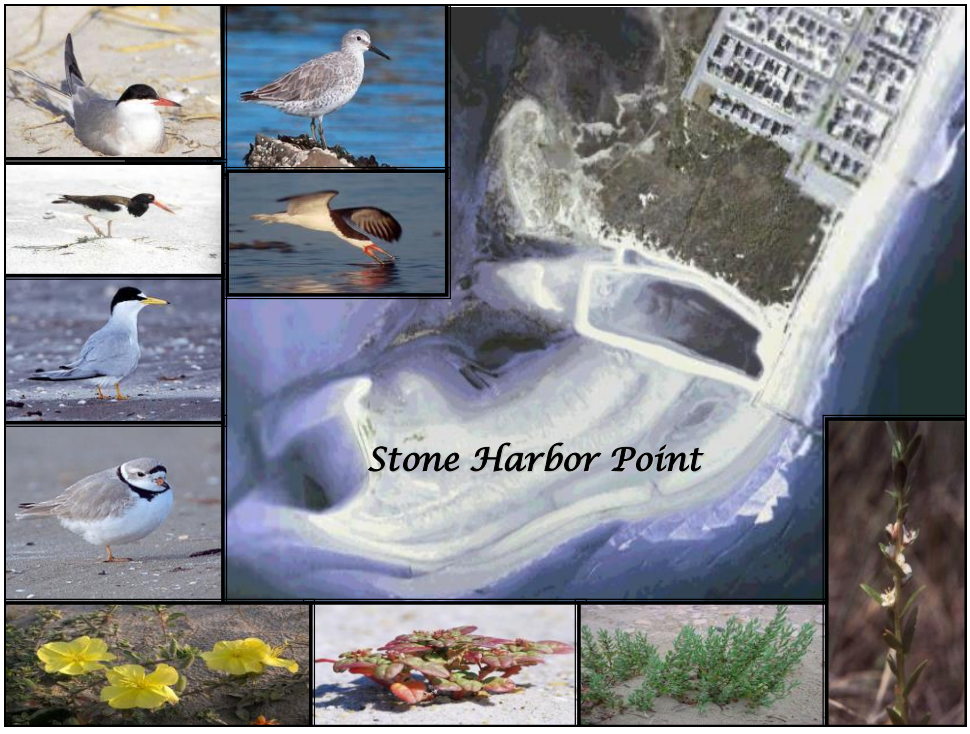
CONSERVATION PLAN
FOR
STONE HARBOR POINT
STONE HARBOR, NEW JERSEY

MARCH 2008



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for

THE NATIONAL FISH AND WILDLIFE FOUNDATION

"All things near and far
By immortal power
hiddenly to each other
linked are,
that thou cannot disturb a flower
without troubling a star."

~ *Madeleine L'Engle*

Acknowledgements

TCI (Karen Terwilliger and Tracy Rice) would like to acknowledge and sincerely thank Todd Pover, Dave Jenkins (and contributing NJDEP and Conserve Wildlife staff), and Annette Scherer and Stephanie Egger (USFWS) for their tireless efforts, commitment and collaboration throughout the document development. We wish to recognize the Borough of Stone Harbor Administration (including the Mayor, Administrator, Town Council, Natural Resources and Bird Sanctuary Committees, Police and Public Works staff) for their participation in and stewardship of their special conservation areas. We underscore the initiative and leadership role of Julian Miraglia and extra effort of Dianne Daly in moving this process forward. The persistence and hard work of all involved speaks to the importance and challenge of an effective partnership to protect this natural treasure. Finally, TCI thanks Lynn Dwyer for her guidance and support, and the National Fish and Wildlife Foundation for the opportunity to provide for this valuable tool to help conserve one of the Atlantic Coasts' invaluable bird habitats.

Executive Summary

The southern end of Seven Mile Island and Hereford Inlet is a rich and vibrant ecosystem full of both rare and common plants and wildlife. New Jersey's Atlantic Coast is one of the most developed in the nation, and Stone Harbor Point is one of the few areas in the state where nature can be seen in all its glory. The natural processes of waves, tides and wind have been allowed to shape and reshape Stone Harbor Point for centuries. As a result of this rare setting, fish, wildlife and plants can be found in great abundance and variety at Stone Harbor Point.

This Stone Harbor Point Conservation Plan provides the framework for the effective conservation of the Borough of Stone Harbor's southernmost beaches and the diverse assemblage of plant and animal species that depend upon this dynamic shoreline habitat. This conservation plan highlights the status of those bird species listed as endangered or threatened by the federal and New Jersey state governments which are of state, national, and international concern but also addresses the broader natural wildlife community relying on this important coastal ecosystem. It presents the threats and factors that limit species recovery and use of Stone Harbor Point and underscores the importance of sound stewardship of Stone Harbor Point as one of New Jersey's most important bird habitats and premiere East Coast shorebird migration stopover areas. Finally, this plan presents an integrated and adaptive management framework of conservation actions (including survey, research, management, outreach and education, etc.) as a long-term stewardship strategy for Stone Harbor's many conservation partners.

The Borough of Stone Harbor has the opportunity and obligation to create, manage and steward one of New Jersey's and the Atlantic Coast's most important bird conservation areas. After the placement and removal of contaminated fill, litigation established the requirement for mitigation of this site. This conservation plan assists the Borough in its legal obligations for mitigation for the fill activities, and is also consistent with the U.S. Fish and Wildlife Service (USFWS) Recreational Activities and Fireworks Guidelines, as well as with State Coastal Zone Management Rules. It is the intent of this conservation plan to satisfy the Terms and Conditions of the December 2005 Programmatic Biological Opinion between the USFWS and the U.S. Army Corps of Engineers (USACE), Philadelphia District, with respect to municipal management planning at Stone Harbor Point, and assist in meeting the conditions of permits issued by the New Jersey Department of Environmental Protection's (NJDEP) Division of Land Use Regulation (DLUR) requiring management planning in municipalities receiving beach nourishment. However, this conservation plan does not fully satisfy the Borough's obligation for a Borough-wide beach management plan under the terms of the USFWS Programmatic Biological Opinion with the USACE because it only addresses the Point. However it greatly facilitates the adoption of these management activities for beaches North of the Point if needed.

The wildlife and plants of Stone Harbor Point are threatened by predators, flooding, human disturbance, fireworks, habitat loss and degradation, and oil spills and contaminants. Human disturbance issues include pedestrian and recreational usage, dogs, kites, kitesurfing, kite buggies, motorized vehicles, beach raking, boats and personal watercraft usage, and scientific research and species monitoring efforts. The Stone Harbor Point Conservation Plan builds upon the Borough's existing ordinances that protect the natural resources of the Point.

The goals of the Stone Harbor Point Conservation Plan are to provide a framework for cooperation and coordinated stewardship among the Borough of Stone Harbor and its multiple conservation partners including regulatory state and federal agencies (i.e., USFWS, NJDEP, USACE) and non-regulatory partners such as CWFNJ, NJ Audubon and the Wetlands Institute.

The conservation plan defines and describes the roles and responsibilities of these local, state and federal regulatory partners, including the Borough, the NJDFW, and the USFWS in the protection and management of listed and other protected species at Stone Harbor Point. The long-term protection and recovery of listed beach bird species (and other listed species as deemed appropriate) as well as their beach habitat at Stone Harbor Point are targeted in order to contribute to the state and national Recovery Plan goals and objectives for these species.

Conservation measures have been identified to increase the population numbers and productivity of federally and state-listed bird species (and simultaneously foster the continued recovery of other rare species in Stone Harbor) by addressing the threats and factors limiting their recovery, including detrimental human activities and predation. Finally, the conservation plan is integrative and adaptive to changing conditions, providing effective conservation actions for the Point's beach birds and their habitat to foster stewardship and cooperation between partners. Key conservation actions that are additions to or modifications of the existing management activities at the Point include:

- Educate the public about the importance and value of Stone Harbor Point through a variety of education and outreach actions that include a Borough website, educational brochures, public relations stories, new (large) signs at the entry points to the Point, a new volunteer stewardship program, and environmental education materials for local schools and Borough employees;
- Partner with the ENSP and CWFNJ to identify and secure funds to hire a steward for the fall months that can educate visitors, monitor ORV and kite disturbance, maintain signs and fencing, and aid in migratory bird surveys;
- Coordinate with ENSP and/or USFWS when an unexpected emergency occurs before undertaking any actions within protective fenced areas during the nesting season.
- Increase law enforcement of existing and new ordinances that protect the Point's resources, including those regulating pets, off-road vehicles, boat landings, and other recreational activities;
- Implement protective measures for seabeach amaranth and other state or federally-listed plants if they should appear at the Point;
- Implement an integrated predation management program in partnership with the relevant state and federal agencies and other partners;
- Increase partnerships and coordination amongst biological monitors and scientific researchers at the Point;
- Nominate the Hereford Inlet Complex (the Point, Champagne Island, and associated shoals) as a Western Hemisphere Shorebird Reserve Network site; and
- Evaluate opportunities to improve nesting habitat for beach nesting birds by elevating some areas to reduce flooding of nests.

The conservation plan will be revised and updated (as needed) at least once every five years to reflect changing conditions and management priorities. The conservation plan includes a short Implementation Manual that can be separated from the large document for use by Borough and monitoring personnel; it summarizes the various conservation zones and seasons at the Point, listing the seasonal restrictions (if any) on individual recreational activities, pets, vehicles and watercraft. A Calendar of Events offers an easy-to-use guide to management activities, and a list of Emergency Contacts provides a quick reference for Borough personnel when emergencies arise.

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I. INTRODUCTION

Need

Stepping off the asphalt of the 123rd Street parking lot and onto the sand trail heading south to Stone Harbor Point is the beginning of a tiny journey to a magnificent place. To the east, one can see and feel the protection of a large dune system standing sentry to the ocean tides and storms; along the westerly edge of the trail is an expanse of bayberry, fragrant and sparkling with songbirds, dragonflies, and occasional blooms of morning glories in the summer. At the end of the humble entrance trail is an expanse of beach reaching out to Hereford Inlet that has stood the storms, and continues to change with each tidal cycle that laps up on its shores. It is a stunning sight in the summer, teaming with a thriving beach nesting bird colony and shorebirds and curious visitors from near and far.

While standing on Stone Harbor Point it is difficult to believe that less than 200 feet to the north is a busy parking lot full of beachgoers, swimmers, surfers, kayakers, fishermen and school children! The fact is, Stone Harbor is a lovely, quaint, and busy coastal resort town packed with anxious vacationers looking for seashore - fun at the water's edge. Thus the need for this plan. The need for management and balance as to the use of this special place is an ongoing process. This conservation plan will set an excellent framework for the process of managing Stone Harbor Point.

