes like bluefish, Atlantic mackerel, Atlantic herring, and butterfish have also been assessed by NOAA's Northeast Fisheries Science Center. The most recent Bluefish assessment (Gibson and Lazar, 2002) indicates the stock is overfished (low biomass), but overfishing is not occurring (current fishing mortality above the reference level). The 2005 commercial quota is down due to lack of knowledge of the status of the resource. The remaining pelagic fisheries are considered underutilized based on their stock assessments in 1996. Fishery-independent statistics for pelagic SGCN like menhaden and bay anchovy are not available, and fishery landings have declined to levels seen in the 1960s and 70s. Spawning stock biomass has started to decline due to recent poor recruitment and may continue to decline until recruitment improves and the recruits enter the spawning stock.

Water quality in the nearshore zone, particularly in the areas immediately adjacent to New York Harbor has declined since European settlement. Since that time coastal waters near the city have served as a waste disposal system for sewage and garbage. Other contributing factors to water quality decline include the dumping of dredged material, coal ash, construction and demolition debris, industrial wastes including acids, and nonpoint source pollutants as a result of human habitation.

Changes in environmental protection laws, fisheries management laws, and cleanup efforts of government and non-governmental organizations over the past 30 years have led to improvements in water quality and fisheries. Passage of the Sustainable Fisheries Act of 1996 and amendments to regional fishery management plans have reduced exploitation rates, increasing the abundance of some fish stocks. However, there are some species, like marine mammals and sea turtles that have shown little or no documented improvement in their status in spite of 30 years of protection under the federal Endangered Species Act (ESA). NOAA revised their Recovery Plan for Northern Atlantic Right Whales which is designed to promote the recovery of northern Atlantic right whales to a level sufficient to warrant their removal from listing under the ESA. The most significant need for northern Atlantic right whale is to reduce or eliminate deaths and injuries from anthropogenic activities, particularly shipping and commercial fishing operations. Secondary priorities of this species' recovery include characterization, monitoring and protection of important habitat, and identification and monitoring of the status, trends, distribution and health of the species. NOAA has also created take reduction plans for Atlantic large whales and harbor porpoises.

Threats

There are a variety of threats to species and their habitats in this basin. These threats are often diffuse and interrelated. The complete summary of threats indicated for SGCN in this basin is in Atlantic Ocean Table 7. Other prominent threats mentioned in species and habitat management plans for the area are also discussed.

Overharvest of Fisheries

Overharvest of fisheries is the most frequently cited single threat to SGCN in the basin. The overharvest of forage fish populations can have a drastic effect on the birds that depend on that forage base. Although other SGCN such as sea turtles and marine mammal species in the basin are not subject to commercial harvest, they can be affected by fishing gear. Many of the fishery management plans for harvested species in the basin indicate that their stocks are over-exploited. Because most of the harvested species are migratory or found in large ranges outside the statutory limits of New York State, coordination with other states, federal agencies and authorities, and neighboring governments is being done to address this threat. In some cases, there are international fisheries just outside of the US Exclusive Economic Zone that are not subject to US fishery management restrictions. There is much more information about the implications and recommendations for over-fishing in the fishery management plans of the Atlantic States Marine Fisheries Commission (ASMFC). A list of SGCN covered by ASMFC plans is in Atlantic Ocean Table 8. Some of these species also have federal fishery management plans and regulations (i.e., dogfish, Atlantic herring, coastal sharks, winter flounder, and lobster).