Purpose

The Stone Harbor Point Conservation Plan (conservation plan) will provide the framework for effective conservation of the Borough of Stone Harbor's southernmost beaches as well as the diverse assemblage of plant and animal species that depend upon this dynamic shoreline habitat. This conservation plan will focus on and describe the status of those bird species listed as endangered or threatened by the federal and New Jersey state governments which are of state, national, and international concern but will also address the broader natural wildlife community utilizing this important coastal ecosystem. The conservation plan will present and assess the threats and factors that limit species recovery and use of Stone Harbor Point. It will underscore the importance of sound stewardship of Stone Harbor Point as one of New Jersey's most important bird habitats and premiere East Coast shorebird migration stopover areas. Finally, the conservation plan will present an integrated and adaptive management framework of conservation actions (including survey, research, management, outreach and education, etc.) as a long-term stewardship strategy for Stone Harbor's many conservation partners.

The Borough of Stone Harbor has the obligation and opportunity to create, manage and be stewards of one of New Jersey's most important bird conservation areas. After the placement and removal of contaminated fill, litigation has established the requirement for mitigation of this site. This conservation plan will assist the Borough in its legal obligations for mitigation for the fill activities, but is also consistent with the U.S. Fish and Wildlife Service (USFWS) Recreational Activities and Fireworks Guidelines (USFWS 1994, 1997), as well as with State

Coastal Zone Management Rules. It is the intent of this conservation plan to satisfy the Terms and Conditions of the December 2005 Programmatic Biological Opinion between the USFWS and the U.S. Army Corps of Engineers (USACE), Philadelphia District, with respect to municipal management planning at Stone Harbor Point (USFWS 2005), and assist in meeting the conditions of permits issued by the New Jersey Department of Environmental Protection's (NJDEP) Division of Land Use Regulation (DLUR) requiring management planning in municipalities receiving beach nourishment. This conservation plan does not fully satisfy the Borough's obligation for a Borough-wide beach management plan under the terms of the USFWS Programmatic Biological Opinion with the USACE.

The Stone Harbor Point Conservation Plan incorporates measures to:

- Restore important fish and wildlife habitat, especially for a suite of protected avian species of regional, national, and international significance;
- Restore and maintain a naturally functioning shoreline and littoral habitats;
- Support watershed-based planning, and regional and programmatic conservation approaches;
- Promote educational and stewardship activities within the Borough and with its multiple partners.

This conservation plan also addresses the vulnerable species and habitats identified by NJDEP in their State Wildlife Action Plan (NJDEP 2005a). It acknowledges adjacent federal Essential Fish Habitat (EFH) species, Habitat Areas of Particular Concern (HAPC), and species considered as the nation's "Living Marine Resources" (NOAA 1999). This conservation plan directly steps down and addresses the NJ State Wildlife Action Plan and the many regional and national bird plans that have identified these species and habitats as conservation priorities, including Partners in Flight (PIF) Bird Conservation Regions (Watts 1999), North American Bird Conservation Initiative (NABCI), Audubon's Important Bird Areas (IBA; Chipley et al. 2003), the North American Waterbird Conservation Plan (Kushlan et al. 2002) and its regional counterpart for the Mid Atlantic/New England/Maritimes (MANEM 2006), the U.S. Shorebird Conservation Plan (Brown et al. 2001) and its regional counterpart for the Northeast (Clark and Niles 2000), the Atlantic Coast Joint Venture (ACJV) Strategic Plan (ACJV 2004) and Waterfowl Implementation Plan (ACJV 2005), and the USFWS Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan (USFWS 1996a).

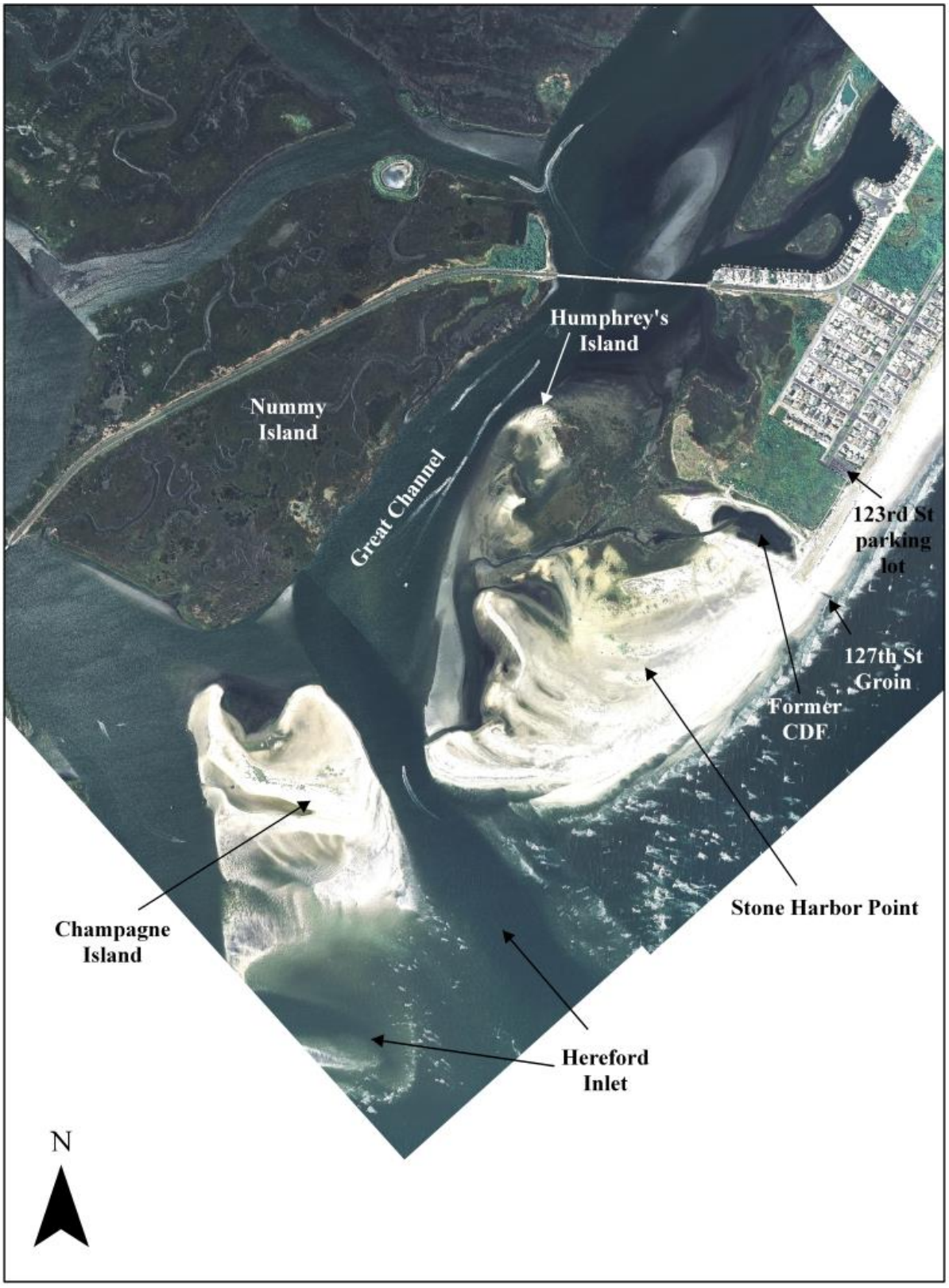
Site Description

Location

Stone Harbor is located on the southern portion of Seven Mile Island, a barrier island along the Atlantic Ocean in Cape May County, New Jersey (Fig. 1). The northern portion of Seven Mile Island contains Avalon, while Hereford Inlet and Five Mile Island border Stone

Harbor to the south. The Borough is separated from the mainland by Great Channel, an estuary that includes parts of the Atlantic Intracoastal Waterway, and numerous wetlands and

Figure 1. Map of Stone Harbor Point. The 2006 aerial photograph is courtesy of the U.S. Army Corps of Engineers, Philadelphia District.



undeveloped marsh islands such as Nummy Island. Champagne Island, a small undeveloped sand island within Hereford Inlet, is partially located within the Borough's municipal boundaries. Nummy Island is not located within the Borough's boundaries. Delaware Bay is only seven miles across the mainland, and Cape May is less than eleven miles to the south.

Stone Harbor Point (the Point) is an undeveloped, sandy barrier spit extending southwest of the 127th Street terminal groin and the 123rd Street parking lot. The land is owned by the Borough of Stone Harbor and deed restricted for conservation purposes (Appendix A). The barrier spit has fluctuated in size over time, growing and contracting towards North Wildwood (across Hereford Inlet) depending on coastal processes. Historically, the Point was in excess of 300 acres of beach, wetland and bayberry stands as recently as the early 1960's. Erosion rates of up to 100 feet per year resulted in the loss of over 250 acres of coastal habitat between 1968 and 1995 (USACE 1997). In 1991 Stone Harbor Point had eroded roughly 250 feet north of the 127th Street terminal groin, extending only 600 feet south of the 123rd Street parking lot. In 1995, the spit consisted of only around 14 acres of sandy beaches (including the intertidal portions) and 15 acres of bayberry habitat (USACE 1997). In 2006, the Point had grown to extend more than 4,900 feet from the 123rd Street parking lot, with over 200 acres of sandy beaches, flats and incipient dunes and 7 acres of tidal pond.

Ecological setting

The southern end of Seven Mile Island and Hereford Inlet is a rich and vibrant ecosystem full of both rare and common plants and wildlife. New Jersey's Atlantic Coast is one of the most developed in the nation, and Stone Harbor Point is one of the few areas in the state where nature can be seen in all its glory. Of the 127 miles of oceanfront beaches in the state, only 14% (18 miles) are undeveloped (USACE 1997). Over 90% of New Jersey's oceanfront coastline has been stabilized or proposed for federal beach fill projects, but not Stone Harbor Point. Eight of the state's eleven inlets have some form of hard stabilization – jetties, seawalls, revetments and the like – along one or both shorelines, but not Stone Harbor Point (although North Wildwood across Hereford Inlet does have a seawall along its inlet shoreline). The natural processes of waves, tides and wind have been allowed to shape and reshape Stone Harbor Point for centuries.

As a result of this rare setting, fish, wildlife and plants can be found in great abundance and variety at Stone Harbor Point. Hereford Inlet provides a crucial pathway for over a hundred species of finfish and shellfish to move between spawning grounds, nursery areas, foraging habitat, and the open ocean. Anglers come from miles around to try their luck at catching stripers, herring, bluefish and other finfish from the surf around the inlet. Mullet and small fish can be found in the tidal pond at the north end of Stone Harbor Point, attracting birds and bigger predator fish alike. Sea turtles can be found during the summer, foraging in the estuaries. Northern diamondback terrapin emerge from the bay to nest at the Point. Offshore whale watching tours depart from nearby Cape May, and dolphins are often seen frolicking in the waters around Stone Harbor. Seals can occasionally be found hauling out of the water to bask or rest at the Point during the winter.

Waterfowl flock to the bay waters and wetlands around the Point, particularly as they migrate north and south; many even choose to spend their winters near the Point. The Atlantic Coast Joint Venture (ACJV) has designated the southern Atlantic coast of New Jersey, including the Hereford Inlet – Stone Harbor Point complex, as a New Jersey Waterfowl Focus Area for its

importance to breeding, migratory and overwintering waterfowl like American black duck and Atlantic brant. In fact, the southern New Jersey coast provides the most significant wintering area for these two species along the entire Atlantic coast, with over 80,000 black ducks and 100,000 Atlantic brant (ACJV 2005). It is not uncommon for snowy owls to visit the area in the winter months. Stone Harbor Point and Nummy Island have been designated as an important wintering site (those hosting more than 1% of the biogeographical population) for American oystercatcher by the American Oystercatcher Conservation Plan (Schulte et al. 2006).

Colonial waterbirds such as herons, egrets, and ibis historically nested at the Point and continue to nest in the wetlands and marsh islands across Great Channel to the west. Up to 1.5 million migratory shorebirds use the coastal habitats of Delaware Bay and Cape May each year, with up to 400,000 shorebirds seen on any single day (ACJV 2005). Tens of thousands of migratory shorebirds use the Point during their northbound spring migration (May through early June) and southbound fall migration (mid-July through December), and thousands of terns, skimmers, and other beachnesting shorebirds stick around to nest at the Point. Piping plovers from as far away as the Great Lakes have been seen using the Point on their southward migration in the fall. Songbirds use the thick bayberry woodland for nesting and migratory habitat. Raptors like peregrine falcons, Coopers and sharp-shinned hawks, and Northern harriers use the area. Over 300 species of birds have been seen migrating along the Cape May peninsula, including about 70,000 raptors (ACJV 2005).

The intertidal shoals and flats along the edges of Stone Harbor Point and within the Hereford Inlet complex provide important roosting and foraging areas for waterbirds and shorebirds. Over 21,000 shorebirds, with 24 or more different species, were documented by the New Jersey Audubon Society at the Point and the adjacent shoals in June 2006. Red knot and dunlin were by far the most numerous, but semipalmated sandpiper, least sandpiper, sanderling, dowitchers, semiplamated plover and ruddy turnstone also had very high numbers. Up to 20,000 red knot have been seen roosting on Champagne Island and on the Point. The federally-endangered roseate tern can be seen migrating through the area every year, although not in high numbers.

The plant life at Stone Harbor Point and its surroundings is also diverse and vibrant. From the salt marsh to the bayberry woodland, plants provide valuable shelter, food and nesting habitat for a variety of wildlife. The USACE found the bayberry thickets at the Point to be one of the last of its kind in New Jersey (USACE 1997). Other plants found at the Point include American beach grass, seaside goldenrod, evening primrose, prickly pear cactus, yarrow, Eastern red cedar, sea lavender, saltmarsh aster, swamp rose-mallow, marsh elder and black grass. The state species of concern seabeach purslane was observed at the Point in 2003 and 2004, and seabeach sandwort in 2001. Wetlands and seagrass add to the site's floral diversity. Saltmarsh cordgrass, saltmeadow cordgrass, and saltgrass dominate the marsh; sea lettuce and eelgrass are the dominant underwater plants, which also include red algae, spaghetti grass and rockweed (USACE 1997).

II. CONSERVATION FRAMEWORK

Historical Background

In 1994 the Borough of Stone Harbor initiated efforts to implement a Maintenance Dredging Project to improve navigability of its back bays for recreational boaters. A total of nine back basins were dredged generating a volume of approximately 90,000 cubic yards (cy) of dredged material. Soundings and sediment sampling were conducted by the Borough's engineer and an analytical laboratory in 1997. The results of the sampling showed grain size to be compatible (90% sand) for the material to be placed on Stone Harbor Point beach and used for "environmental restoration". However, chemical analysis of the sediments showed that some basins contained elevated levels of mercury above the sediment quality guidelines set forth by Long et. al (1995) and that in some basins were above the Effects Range - Low threshold[1]. This was a concern to NJDEP and the USFWS because the Point serves as habitat for the piping plover, a shorebird listed as threatened and endangered by the federal and state governments respectively, and other beach nesting bird species. The Borough proposed to place spoils from these contaminated basins into Site 103, a historic, upland dredge disposal site that would need minimal earthwork to upgrade the existing confined disposal facility (CDF). NJDEP and the U.S. Army Corps of Engineers (USACE) accepted that alternative, with the rest of the dredged material from the other basins going to the Point.

Several alternate spoil sites were investigated; and while Sedge Island located in the back bay of Paradise Bay was the most logical, it was met with public opposition for aesthetic reasons. Stone Harbor Point was chosen as a disposal site by the Stone Harbor Borough Council in hopes that the material could later be used for an environmental restoration project.

The USACE permit was issued in May of 2001 and the Stone Harbor Borough Council agreed to its conditions, which included numerous conditions with regard to testing the sediments after the dredging. Because of the use of the Point by piping plovers, the federal Endangered Species Act required the involvement of the USFWS. The USFWS included terms and conditions in the federal USACE permit beyond those customarily imposed by the USACE and the NJDEP for more traditional dredge spoil sites. The Borough was obliged through this permit to sample the spoils placed at Stone Harbor Point to reassess their suitability for use for environmental restoration on the Point beach and in the bayberry woodland.

International Hydronics, Inc. conducted a full sampling program and the spoils were found to contain elevated levels of contaminants with the potential to impact the beach nesting habitat. Additionally grain size analysis showed the material to be unsuitable for environmental restoration. The Borough requested the material remain and be covered or mixed with sand from a proposed USACE restoration project at the Point. This restoration project was not implemented by the USACE, however. The Borough refused the bioaccumulation testing requested (and set forth as a permit condition) of the USACE.

[1] The Long et al. (1995) guidelines, Effects Range - Low (ERL) and Effects Range - Median (ERM), represent sediment contaminant levels at which adverse benthic organism impacts were found in approximately 10 and 50 percent, respectively, of examined toxicity studies. Concentration between the ERL and ERM are indicative of adverse impacts at a frequency somewhere between 10 and 50 percent (USFWS 2001).

The Borough of Stone Harbor filed suit against the USFWS and the USACE in October of 2002 in an attempt to leave the material at the Point. After failed attempts at negotiation for material removal, the U.S. Department of Justice, on behalf of the USFWS and USACE, filed suit against the Borough in January of 2003. The Borough hired a litigation attorney, and a sediment scientist to assist them in their lawsuit. The Borough and the Department of Justice reached a settlement agreement in February 2003. Pursuant to a court-approved Consent Decree, the Borough agreed to remove all unsuitable materials from Stone Harbor Point and restore the area to pre-project conditions. The spoils were then hydraulically transferred to Sedge Island. When Sedge Island reached its capacity, the remaining material was transferred to a parking lot until a suitable disposal site could be located. In April 2004, the last of the spoils were transferred via truck to a turf farm out of the county.

Additional terms of the consent decree included:

- Mitigation through the creation of 4.4 acres of beach nesting bird habitat at the Point
- The contribution of $250,000 to the National Fish and Wildlife Foundation to be used for shorebird conservation within the Borough.

The Borough used sand from the oceanfront side of the Point to construct two raised bare sand areas, totaling 4.4 acres, to provide elevated nesting habitat for beach nesting birds, particularly the piping plover, in the spring of 2003. The elevation of these areas was raised by approximately two feet in order to reduce the loss of bird nests to flooding by storm tides. The piping plovers and other beach nesting birds successfully nested on the two raised areas in 2003, 2004, 2005, and 2006. In all, the cost of the dredging project, the associated litigation, and mitigation exceeded $ 5 million.

All contaminated sediments within the dredged material disposal site at the Point were removed and the berms of the CDF were re-graded to provide elevated nesting areas around the perimeter and re-create a tidal connection to flood the lower elevation areas, within the center of the former CDF. A tidal pond has historically existed at the Point, and this conversion of the former CDF into a tidal pond replicates historical conditions at the site. The site is no longer considered a CDF (the state permit for the one-use only CDF expired in August 2005), and the Borough intends to manage the site as a natural resource (tidal pond) within the ecological context of the Point.

Landscape evolution

Seven Mile Island is a barrier island located on the New Jersey Coastal Plain, which consists of a flat to gently rolling landscape built of unconsolidated sediments that thicken to the south. Stone Harbor Point is underlain by over 38 feet of sand; bedrock can't be found until you dig down 6,000 feet below the surface (USACE 1997). Cape May peninsula separates Delaware Bay on the west and the Atlantic Ocean on the east. Stone Harbor Point and its associated estuaries are only 7.2 miles from Delaware Bay across the Cape May peninsula. Stone Harbor Point is the southern end of Seven Mile Island, with Avalon and Townsends Inlet at the north end of the island and the Borough of Stone Harbor and Hereford Inlet at the south end of the barrier island. The Point is an undeveloped barrier spit extending south from 122nd Street and the developed portions of the Borough.

Stone Harbor Point is influenced by both natural and manmade processes, which shift the landscape with the daily tides. Tidal flats are exposed at low tide allowing shorebirds to forage for prey in the sand and mud. Plants take root above the reach of the high tide. The winds blow sand across the surface, rearranging the landscape by moving sand from one place to another. Storm tides may flood interior areas of the Point, washing out bird nests and young plants, and further moving sand and shells around the landscape. Man adds sand to the oceanfront beaches to reduce storm damages and dredges it out of channels to make navigation easier and safer. At the north end of the barrier spit that is the Point, wooden bulkheads, rock walls and groins (low wooden or stone walls that run perpendicular to the beach) were built in the past to stabilize the dynamic beaches and protect buildings and infrastructure, but are now mostly buried under new sand and will only interfere with natural processes during large storms when they may become exposed to the wind and waves. Plants have been planted on the newly built dunes, stabilizing the new sand and reducing the amount of sand lost from wind erosion.

The mean wave height at Hereford Inlet is a little less than 3 feet (Nordstrom 1987). The tidal range is 4.4 feet, with a mean higher high water of 4.7 feet above mean lower low water (MLLW) and an extreme low water of 3.0 feet below MLLW (NOAA 2001). The overall, or net, longshore transport of sediment is from north to south in this region, moving sand from Avalon and the developed reaches of Stone Harbor to the Point and Hereford Inlet (Nordstrom 1987). Historically, as shoreline stabilization structures such as bulkheads and groins were constructed along the oceanfront beaches of Avalon and Stone Harbor, the natural sediment supply to Stone Harbor Point and Hereford Inlet was reduced and the spit was subject to higher erosion rates. By the 1990s, the oceanfront beaches had eroded up to the bulkheads and very little dry sand beach was left in Stone Harbor. Between 1987 and 2001, Avalon constructed a series of small beach fill projects that have added a total of 4,386,571 cy of sediment to the oceanfront beach between 8th and 31st Streets (Farrell et al. 2003). The Borough of Stone Harbor constructed a similar project in 1998, placing 300,000 cy along the beaches between 98th and 111th Streets to reduce the potential for storm damage to infrastructure and private property in that area (Sheerhan 1999).

In the fall of 2002 and winter of 2003, the U.S. Army Corps of Engineers (USACE) constructed a beach nourishment project along the oceanfront beaches of Avalon and Stone Harbor [with a gap at the undeveloped high dune area in Avalon, between 33rd and 71st Streets], creating over 150 feet of dry beach all along the island, burying the groins, and rebuilding and replanting the dunes in front of the bulkhead (Farrell et al. 2003, USACE 1997). This federal storm damage reduction project ended at the terminal groin just south of the 123rd Street parking lot and beach access to the Point. The USACE plans to maintain the artificial beach for 50 years with periodic additions of new sediment, tentatively scheduled to occur every 3 years (USACE 1997). The next beach fill construction is expected to occur in 2007 or 2008, depending on federal funding.