Habitat Loss and Degradation

Habitat loss due to human development is another significant threat to SGCN in the basin, affecting 17 species groups. Development on beaches, trawling scars on the ocean floor, and placement of pipelines and structures in and on the water result in habitat loss in this basin. The placement of shoreline structures like bulkheads, groins, and jetties can seriously alter the coastal habitat by modifying biological resources and habitat structure, causing cumulative ecological effects and changing physical and ecological processes such as the distribution of sand on beaches. Wave action and reflection off bulkheads causes sand scour immediately seaward of the structure. Over time, the intertidal portion of the remaining beach may disappear entirely. When the shoreline is hardened, habitats do not cease to exist but shift from one type to another which may have dramatic effects on species composition. Groins and jetties interrupt longshore currents and trap sand. Undeveloped beach immediately down-current from the structures becomes more prone to erosive forces. Placement of structures in the dunes and on the upper beach cause immediate loss of habitat for nesting and transient birds. Shoreline engineering, such as jetties, bulkheads and repeated beach nourishment are short-term strategies that weaken the barrier islands. These elements as well as construction in the beach and dune areas affects the ability of the system to respond naturally to human-induced threats as well as storm events and sea level rise, and therefore threaten the viability of all species who utilize the area throughout their lifecycle.

Mining for sand, gravel, and shellstock, as well as exploration and production drilling of the outer continental shelf, affect the biota and their habitats. Sand and gravel mining can result in loss of infaunal benthic organisms; mining modifications of the substrate in the plume area can sometimes be measured in miles. Deep borrow pits within areas of minimal flushing can have decreased dissolved oxygen and may become seasonally or permanently anaerobic. Use of "borrow areas" for beach nourishment can have a significant effect on benthic invertebrates and their habitats. The Atlantic surf clam is not on the list of SGCN, but is a commercially important harvested species in the waters of the Atlantic Ocean, and it is directly harmed by sediment dredging in borrow areas. Deposition of drilling mud during exploratory and production drilling affects the surrounding habitats. Accidents that result in spilled oil products can originate from well blowouts, pipeline breaks, and shipping accidents; these can have a devastating effect on the environment. Potential future threats to the basin related to off-shore development activities include power generation projects, pipelines and cables, and off-shore aquaculture when these structures are improperly sited.

Contaminants

Chemical contamination in the basin is the legacy of industrial development in the adjacent coastal cities. The contamination has been delivered through disposal of contaminated sediments dredged from estuarine and riverine environments, or from natural sediment transport out of the nearby harbors. Movement of these contaminants can be dramatically increased by storm activity in the basin. Although disposal of dredged material in the ocean no longer takes place, the resuspension of contaminants from these sediments through various types of offshore development activities can affect SGCN.

Oil spills are a risk in this basin due to the high volume of petroleum tankers in the area. There is the risk of spills from petroleum tankers and barges due to leaks and accidents, but there is also the risk of leakage of fuel and hydraulic systems from all shipping traffic. Petroleum products are also used as antifreeze in the lining of underwater power transmission cables. Those cables are at risk of leakage due to age, or punctures due to fishing activity and anchor dragging. The effect of oil on wildlife can be significant. There is acute toxicity to fish and marine invertebrate adults, juveniles, larvae, and eggs from the compounds in petroleum. There is also danger to sea birds and ducks from the petroleum coating their feathers both due to the removal of the insulating properties, as well as the toxicity of the ingested oil when the bird tries to clean itself, or consumes contaminated prey.

Sewage discharge and nonpoint source pollution results in organic loading of riverine, estuarine, and coastal waters. Symptoms of this loading in the nearshore waters of the basin are the increasing prevalence of excessive algae blooms, shifts in algal species composition, high sediment biological oxygen demand (BOD) at affected sites, and anoxic events. Reduced water quality is the second most common threat to SGCN in this basin.

Dredged material disposal, as discussed above, results in alteration of the bathymetry, grain size, and contaminant load in the sediments of a small portion of the basin within the HARS. Most of the contaminants found in these sediments can be mobilized through the food web into higher level consumers like predatory fish, whales, and pisciverous birds. DDT compounds impair the reproduction of

birds by thinning the shells of their eggs. Contaminants like mercury and PCBs are thought to impair the reproduction of some marine mammals. PCBs are known to accumulate in the fatty tissues of many fish species, but the specific long-term effects on reproduction and survival are unknown. Disposal of dredged material from harbors inshore also moves organic sediments out into the naturally more nutrient poor parts of the basin.