With the addition of nearly 3 million cubic yards of sediment to the beaches of Seven Mile Island, Stone Harbor Point stopped eroding and has accreted more than 4,200 ft in the last ten years (1997-2006). In 1988, a beach monitoring profile of the NJ Beach Profile Network was lost to continuous erosion at the Point, and a new station was created just south of 121st Street (Farrell et al. 2003). The entire Point was lost to erosion between 1989 and 1992 (Farrell et al. 2003). The inlet shoulder was adjacent to the bayberry thicket in 1992 and is now located over 4,900 ft to the south of the 123rd Street parking lot. The sandy areas of the Point now total approximately 200 acres and include a tidally flushed pond. In 2003, the Borough elevated two

areas (totaling roughly 4 acres) of the low-lying barrier spit to improve breeding habitat for piping plovers by providing nesting areas that would be less likely to flood. Since that time, no artificial manipulations of the landscape at Stone Harbor Point have occurred.

Assuming that the federal beach fill project will continue for its 50 year project life, Stone Harbor Point is expected to continue accreting as the sediment supply to the island is periodically supplemented and the material washes south. The elevation of the spit will gradually rise, with incipient dunes starting to form and vegetation taking hold on the now barren sand. Over time the dune fields will increase in size and vegetation will become more abundant. The low-lying, sparse to unvegetated areas favored by beach nesting birds are likely to be restricted to the southern end of the spit as vegetation extends from the north farther onto the spit. Salt marsh grasses are also likely to colonize the flats on the bayside of the spit, further vegetating the Point. Occasional overwash events created by storms will probably maintain a dune system characterized by gaps penetrated by overwash fans rather than a continuous dune ridge.

Prior to the beach fill activities of the late 1990's and early 2000's, Stone Harbor Point was vulnerable to inlet breaching; the addition of millions of cubic yards of sediment to the system in recent years has made the spit less vulnerable to breaching. If the beach fill is maintained as designed by the USACE, the spit will continue to stabilize and accrete, with dune fields forming and further reducing the chances of a breach. The last known significant breach of the Stone Harbor Point spit was during the late 1960's and early 1970's, when the spit was broken into a series of small islands instead of one long peninsula attached to the developed portion of Stone Harbor.

The main inlet channel within Hereford Inlet shifts in space over time, sometimes hugging the rock revetment (or seawall) on the North Wildwood shoreline and at other times shifting to the north and allowing a large sand spit to form in front of the North Wildwood revetment (Farrell et al. 2003). The main channel is generally around 36 feet deep and typically has other, shallower channels of about 6 feet deep passing around and through a number of shoals. The shoals often reach 2 to 4 feet above mean low water, with some form of Champagne Island present since at least the 1880's. Since 1998, the inlet channel has moved north away from North Wildwood and their rock wall revetment, allowing a sand spit to form (Farrell et al. 2003); in 2006 the spit was still present, indicating that the deep channel remains to the center or north side of the inlet. The North Wildwood spit comes and goes with the shifting inlet channel, occurring three times since mapping of the inlet began (Farrell et al. 2003). This cyclic nature of the inlet and its adjacent shorelines alternately allows Stone Harbor Point and the beaches of North Wildwood to grow and erode (Nordstrom 1987, 1988; USACE 1997).

When the main inlet channel is south of Champagne Island, Stone Harbor Point grows both south and east, as it did from 1840 to 1880 (growing at 74 ft/yr) and again from 1955 to 1965 (Nordstrom 1987, 1988; USACE 1997). In 1952, for example, Hereford Inlet was much wider than its current size, Champagne Island was attached to North Wildwood as a spit extending northwest towards the toll bridge, and a small emergent shoal named Gull Bar and four larger intertidal shoals were present in the middle of the inlet. Stone Harbor Point was large and contained a large pond of unknown salinity running parallel to the shore and tidal marshes along the bayside shoreline. A precursor to Humphrey's Island was located at the mouth of a north facing embayment in the bayside tidal marsh.

When the main inlet channel shifts north of Champagne Island, the oceanfront beaches of North Wildwood erode, a spit grows north into the inlet from North Wildwood, and the southern

tip of Stone Harbor Point may erode; this occurred from 1880 to 1920 and again in the 1980's and 1990's (Nordstrom 1987, USACE 1997). Stone Harbor Point has historically eroded or accreted at rates as high as 142 feet per year, creating a very dynamic setting (Nordstrom 1987). At certain points in time, the spit may be stable with no overall erosion or accretion, as it was during from 1920 to 1928 and again from 1936 to 1955 (Nordstrom 1987). The overall erosion and accretion cycle at Hereford Inlet takes about 60 years, and before the federal beach fill project, there was a long term net loss of 30 feet per year of Stone Harbor Point and a net gain of 12 feet per year at North Wildwood's inlet shoreline (USACE 1997).

Human manipulation of the environment can alter the natural cycle at Hereford Inlet. The construction of the rock revetment along the North Wildwood inlet shoulder in 1977 stabilized that shoreline (USACE 1997), and construction of the bulkhead and two groins just north of the spit in 1967 accelerated erosion of the spit as it was starved of sediment from the north (Nordstrom 1988). Maintenance dredging of Hereford Inlet tends to suppress the natural cycle as well (Nordstrom 1987, USACE 1997). Dredging of the main channel in the inlet would allow the channel to remain south of Champagne Island, as would removing sediment from any of the shoals for use as beach fill (USACE 1997). The state of New Jersey has historically dredged Hereford Inlet, essentially on an annual basis, from the late 1960's to the early 1980's; since that time the inlet has only been periodically dredged, with the last known dredging occurring in 1991. The dredging is usually conducted with a sidecast dredge, which simply moves the sediment out of the navigational channel and dumps it beside the channel. This process keeps the material within the inlet and does not create a sediment deficit. The shoals currently in and around Hereford Inlet are likely to increase in size in the future with the federal beach fill project, and some may become fully emergent and provide additional bird nesting habitat. Navigation through Hereford Inlet and its associated estuarine channels may become more difficult as channels shift and shallow with the additional sediments reaching the inlet.

As global sea levels continue to rise, Stone Harbor Point will continue to evolve as a result of both natural and man-made influences. The federal beach fill project has restored much of the sediment deficit of the previous three or four decades, allowing Stone Harbor Point to return to the state it was in during the late 1950's or early 1960's. Man has created a tidal pool in the former CDF that mimics the historic tidal pond found on the spit. The addition of millions of cubic yards of sand to the island's beaches has largely corrected the erosion caused by hard stabilization structures like jetties, bulkheads and groins. If the federal beach fill project is maintained as designed, the spit is likely to continue to gain in elevation and vegetation density, building extensive dune fields that are periodically overwashed by storms. If the federal beach fill project is not maintained, rising sea levels will erode Seven Mile Island, exposing the hard stabilization structures again; the spit would eventually return to its erosional and highly overwashed state, with storms potentially breaching the spit and dividing it into one or more small islands that move towards the mainland.

Regulatory Background

Management of Stone Harbor Point and its habitats needs to reflect the obligations and opportunities of the federal, state and local regulatory framework. Federal laws such as the Clean Water Act, Endangered Species Act, and Migratory Bird Treaty Act, regulate activities that may impact wetlands and waters, threatened and endangered species, and migratory birds.

The state of New Jersey also has laws governing state-listed threatened and endangered species, non-game species, coastal development, and land use. The Borough has adopted several ordinances that regulate development, recreational and pet uses of the Point. This conservation plan is consistent with this regulatory setting.

Federal

Federal laws and regulations relevant to the Stone Harbor Point Conservation Plan include the following:

Clean Water Act of 1972, as amended (CWA) (33 USC 1251-1387). The purposes of the CWA are to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters". To enact this goal, the U.S. Army Corps of Engineers (USACE) has been charged with evaluating actions that result in potential degradation of waters and wetlands of the U.S. and issuing permits for actions consistent with the CWA. The U.S. Environmental Protection Agency also has responsibility for oversight and review of permits and actions which affect waters of the U.S. Implementing regulations describing the USACE's CWA program are contained in 33 CFR 320-330.

Coastal Barriers Resources Act of 1982 (CBRA) (96 Stat. 1653; 16 USC 3501 et seq.). Congress passed the Coastal Barriers Resources Act in 1982 to address problems caused by coastal barrier development. The law encourages the conservation of hurricane prone, biologically rich coastal barriers by restricting Federal expenditures that encourage development, such as Federal flood insurance through the National Flood Insurance Program. This system is made up of a defined list of undeveloped coastal lands and associated aquatic environments that serve as barriers protecting the Atlantic, Gulf, and Great Lakes coasts. The John H. Chafee Coastal Barrier Resources System currently includes 585 units comprising nearly 1.3 million acres and about 1,200 shoreline miles. There are also 271 Otherwise Protected Areas (OPA), a category added by the **Coastal Barrier Improvement Act of 1990** (P.L. 101-591; 104 Stat. 2931) to add a layer of Federal protection to coastal barriers already held for conservation or recreation, such as national wildlife refuges, national parks and seashores, state and county parks, and land owned by private groups for conservation or recreational purposes, and discourage development of privately owned inholdings. The only Federal funding prohibition within OPAs is Federal flood insurance. Stone Harbor Point and the Hereford Inlet area are included in this system as CBRS Unit NJ-09 and OPA NJ-09P. Three important goals of this act are to minimize loss of human life by discouraging development in high risk areas, reduce wasteful expenditure of federal resources, and protect the natural resources associated with coastal barriers.

Coastal Zone Management Act of 1972 (CZMA) (16 USC 1451-1464). The CZMA presents a congressional declaration to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations". The CZMA also encourages "states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone". In accordance with the CZMA, the State of

New Jersey has adopted state laws and regulations, including a Coastal Zone Management Plan, that is administered by the NJDEP. All actions proposed by federal, state, and local agencies must be consistent or compatible with the Coastal Zone Management Plan, as determined by the NJDEP.

Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*): Establishes that endangered and threatened animals and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. Section 4 provides for listing wildlife and plants as threatened or endangered, including criteria for listing and de-listing species and for development and implementation of recovery plans for the conservation and survival of listed species. Section 6 authorizes cooperative agreements and funding for States to establish programs for conservation of threatened and endangered species. Section 7 directs all federal agencies to utilize their authorities to carry out programs for conservation of listed species and to consult with the USFWS regarding any proposed federal action that may affect a federally listed species. Section 9 prohibits take of federally listed wildlife and restricts collection, destruction, and transport of endangered plants. Section 10 establishes permits for scientific collection, and permits for take of listed wildlife that is incidental to an otherwise lawful non-federal action contingent upon preparation of a Habitat Conservation Plan. Implementing federal regulations are found at 50 CFR 17 and 50 CFR 402. The federal list of threatened and endangered species is found at 50 CFR 17.11 and 17.12. The ESA is administered jointly by the USFWS and the National Marine Fisheries Service.

Migratory Bird Treaty Act, as amended (MBTA) (16 USC 703-712). The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful. The MBTA is administered by the USFWS.

State

New Jersey laws and regulations relevant to the Stone Harbor Point Conservation Plan include the following:

New Jersey Endangered and Nongame Species Conservation Act of 1973 (New Jersey Statutes Annotated, 1937; Titles 13 and 23). The New Jersey Endangered Species Conservation Act established laws to protect and restore threatened and endangered species in New Jersey and allowed the New Jersey Department of Environmental Protection, Division of Fish and Wildlife, to establish the Endangered and Nongame Species Program (ENSP) to restore and maintain these species. The law was designed to protect species whose survival in New Jersey is imperiled by loss of habitat, over-exploitation, pollution, or other impacts. The act also includes "nongame" species defined as "any wildlife for which a legal hunting or trapping season has not been established or which has not been classified as an endangered species by statute or regulation of the state." Actions prohibited by the Act include "the taking, possession, transportation, exportation, sale or offer for sale or shipment of any species or subspecies of wildlife appearing on the following lists: 1) wildlife deteremined to be endangered by the commissioner pursuant to this act, 2) nongame species regulated pursuant to this act, and 3) any Federal list of

endangered species." The Act also states that "[e]xcept as provided by law, rule, or regulation or by the code, no person shall pursue, hunt, take, capture, kill, attempt to take, capture or kill, or have in possession, living or dead, a wild bird." Various habitat protection measures are also prescribed by the Act. Implementing State regulations are found at N.J.A.C. 7:25-4. The State list of threatened and endangered wildlife is found at N.J.A.C. 7:25-4.13 and 4.17. The Act is administered by the ENSP.

New Jersey Endangered Plant Species List Act (N.J.S.A. 13:1B *et seq.*): Finds that plant species have medicinal, genetic, ecological, educational and aesthetic value to the citizens of New Jersey and that the perpetuation of many native plant species is in jeopardy. The Act establishes an official State list of endangered plants found at N.J.A.C. 7:5C1-1 *et seq.* The Act is administered by the Office of Natural Lands Management (ONLM).

New Jersey Coastal Zone Management Rules (N.J.A.C. 7:7E): Constitute the substantive rules of the NJDEP regarding the use and development of coastal resources, to be used primarily by the NJDEP Division of Land Use Regulation in reviewing permit applications under the **New Jersey Coastal Area Facility Review Act** (N.J.S.A. 13:19-1 *et seq.* as amended to July 19, 1993) (CAFRA), the **New Jersey Wetlands Act** of 1970 (N.J.S.A. 13:9A-1 *et seq.*), the **New Jersey Waterfront Development Law** (N.J.S.A. 12:5-3), Water Quality Certification (Section 401 of the CWA), and federal Consistency Determinations (Section 307 of the federal Coastal Zone Management Act (104 Stat. 4779; 16 U.S.C. 3951 *et seq.*)). The Rules are administered by the DLUR.

Local

The Borough of Stone Harbor recognizes the legal infrastructure that effects the management and protection of its beaches. Stone Harbor Point is deed restricted for conservation purposes (Appendix A). Article IV of the Borough's Public Beachfront Recreational Areas laws sets forth the following:

> *This article further acknowledges that the entire southern portion of the island south of 127th Street and a portion of the island as far north as 122nd Street is governed by an easement of record by which the Borough of Stone Harbor is to preserve and protect such property as a wildlife habitat, and a recreational educational nature area for such activities as nature walking, bird watching, and fishing as permitted and regulated. This area is subject to the Coastal Area Facility Review Act (CAFRA) Permit No. CA 75-7-125, and the Order of Dismissal from the Office of Administrative Law, Docket No. ESA 1412-80. The Permit and Order contain conditions that the area south of 127th Street is to be conserved to protect natural resources and provides that the use and parking of motor vehicles shall be regulated such that dunes, endangered and threatened wildlife habitat, critical wildlife habitat, wetlands and other natural resources are protected.*

The Borough's beach management programs and policies on specific recreational activities, vehicles, and beach maintenance are summarized in Section V (pp. 72-82, Tables 14-

17). Chapter 147 of the Borough's General Legislation (http://www.e-codes.generalcode.com/codebook_frameset.asp?t=tcfull) sets forth ordinances regarding licensing and general regulation for animal control and the management of animals in the Borough, including Stone Harbor Point:

Dogs

Dogs must be licensed, registered and vaccinated. Collars and tags must be worn at all times. The existing ordinances state that no dog or other animal shall be permitted to run free in or upon any public property in the Borough of Stone Harbor, with the exception of the area south of 123rd Street, west of the ocean bulkhead (The Point), and only between October 1 and March 15, inclusive. Ordinances call for immediate, sanitary cleanup of dog waste, or the owner is ticketed

No person owning, keeping or harboring any dog shall permit it to run at large upon the public streets or in any public park, public building or other public place within the Borough. Lifeguards are excellent at keeping this law enforced in the summer during the hours of 10 am to 5 pm on protected beaches. However, since the Point is not a protected beach, enforcement of this ordinance depends on sporadic police patrols of the Point and the 123rd Street parking lot. Stone Harbor Police Department patrols the beaches about two times per shift. Currently there is no police policy requiring a minimum number of patrols for any of the Borough's beaches. There are restraints imposed on vehicle use (including police vehicles) for the Point during nesting season, unless there is a life threatening emergency (http://www.e-codes.generalcode.com/codebook_frameset.asp?t=tcfull). These restraints are requested by NJDEP-ENSP and USFWS for the period of time between the hatching of piping plover chicks until they fledge.

Dogs and other animals under leash are permitted on public oceanfront beaches only between October 1 and May 31st. However as stated above, up until now dogs have been allowed to run free on the Point between October 1 and March 15th and on leashes until May 31st. Persons walking dogs on leashes must be 12 years old, and the leash may not be more than 6 feet long. The Borough's ordinances allow for the impounding and destruction of unlicensed dogs running at large; dogs believed to be a stray, or believed to be vicious; and dogs found off the premises of their owner without a collar and registration.

Cats

Cats that are pets must be licensed and vaccinated. The Borough encourages cat owners to keep their cats indoors through continued outreach. Neutering is encouraged by the Borough through their cat licensing fee structure. An owner is charged more money for a license if a cat is not neutered ($5.00 versus $50.00).

No person shall allow any cat to roam free within the Borough of Stone Harbor in a manner to enter upon the area of the Borough commonly known as the "Bird Sanctuary" (the area located in the 200 block between 111th Street and 117th Street) nor upon the area commonly known as "The Point" (south and east from the 123rd Street parking lot to the Atlantic Ocean and/or bay waters).

Feral Cats

The Borough of Stone Harbor recognizes its obligation to effectively and humanely control feral cat populations within its borders. The Borough recognizes that feral cat control is a duty and must be ongoing to protect the nesting area of endangered and threatened avian species at Stone Harbor Point. Early in 2004, the Borough formed a Special Feral Cat Committee, which spent many months investigating methods of carrying out this obligation. The committee conducted numerous meetings with NJ Audubon Society, the USFWS, and NJDEP Division of Fish and Wildlife. The Committee recommended a Trap, Neuter and Return Program (TNR), which was adopted by the Borough on April 5, 2005. This program and its associated ordinances have been extremely effective in drastically reducing, controlling and managing the Borough's feral cat population. The TNR program has allowed the Borough to reduce the feral cat population over time without the necessity of wholesale capture and euthanization. The Committee and the Borough's leaders continue to work hard in the ongoing implementation of a pro-active, vigilant Feral Cat Control Policy.

The first action of this conservation plan was to appoint an Animal Coordinator for the Borough. It should be noted that the Animal Coordinator is also a Sergeant in the Stone Harbor Police Department, and thus possesses the knowledge, expertise, and authority to oversee this program effectively. Part of the success of this program can be directly attributed to the work and commitment of the Animal Coordinator, the respect that she has developed from the community members and her continuous involvement in the management and enforcement of this program and its ordinances.

The Borough is pleased to report the feral cat population from 111th Street south to Stone Harbor Point has been virtually eliminated. Trapping at Stone Harbor Point starts in February of each year, and continues through the end of October. This trapping effort allows for "clearing" and managing the area prior to and during the breeding and brood rearing season of beach nesting birds, as well as critical shorebird stopover periods for Stone Harbor Point. The Borough of Stone Harbor recognizes the fact that one of the goals of predation control is the phased reduction and eventual elimination of feral cat colonies within its boundaries. To date no feral cat colonies are maintained from 111th Street south to the area known as Stone Harbor Point.

In 2005 a total of 28 cats were removed from the Borough – the majority being removed from the Bird Sanctuary (9 cats) and Stone Harbor Point (7 cats); none of these cats were returned to the Borough. This continued in 2006 when a total of 7 cats were removed (none from the Point, 6 from the Bird Sanctuary and 1 from elsewhere in the Borough). To date in 2007 two have been removed, both from areas outside the Point and Bird Sanctuary. Based on the number of cats being trapped by animal control officers showing a significant reduction from 2005 to date (despite consistent trapping effort), it is evident that the number of feral cats within the Borough has greatly diminished.

Since February of 2005, 27 known female cats were either removed (12) from the Borough or spayed and returned to permitted cat colonies (15). Based on a female producing only one litter of four kittens per year (when in fact a female can have two litters in a year), 50% of each new litter being female, females capable of reproducing in their first year, and no mortality (when in fact yearly mortality may be high), the removal or spaying of these females

has prevented the possibility of an additional 1,000 to 2,000 feral cat predators from being born in the subsequent five years.

At this date there are 52 cats living in 10 colonies within the Borough. In 2005 no deaths were reported. In 2006 two were reported to have died and so far in 2007 one has been reported to die. Over the succeeding years the Borough expects the number of colonies to diminish because of its vigilance in protecting bird habitats. Based on the Borough's experience and should these trends continue, the Borough expects to see at least a 28% reduction in the next eight years. The strong enforcement of the "no cat zone" south of 111th Street will continue, and the program will continue to be monitored and reported on an annual basis.

The full text of the law regarding feral cats is available online (http://www.e-codes.generalcode.com/codebook_frameset.asp?t=tcfull). The following are key elements of the Borough's ordinance:

- An Animal Coordinator position has been created to oversee the program and keep *meticulous records* of trapping and locations of each trapping. Records include which agent has performed the trapping as well (i.e., Animal Control or NJDEP-ENSP personnel).
- Feral cat colonies are prohibited from 111th street south.
- Feral cats must be registered by the caregivers with the Borough's Animal Coordinator, who serves as a clearinghouse for information to current caregivers, education and assistance for persons found in violation of this article.
- Ear tipping has been implemented on feral cat colonies in order to identify them as spayed or neutered and vaccinated members of a managed colony.

The ordinance allows for re-evaluation of its efficacy in December of 2008. This "Sunset Provision" has been incorporated into this ordinance so that the TNR Program may be properly evaluated and reassessed after an appropriate period of time. The Article will expire on December 31, 2008. If the TNR Program is eliminated, effective January 1, 2009, the Borough's Animal Control Officer (ACO) shall resume primary responsibility for the management of feral cats within the Borough, including, as necessary, the capture and transport to the County Animal Shelter for handling in accordance with the interlocal agreement between the Borough and the County applicable to handling such animals. The Borough, through its ACO, will also continue to work in partnership with the NJDFW to control cats in sensitive wildlife locations.