Entanglement, Entrainment, and Collisions

Floatable debris such as plastics can kill marine animals that ingest them by causing intestinal blockages. Floatable debris also entangles both marine species and birds, and in minor cases cause limited mobility, deformities, or, in the worst cases, drowning.

Fishing gear can unintentionally affect many of the species in the basin. Gill nets and trawls are not selective in the species that they catch, other than size. The mortality of non-target species from fishing gear, bycatch, can be significant. The effects of bycatch mortality on sea turtles in the Gulf of Mexico shrimp fishery resulted in the mandated installation of turtle excluder devices on all shrimp nets. In the northeastern United States, bycatch reduction plans have limited the use and size of certain gear like long lines. Whales can also become entangled in fishing gear of various types and drown. Large whale species, such as right whales, tend to encounter fixed fishing gear but subsequently break free. However, as a result they may carry away pieces of that gear on their bodies, frequently wrapped around their tail flukes or across their mouths. NMFS keeps records of reports of marine mammals that have been found tangled in fishing gear, and use the information contained in those reports to monitor the efficacy of gear restrictions. Fishing gear like trawl nets can also alter the physical habitat of the basin by scarring the benthos.

Shipping in general can be a threat to SGCN. The potential threats associated with ship traffic include introduction of invasive species in ballast water, whale strikes, and petroleum discharges from vessels among others. Container ship traffic is a major cause of human-induced right whale mortalities in the western North Atlantic. It appears that the western North Atlantic population of these whales migrates through the busiest shipping lanes in the region, including ships entering New York Harbor (Swartz et al, 1999).

Priority Issues in the Basin

In this basin, there are several existing or emerging issues that were not covered by other discussion in this basin chapter. The following section attempts to describe these issues and their relevance to SGCN in this basin.

Coordination with other States:

Coordination with other states and NMFS regarding interstate and federal fishing activities, marine mammals, and other endangered species conservation is necessary. Because most of the harvested species within this basin are migratory or found in large ranges outside the statutory limits of New York State coordination with other States and interstate entities regarding interstate and federal fishing activities is essential. To further this goal attempts should be made to use existing interstate cooperative mechanisms for habitat protection, such as NMFS and Atlantic States Marine Fisheries Habitat Committee, National Estuary Research Reserves and federal/state estuary programs to address SWG habitat recommendations on a regional basis. In addition SWG funds should be regionally pooled for regional scale studies and conservation activities.

Coordination to Address International Harvest

Coordination with above mentioned entities will be necessary to address international harvest and/or protection of SGCN.

Offshore Resource Development

Offshore mineral extraction

The effects of offshore mineral extraction must be reviewed to determine potential effects on SGCN and their habitats and actions taken to address these effects.

Wind power and hydropower development

The effects of these activities on SGCN must be carefully reviewed in order to minimize any adverse effect on these species and their habitats.

Pipelines and Cables

The cumulative effects of pipelines, cables and other transmission lines must be reviewed for potential effects on SGCN and their habitats in the basin.

Off-shore aquaculture development

The development of off-shore aquaculture both within New York's statutory limit and in federal waters has the potential to negatively affect SGCN and other species in the basin, as well as, water quality and their habitat. Potential effects of off-shore aquaculture including escapement, disease, genetic mixing of stocks, nutrient loading, etc. must be considered to minimize to the greatest extent possible, adverse effects on SGCN and other important species in the basin.

Sand/gravel mining activities

These activities can directly affect SGCN and their habitats and actions must be taken to protect and minimize potential effect on SGCN and their habitats.

Beach Development and Beach Nourishment

Wind, waves, tides, currents, and storms all shape and maintain coastal habitats. While these forces can be destructive, over time these dynamic processes work to rejuvenate the beaches and dunes, tidal wetlands, barrier islands and bays. Development, coastal manipulation and shoreline stabilization constitute some of the most serious threats to the continuing viability of salt marshes, beaches and dunes and their dependent species. In the past there has been a great deal of effort towards maintaining dynamic shorelines exactly in place. This past coastal management has been expensive and unsuccessful in many cases, allowing incompatible development in this dynamic environment. Shoreline engineering, such as jetties, bulkheads, and repeated beach nourishment are short-term strategies that weaken the barrier islands. This has broad reaching effects on loss of suitable habitat for many SGCN, including loss of tidal wetlands, which, in turn, affects water quality of the bays and wildlife habitat.

Vision, Goals and Objectives for the Basin

Vision

The Atlantic Ocean Basin will have natural processes restored to the maximum extent practical to support healthy and sustainable populations of all SGCN presently found there.

Existing conservation partnerships among federal, state, and local government partners, not-for-profit organizations, and other citizens groups will be strengthened. New and innovative partnerships will be formed.

Conservation partners in the basin will work together to collect, share, and analyze information on SGCN and their habitats in the basin. Information will be used to constructively manage species and habitats for the greatest benefit to biodiversity preservation while balancing human needs for use of the resources.

Members of the public will understand the value of healthy habitats and the species that they support.

Goals and Objectives

- Ensure that no at-risk species becomes extirpated from the basin by better understanding the current distribution, abundance, and habitat needs of these species. Share this information with local governments in a way that helps inform their decision making related to local land use.

- Increase the capacity for effective management of migratory marine species at all times of the year, including response to spills, strandings, and collisions. The management will be supported by adequate data collection on all SGCN in the basin.

- Reduce the adverse effects of human activities in the basin and adjacent lands on SGCN through improved pollution prevention strategies and more effective regulation of development within the coastal area through more focused attention on projects that could cause the highest level of effects. Increase the capacity for effective enforcement of management strategies and plans.

- Preserve and restore key representative habitats that support the basin's biodiversity.

Priority Strategies/Actions for Basin-wide Implementation

The following recommendations do not appear in any priority order. All of these recommendations are intended to be of high priority to implement in this basin in the coming 5 to 10 years for the benefit of the most critical SGCN in the state. See the discussion of "*Development of Conservation Recommendations for Species of Greatest Conservation Need and their Habitats*" and their prioritization in the Introduction. All of the recommendations for SGCN found in this basin can be viewed in Appendix A.

Data Collection Recommendations for Critical Habitats

- Monitor the use of artificial reefs and natural structures by SGCN in the basin. Compare fish sanctuary areas with unrestricted areas to quantify, if possible, benefits of sanctuaries to structure-oriented SGCN.

- Collect data on beach habitat use by SGCN in the basin to determine priority areas for land protection and beach management. Include temporal information on beach use to enable development of beach disturbance restriction windows for recreational use, construction, and beach nourishment.

- Determine effectiveness of and possible improvements to current coastal regulations and policies. DEC is doing this for the Tidal Wetlands Regulations.

- Map all major habitat types to establish baseline and use as basis for trends analysis.

- Build and manage an accessible coastal/marine spatial habitat database which includes open space data that towns and counties can access to update information. Encourage standardization of all Town, County and State GIS databases.

- Property owners such as OPRHP, DEC, etc. should assess beach driving activities, location, and effects on SGCN.

Data Collection Recommendations for SGCN

Several high priority SGCN in this basin require collection of additional species-specific data in order to effectively implement management actions for them. The specific recommendations are outlined below.

HORSESHOE CRAB

- Continue fishery-independent monitoring of all life stages of horseshoe crab off the south shore of Long Island.

TRANSIENT SHOREBIRDS/HORSESHOE CRABS

- Investigate interactions of migratory bird species and horseshoe crab eggs along NY's Atlantic coastline.

- Document and map important shorebird forage areas on Atlantic Beaches using reports from birders. Include dates of bird concentrations at the site.

- Document dominant food items (including horseshoe crab eggs) during migration stopovers on Atlantic beaches.