Since the threats posed by both feral cats and the Borough's establishment and maintenance of TNR colonies in close proximity of protected species are not completely avoided at this time, and no incidental take authorization is sought for Borough-sponsored or –approved acts, liability remains a concern. Although Borough actions included in this plan (inclusive of the *Conservation Plan for Stone Harbor Point*) regarding cats contain laudable components, the Borough would not be authorized or covered by the USFWS should take of species listed under the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) occur in the future. However, if the TNR program is eliminated via the sunset provision, effective January 1, 2009 the Borough would no longer be liable for a take that occurs as a result of a Borough sponsored TNR program.

Other Wildlife

No feeding of wildlife is permitted in the Borough. A wild animal is defined as any live monkey, ape, raccoon, skunk, fox, snake or other reptile, leopard, panther, tiger, lion, lynx, or any other animal or bird of prey which can normally be found in the wild state. No attracting or feeding of wild and/or stray domestic animals, including but not limited to stray cats, stray dogs, seagulls, Canada geese, skunks and squirrels, is allowed within the Borough of Stone Harbor. (Birdfeeders *are* permitted!)

Relationships to Other Projects and Programs

USACE projects

The U.S. Army Corps of Engineers constructed a large beach fill and shoreline stabilization project along Seven Mile Island during the winter of 2002-2003. The engineering project added over 3.1 million cubic yards of sand to the oceanfront beaches of Avalon and Stone Harbor, widening the beaches by 150 feet (USACE 1997). A new dune ridge was also built, at a height of 16 feet above NGVD (National Geodetic Vertical Datum, which is about 1.5 feet above mean low water), with a top crest 25 feet wide, and 50 acres of dune grasses were planted on the new dune ridge. Roughly 42,500 feet of sand fencing was also installed to trap windblown sand and build additional dunes. The stone seawalls at Townsends Inlet in Avalon and Hereford Inlet in North Wildwood were also refurbished and lengthened. The USACE project is anticipated to last 50 years, with periodic maintenance that renourishes the beaches with more sand (~746,000 cy) every three years. The sand is dredged from the seafloor east of the island and moved by hydraulic dredge to the beaches. The federal beach fill extends from 8th Street in Avalon to the 127th Street terminal groin in Stone Harbor, except for the area between 33rd and 71st Streets. As of January 2007, the USACE has not received funding to construct its first maintenance renourishment of the beach fill, which was due to be undertaken in 2006.

The USACE beach fill project was originally designed to include an extensive ecosystem restoration project at Stone Harbor Point (USACE 1997). This restoration project was designed during the mid-1990's when the Point had eroded north of the 127th Street terminal groin. As a result, the original design included the restoration of 116 acres of wetland, beach, dune and bayberry habitat. Over 1.3 million cy of sand would be dredged from offshore and placed on the Point to restore the sandy spit; a 12 foot high dune extending 1,000 feet southwest of the 127th Street terminal groin and then a 10 foot high dune running 350 feet along the inlet shoreline were designed to include a geotube center to prevent breaching of the dunes by storms, protect the spit from erosion caused by the 127th Street terminal groin, and protect the restored habitat behind the dunes. Sixty-four acres of bayberry and Eastern red cedar were to be planted. Nearly three acres of dune grasses and 1,500 feet of sand fencing would help stabilize the newly created dunes. As of January 2007, the USACE has not received funding to build this project and the spit has restored itself naturally. If, and when, the USACE receives funding to build an ecosystem restoration project at Stone Harbor Point, the design would be modified to reflect current conditions and needs.

In addition to these oceanfront projects within Stone Harbor, the USACE maintains the Atlantic Intracoastal Waterway (AIWW) in the estuaries behind Seven Mile Island. The AIWW runs from Delaware Bay through Cape May Canal, through Grassy Sound behind North Wildwood, then around the west and north sides of Nummy Island before connecting with Great Channel before turning north towards Avalon via Great Sound. The AIWW does not pass near Hereford Inlet or the channels immediately surrounding the inlet. The USACE periodically dredges portions of the 100 foot wide AIWW to maintain a navigational depth of 6 feet, placing those materials within nearby dredged material islands or recycling them for other beneficial uses.

NJ Audubon Society

The New Jersey Audubon Society (NJAS) is the most active organization providing regular educational activities on Stone Harbor Point. The organization's Cape May Bird Observatory conducts weekly walks on Tuesday evenings from April 1 to June 31 and from September 1 to October 31, which are attended by anywhere from 5 to 30 people. The Point is also a featured destination during its Spring and Autumn Birding Weekends, which attract 700 to 800 people each year. NJAS's Citizen Science Program, which is conducted in conjunction with ENSP, collects shorebird count data at the Point during their spring surveys; some shorebirds are occasionally banded as part of the group's research, although the bulk of its banding takes place along the Delaware Bay shoreline. The NJAS has designated Stone Harbor Point as one of New Jersey's Important Bird Areas (IBA); the IBA program recognizes sites of national significance for birds (www.njaudubon.org).

The Wetlands Institute

The Wetlands Institute is located along Stone Harbor Boulevard across Great Channel from Seven Mile Island. The non-profit education Wetlands Institute promotes the conservation and preservation of coastal ecosystems by providing a fun and educational experience for families, school groups and vacationers of all ages. In 2006, the Wetlands Institute conducted 22 school programs at Stone Harbor Point, with groups ranging from 11 to 105 students, for a total of 784 students. One workshop for teachers (20 participants) and eight summer nature camps (480 students total) were also held by the Institute. Staff at the Wetlands Institute guide numerous public bird walks, educating about 150 people in 2006 about the birds found at and near the Point. The Wetlands Institute sponsors an annual Wings 'n Water Festival every September that highlights the area's natural resources, including its avian wildlife.

Scientists at the Wetlands Institute conduct a variety of research and conservation programs in Stone Harbor, including the Point. Their Terrapin Conservation Project assesses the impact of human activities on diamondback terrapins and ways to reduce those impacts; staff frequently rescue injured turtles from the region's roadsides, rehabilitate them, hatch and raise terrapin eggs from pregnant females killed by vehicles, and release the turtles back into the wild. The Beach Biology Project studies the intertidal zone of beaches throughout Cape May County, focusing on the beaches of Seven Mile Island; research focuses on burrowing invertebrate life and profiling of physical beach characteristics (www.wetlandsinstitute.org).

Local Projects

In 2004 the Borough Council established a Natural Resource Committee to oversee any and all projects in the Borough that would have the potential to impact beaches, back bays, Stone Harbor's Bird Sanctuary, Sedge Island, Site 103 (north end of Nummy Island) and most importantly, Stone Harbor Point. The Borough re-evaluated the dredging project history and looked forward to getting mechanisms in place to enhance the review process and management processes involved in projects that have potential to affect its natural resources.

In 2005, Mr. Julian Miraglia was elected to Borough Council and became chair of the Natural Resources Committee. Councilman Miraglia and his committee of leaders, the Borough Council, and the citizens have provided the Borough with a renewed energy and sense of stewardship with regard to the management of its precious natural resources. Three new projects highlight this renewed commitment to the protection of the Borough's natural resources:

Bird Sanctuary Rejuvenation Project

Just north of the Point, between 111th and 117th Streets and bordered by 2nd and 3rd Avenues, is the Stone Harbor Bird Sanctuary. The 21 acre Stone Harbor Bird Sanctuary (SHBS) has been internationally known by ornithologists and bird lovers for its value as a significant wading bird breeding habitat and migratory songbird stopover. The SHBS is a National Natural Landmark, with old growth maritime forest, a freshwater pond, and saltwater marsh. Over the last 10 years, many of the wading birds that used to nest at the SHBS have disappeared due to the invasion of non-native plant species, restricted tidal flow and predator issues.

There is intense local interest in restoring the Stone Harbor Bird Sanctuary. The Borough has entered into a long term partnership with the USFWS's Partnership for Fish and Wildlife Program. Additionally, Stone Harbor has established a Stone Harbor Bird Sanctuary Committee as well as funding to the project for several years. The Committee has formed a "Friends of the Sanctuary" program that has generated local as well as regional interest. Resource agencies and several natural resource foundations are also very interested in the sanctuary.

The Borough has retained Duffield Associates' team of scientists and engineers to work with the Borough and the Bird Sanctuary Committee to develop and implement a comprehensive habitat restoration program that started with the development of a Master Plan for the Borough. The rejuvenation project will be carried out over several years, and includes saltmarsh restoration, freshwater wetland restoration, invasive species control, and improved hydrology. The project's mission is:

- To preserve, protect and foster the ecological well being and diversity of the Stone Harbor Bird Sanctuary and that of the birds that nest in it.
- To create and continually maintain an environment in the SHBS that will encourage the nesting of colonial wading and other compatible species of birds.
- To provide for the education of visitors to the SHBS concerning the significance of the SHBS, its historical origin and community relationship, the species of birds in the SHBS and their importance to our environment, and the need for preservation of both the SHBS and its inhabitants.

The project has gained the attention and support of the community, the county, USFWS, NJDEP, and the NJAS.

Stone Harbor Point Wildlife Viewing Platforms / Education Areas

The Borough has received funding from the National Fish and Wildlife Foundation to construct wildlife viewing platforms, develop an education focal point, and provide for enhanced

stewardship on Stone Harbor Point. This represents an exciting new opportunity to share this extraordinary ecosystem and the phenomena of shorebird ecology, beach nesting bird biology and the importance of conservation with education groups, conservation programs, and the numerous visitors that travel to this regionally significant habitat.

Birding Trail

The Borough is in the process of establishing a 1.5 mile long urban / nature trail connecting the Stone Harbor Bird Sanctuary, the new viewing platform and pergola at Sand Marsh Cove, Stone Harbor Garden Club award-winning garden at 122nd Street and Second Avenue, and Stone Harbor Point. The Birding Trail incorporates the beach nesting bird watching platforms at the Point, a waterfowl and waterbird viewing platform at Sand Marsh Cove near Third Avenue and Ocean Drive, and the existing nature trails within the Stone Harbor Bird Sanctuary. The Borough plans to install signs along the trail, along with painted stencils of birds along the sidewalks connecting the natural areas. This local birding trail is expected to become a part of the regional New Jersey Coastal Heritage Trail.

III. RESOURCES IN NEED OF CONSERVATION

Beach Nesting Birds

Beach nesting birds such as piping plover, black skimmer, least tern and common tern have long been associated with Stone Harbor Point. Although he was primarily an egg collector not a birder, Charles Schick wrote of tern and skimmer colonies being present in the 1880's at the "southern extremity" of Seven Mile Beach (Schick 1890). Witmer Stone made numerous references to beach nesting birds breeding at the "lower end" of Seven Mile Beach during the 1920's and 30's in his classic work, *Bird Studies at Old Cape May* (Stone 1937). Clay Sutton fondly reminisced about the abundant tern and skimmer colonies he experienced at "the Point" as a child growing up in Stone Harbor in the 1950's (Sutton 2003). Official records of nesting at Stone Harbor Point began in earnest in 1976, when the Endangered and Nongame Species Program, then a newly formed program within the New Jersey Department of Environmental Protection, began regular statewide surveys of terns and skimmers, followed several years later with piping plover surveys. It became clear early on from these surveys that Hereford Inlet, including both Stone Harbor Point and Champagne Island (in various shifting configurations), was especially important for black skimmers, but also supported other beach nesting birds when habitat was available. The presence of nesting birds at Stone Harbor Point over the last 30 years has been, to a large extent, driven by the availability of suitable habitat – as the Point has accreted and eroded, so have breeding birds come and gone.