ATLANTIC STURGEON

- Conduct sea sampling to learn bycatch in number and size of Atlantic sturgeon by fishery over space and time in commercial fisheries of the Atlantic Ocean.

- Continue monitoring the abundance, distribution and habitat use of juvenile Atlantic Sturgeon in the Atlantic Ocean.

PELAGIC SHARKS

- Initiate a volunteer shark data collection program which would collect additional catch and biological information on pelagic sharks from New York's recreational anglers with Cooperative Shark Tagging Program, Apex Predators Program under NOAA Fisheries.

- Increase traditional tagging programs and implement radio tagging to better document the movement of pelagic sharks through the basin.

- Increase the collection of landings data from shark dealers.

- Participate in coastal and pelagic shark stock assessments.

- Initiate coastal shark surveys, in coordination with universities, to identify essential fish habitat for coastal sharks.

WINTERING WATERFOWL

- Determine contaminant levels (e.g., mercury, other metals, PCBs, other organochlorines) in samples of the above waterfowl/water birds wintering in the Atlantic Ocean Basin to assess potential effects on reproduction or survival. Obtain samples as opportunities arise.

BEACH AND ISLAND GROUND-NESTING BIRDS

- Support and encourage habitat research projects that would help define preferred habitat in order to guide restoration efforts and focus habitat protection efforts.

- Support basin-appropriate research that addresses data collection priorities established in species Recovery Plans (piping plover and roseate tern), the Tern Management Handbook (Kress and Hall, 2002) and similar planning documents currently being prepared through interstate and interagency working groups.

- Continue annual surveys to collect nesting data, including but not limited to, number of nesting pairs, productivity, and number of active breeding sites.

HARBOR PORPOISE

- Use radio tagging and satellite telemetry to monitor movements of harbor porpoise in the basin.

- Monitor seasonal abundance with aerial surveys.

- Conduct contaminant analysis on stranded animals to determine effects of local habitat on the species.

RIGHT WHALE

- Continue the ongoing northern right whale survey conducted by the Riverhead Foundation for Marine Research.

- Characterize fixed fishing gear configurations, such as the number of vertical lines a fisherman uses, to gain a better understanding of the magnitude and risk of entanglements in the basin.

TRANSIENT (NON-BREEDING) SHOREBIRDS

- Initiate annual shorebird monitoring program, using established protocols at 5-10 locations in New York State.

- Conduct field studies to document ecology of transient shorebirds, including important food items, habitat use and time/activity budgets.

Planning Recommendations

- Regularly update oil and chemical spill response plans for the basin in cooperation with the US Coast Guard, state, and local governments. Review the ability of government and not-for-profit wildlife rehabilitation facilities to respond to wildlife damaged by petroleum and chemical spills in the basin.

- Complete fishery management plans for all SGCN lacking current plans. Coordinate planning with ASMFC, federal government, estuary programs, other states, NGOs, and the fishing community. Incorporate the recommendations for Large Marine Ecosystem-based fishery management developed by the Northeast Fisheries Science Center in 2004. Consider planning strategies to obtain information on forage species abundance and availability to support predators.

- Develop a long-term beach and island ground-nesting bird management plan with population targets and management recommendations to achieve them.

- Define priority areas of wintering waterfowl, marine mammal, and sea turtle use and develop management strategies to minimize human disturbance and offshore development through the permitting process.

- Develop a conservation plan for transient (non-breeding) shorebirds that regularly occur in New York which identifies objectives and actions to sustain shorebird resources within and outside New York State.

- Provide training for town government staff to implement Coastal Erosion Hazard Area (CEHA) and to understand the NYS Tidal Wetland law.

Land Protection Recommendations

- Acquire fee title, development rights, or other easements on beach property to protect beach and island ground-nesting birds, transient waterfowl, and horseshoe crabs.

- Protect (through fee title acquisition and easements) shore lands and require upland buffers associated with beach, bluff and dune habitat within state regulation to accommodate natural processes and sea level rise. This will allow for marshes and dunes to retreat inland.

Management and Restoration Recommendations

- Establish and/or continue to implement seasonal use restrictions on public beaches documented as important habitat for transient shorebird species, especially red knot; beach and island ground-nesting birds especially roseate tern, common tern, and least tern; black skimmer and piping plover; and horseshoe crabs. Restricted activities may include pedestrian access in nesting areas, use of vehicles on beaches, construction projects, and beach nourishment activities.

- Enforce grain size conditions on beach nourishment permits to avoid changes to beach habitats used by SGCN, especially beach and island ground nesting birds and horseshoe crabs.

- Remove and/or reduce the presence of feral domestic species and wild predators on beach and island ground-nesting birds.

- Maintain a moratorium on Atlantic sturgeon possession and implement changes to fisheries with the greatest sturgeon bycatch to minimize them.

- Implement the management recommendations of the Interstate Fishery Management Plan for horseshoe crabs.

- Manage vegetational succession in beach areas used for nesting by beach and island ground-nesting birds. Use dredge spoil placement, beach nourishment and overwash to restore or expand nesting habitat, especially for roseate terns.

- Use seasonal fenced areas for plovers and terns as seasonal habitat protection for other beach strand species.

- Close nesting beaches to off-road vehicles during periods of unfledged plover and tern chick use.

- Fence early successional habitat created by breaches and overwash.

- Develop a specific habitat protection and restoration action plan for publicly owned beach, bluff, and dune complexes.

- Increase enforcement capacity and training for all existing and proposed management strategies and plans for requirements that are legally enforceable. This could include working with NMFS through Joint Enforcement Agreements for the enforcement of federal regulations by local law enforcement officials.

- Implement the NMFS rules and regulations for skates and rays as appropriate for New York waters.

- Implement management regulations for pelagic and demersal sharks consistent with the recommendation of NMFS and work with ASMFC to develop an Interstate FMP for coastal sharks.

- Develop technical guidelines (e.g., seasonal windows, mitigation) on ocean construction activities (pipelines, cables, dredge borrow areas) to minimize effects to SGCN and other important wildlife species.

- Seek management and restoration opportunities that aim to restore natural shorelines in the basin.

Information Dissemination Recommendations

- Share results of wintering waterfowl contaminant levels with agencies and interested parties involved in contaminant tracking efforts in NY Harbor and dredged material management to guide their efforts.

- Continue to work with state, federal, and municipal beach managers to identify beaches important to SGCN in the basin and make management recommendations to protect them at appropriate seasonal and spatial scales using data collected under the State Wildlife Grants Program.

- Share transient shorebird information collected under SWG with international conservation organizations.

- Educate and inform landowners adjacent to beach and island ground-nesting bird nesting areas about the importance of predator control in these areas, including feral domestic and domestic animals.

- Conduct outreach to fishermen to inform fishermen of the Atlantic Large Whale Reduction Plan and the Harbor Porpoise Take Reduction Plan.

- Conduct outreach to law enforcement personnel to inform them of the Atlantic Large Whale Reduction Plan and the Harbor Porpoise Take Reduction Plan and their requirements for fishing gear so that this information can be incorporated into routine inspections of vessels and gear.

- Develop outreach materials for mariners regarding the identification of whales, dangers to whales associated with ship strikes and marine debris, and where to report information.

Regulatory and Legislative Recommendations

- Evaluate needs and benefits to promote voluntary use of bait bags in the eel and conch fisheries to reduce the number of horseshoe crabs needed for bait.

- Improve and increase the effectiveness and consistency of current coastal regulations.

Incentives

- Develop private lands incentives to remove existing obsolete beach structures and discourage new beach hardening structures including groins, jetties, and bulkheads.

- Develop buy-out program for storm damaged beachfront properties within flood-hazard areas and/or disincentives to redevelopment.

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Tables and Figures

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