The following is a summary of abundance, distribution, and reproductive success of beach nesting birds at Stone Harbor Point. The primary focus is on the past ten years, the period when beach nesting birds recolonized the site as the beach built up after years of being nearly completely eroded, and when more intensive monitoring and collection of data, including GIS mapping, was undertaken. Unless otherwise indicated, data cited in this section are from the New Jersey Division of Fish and Wildlife (NJDFW) – ENSP, including both published and unpublished reports/records.

Piping Plover

NJDFW-ENSP and its cooperators conducted statewide piping plover surveys in 1980 and between 1984-2006, as well as limited surveys in 1976 and 1983. In general, surveys have been more intensive and uniform since 1987 as a result of federal listing of the species the year prior. The number of pairs of piping plovers nesting at Stone Harbor Point from 1980-1986 ranged from 1-5 pairs, but no nesting was recorded from 1987-1998. This dormant period is largely reflective of the lack of suitable nesting habitat during that time. As an indication of how little suitable habitat existed at the time, when ENSP developed a recovery framework for piping plovers in New Jersey in 1999, the target recovery goal for Hereford Inlet, consisting of three sites (Stone Harbor Point, Champagne Island, and North Wildwood) was just 3-5 pairs. Starting in 1999, piping plovers returned to the site with 3 pairs nesting that year, and the number of pairs has significantly increased since that time (Table 1). A total of 17 pairs nested at the site in 2006,

Table 1. Piping plover breeding results: 1999 - 2006.

	1999	2000	2001	2002	2003	2004	2005	2006
Pairs	3	5	5	6	6	9	10	17
Pairs Hatched	2	2	2	5	3	4	7	6
Chicks Fledged	3	0	1	1	3	1	6	3
Pair Success	67%	40%	40%	83%	50%	44%	70%	35%
Fledge Rate	1.00	0.00	0.20	0.17	0.50	0.11	0.60	0.18

Note: Pair success equals the percentage of pairs that hatched at least one chick.
Fledge Rate equals the number of chicks fledged per nesting pair.

which represented 15% of the statewide total (116 pairs) and more pairs than at any other individual site in the state.

The increase in the number of piping plover pairs nesting, especially the dramatic increase in 2006, has occurred as the site has accreted in recent years, thus providing more suitable breeding habitat. The distribution of nests in recent years has generally followed this physical expansion of the habitat (Fig. 2). In 1999, plovers primarily nested along a thin band of beach just beyond the bayberry/shrub habitat. Pairs began expanding south as the Point grew and more recently eastward as the area closer to the oceanfront has gained some elevation. In 2006, plovers also nested at the southwest extremity of the Point where a "hook" has formed.

Just prior to the 2003 nesting season, the Borough of Stone Harbor, placed ~ 20,000 cubic yards of sand at the site, which increased the elevation ~ 2 feet above the existing grade at two separate locations totaling 4.4 acres (Fig. 3). The purpose of this restoration was to provide more suitable nesting habitat and minimize the impacts of flooding at the site, which had been the primary factor limiting reproductive success up until that time. (See Section II of this conservation plan for details about restoration plan/legal settlement leading to restoration). During the breeding season immediately following the placement of the sand, 5 of the 6 pairs of plovers at the site nested on the larger habitat area and 1 nest was found on the smaller area. However, extremely high flooding/tidal events still destroyed many of the nests that year. Piping plovers have continued to nest on the restored habitat areas, particularly the larger area, since that time although usage has gradually decreased as habitat quality has degraded (i.e., dense vegetation has grown on the bare sand) and other suitable habitat at the site has become available through natural processes.

Despite an increase in the amount of suitable habitat at the site which has resulted in an increase in the number of breeding pairs between 1999 and 2006, reproductive success, especially the number of chicks fledged, has been poor during the entire period. Nest hatching success has varied considerably, ranging between 35-83% for an average of 51% since 1999 (Table 1). Fledge rates have consistently been extremely low (except in 1999, which looks to be an anomaly and was based on only 3 pairs), averaging just 0.30 chicks per pair across all years from 1999-2006 (Table 1). Whether looking at individual years or for all years combined, fledge rates at Stone Harbor Point are well below the 1.50 chicks per pair established as a recovery goal

Figure 2. Distribution of piping plover nests at Stone Harbor Point from 1999 - 2006. Note that in the 2006 color infrared aerial photography, vegetation appears red.

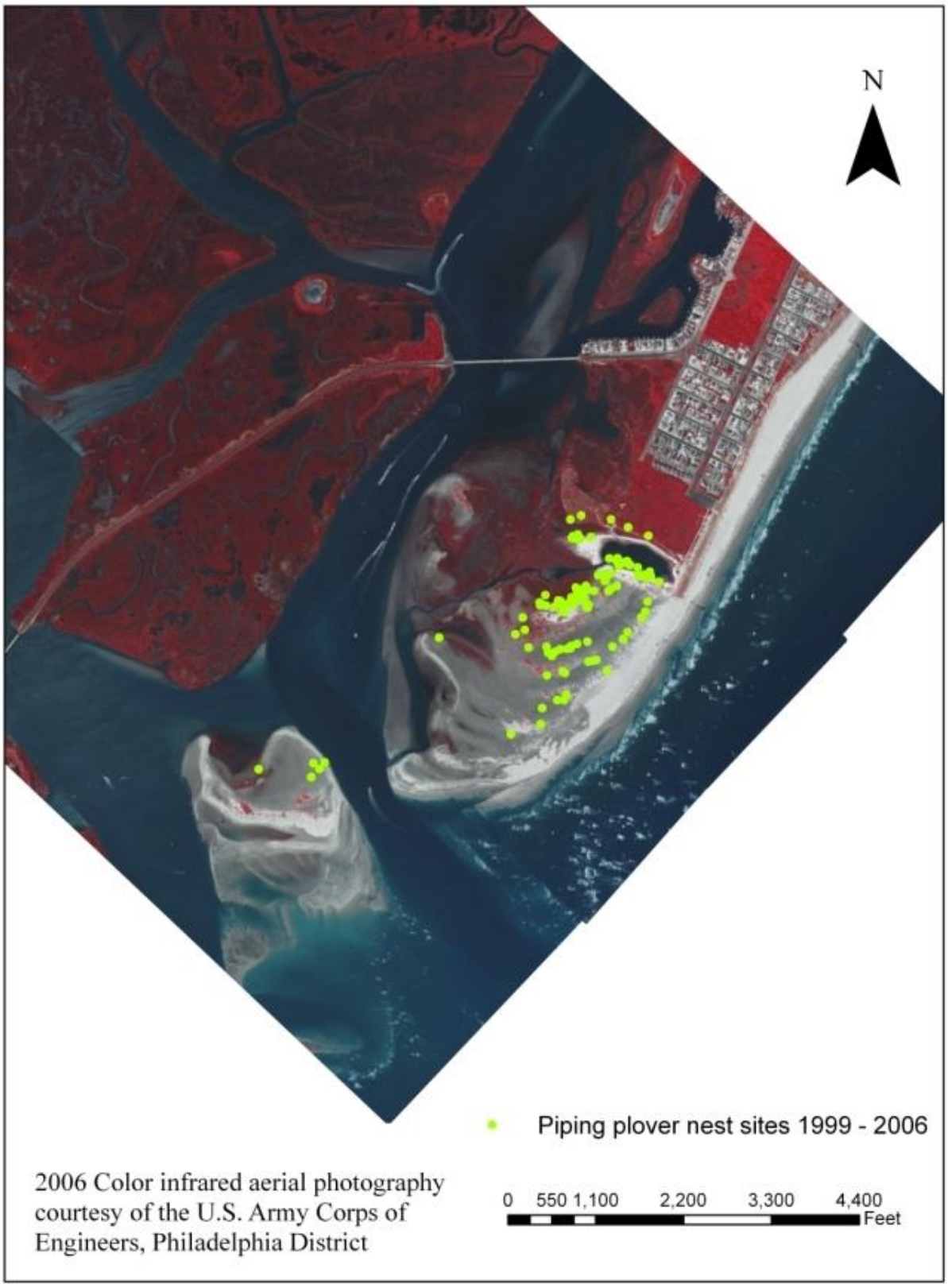
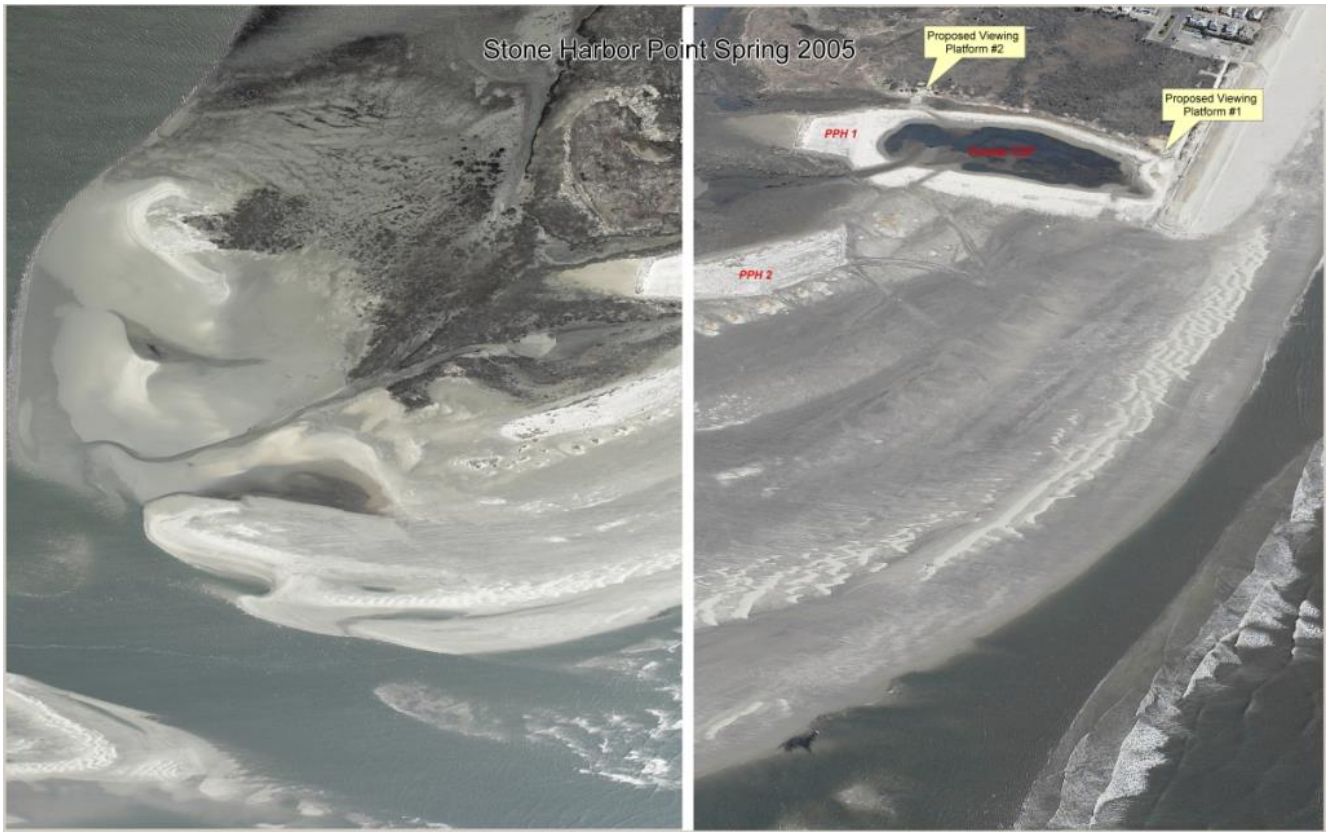


Figure 3. Aerial photograph from 2005 of the two piping plover restoration areas created at Stone Harbor Point (labeled PPH 1 and PPH 2) by the Borough in 2002; images provided by Duffield Associates and also show the locations of two proposed viewing platforms.



by the USFWS in its recovery plan for the Atlantic Coast population of the species, as well as the 1.245 level believed necessary to maintain the population. Productivity at Stone Harbor Point has also been below statewide averages. The causes for chick loss are rarely observed, with predation, flooding, and human disturbance the most likely causes. Predation by gulls is a likely cause of piping plover chick loss, given that piping plover chicks have disappeared at the same time that gull predation on tern and skimmer chicks has been observed. Laughing gulls have also been observed preying on piping plover eggs and jumping on top of exclosure netting (C. Kisiel, ENSP, pers. obs.). Given the low fledge rates and increased number of piping plovers recently nesting at Stone Harbor Point, there are concerns that the site could be a population sink that jeopardizes state or regional level recovery.

Black Skimmer

Surveys of black skimmers have been conducted on a statewide basis by NJDFW-ENSP and its cooperators since 1976. Black skimmers are more closely associated with Stone Harbor Point (and Champagne Island) than probably any other species. They have nested at one or both of those sites every year since 1980 with the exception of 1987 and 1988 (and in 1986 only 2 adults were present). Large colonies numbering over 1,000 individuals have been present some of those years, the largest being a colony of 1,831 total adults at Stone Harbor Point in 2005

(Tables 2 and 3). Furthermore, in recent years the skimmer colonies located in Hereford Inlet were the largest in the state, and because most of the state's skimmers have been concentrated in just 2 or 3 large colonies the Hereford Inlet colonies represented a significant portion of the state population. Because of the trend in New Jersey over the past thirty years towards fewer and larger colonies, black skimmers remain vulnerable despite some recent gains in population.

The distribution of black skimmers at Stone Harbor Point since 1998 has shifted as the habitat features have changed (Fig. 4). In the late 1990's skimmers were limited to a sand desposit/bar located near the northeastern portion of site's limited sandy beach. This location provided some of the only elevated nesting habitat at the site, although it was still flood prone. Nesting expanded somewhat from this general location in the early 2000's, but in 2003 a large shift in site selection by nesting birds occurred as a result of the sand placed at the site by the Borough. Skimmers favored the large restoration area, and with the increase in suitable nesting habitat the size of the colony dramatically increased to 1,337 individuals compared to just 397 in

Table 2. Black skimmer breeding results at Stone Harbor Point: 1976-2006.

Year	Peak Total Adults	Peak Incubating Adults (Pairs)	Total Chicks Fledged
1976	0	NA	NA
1977	0	NA	NA
1978	0	NA	NA
1979	0	NA	NA
1980	344	NA	NA
1981	480	NA	NA
1982	400	NA	NA
1983	350	NA	NA
1984	400	NA	NA
1985	300	NA	NA
1986	2	NA	NA
1987-1997	0	0	0
1998	533	179	398
1999	568	241	0
2000	634	225	82
2001	870	430	0
2002	397	210	339
2003	1,337	463	179
2004	1,000	443	33
2005	1,831	231*	420
2006	704	264	0

NA= not available.

*Note: Surveys were conducted from periphery of the colony and as a result this figure is likely lower than number of pairs actually present because of difficulty detecting birds nesting in dense vegetation. This may have occurred in other years as well but it was not as evident as this year when compared to the peak number of total adults counted at the site.

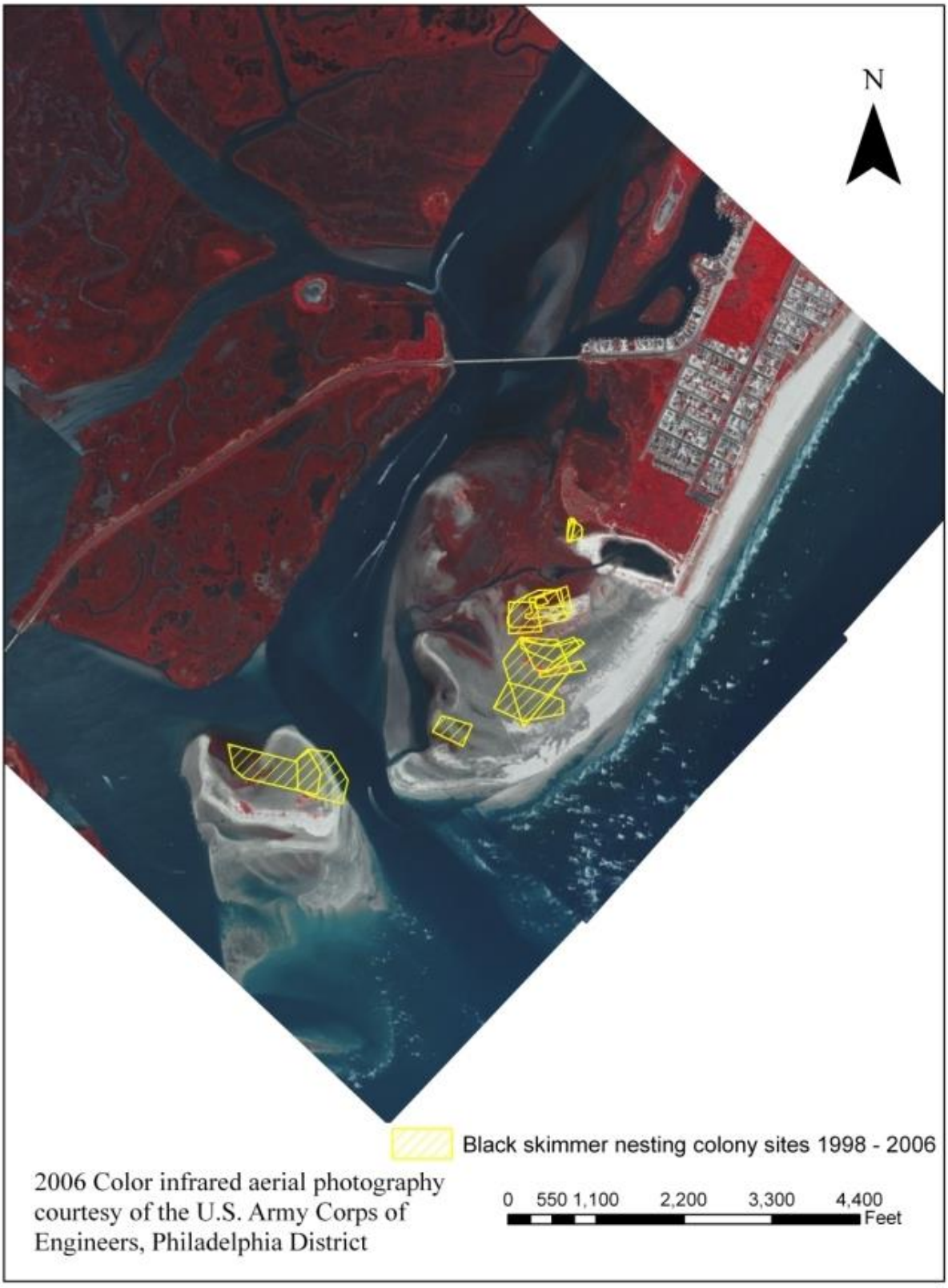
Table 3. Total number of adult black skimmers present in Hereford Inlet: 1976-2006.

Year	Stone Harbor Point	Champagne Island	Total Hereford Inlet
1976-1979	0	0	0
1980	344	0	344
1981	480	0	480
1982	400	32	432
1983	350	0	350
1984	400	0	400
1985	300	0	300
1986	2	0	2
1987	0	0	0
1988	0	0	0
1989	0	383	383
1990	0	755	755
1991	0	650	650
1992	0	650	650
1993	0	800	800
1994	0	1,100	1,100
1995	0	1,005	1,005
1996	0	1,297	1,297
1997	0	950	950
1998	533	0	533
1999	568	0	568
2000	634	103	737
2001	870	0	870
2002	397	204	601
2003	1,337	0	1,337
2004	1,000	0	1,000
2005	1,831	247	2,078
2006	704	1,619	1,619*

*Note: In 2006, the colony at Champagne Island did not form until the colony at Stone Harbor Point completely failed. Skimmers were observed a few days later initiating breeding behavior at Champagne Island. Therefore, the totals from the two sites were not summed. Some double counting may have occurred in other years when both sites were active, but in those cases the colonies were active at the same time.

2002 (Table 2 and Fig. 4). Skimmer usage of the restoration area has gradually diminished since that time, as other suitable habitat (i.e., newly forming dunes) has become available and predator harassment has resulted in other shifts – generally further east and south from the restoration area.

Figure 4. Distribution of black skimmer nesting colony sites at Stone Harbor Point from 1998 - 2006. Note that in the 2006 color infrared aerial photography, vegetation appears red.



Colony location has sometimes shifted at Stone Harbor Point within individual years as all or part of the colony failed. Moreover, colonies have also shifted between Stone Harbor Point and Champagne Island from year to year and in individual years (Table 3).

Black skimmer productivity has fluctuated tremendously at Stone Harbor Point since 1998. Fairly robust productivity was recorded several years (1998, 2002, 2005), while the colony completely failed in other years (1991, 2001, 2006), making it difficult to discern any pattern (Table 2). [Note that the 2006 colony failure at the Point was subsequently successful at Champagne Island, where chicks were produced by the same adult individuals who renested on the island.] Because populations within the Inlet have remained fairly high over the entire period since 1976, especially in recent years, and because black skimmers are a long-lived species, productivity is likely sufficient at the present time to sustain the local population. However, flooding, which is a persistent problem at Stone Harbor Point and largely unpredictable, remains a strong limiting factor. Furthermore, considerable depredation of skimmer nests and chicks by laughing gulls at the site during the past four years has raised additional concerns. As previously discussed, the fact that there are just a few large skimmer colonies remaining in the state makes protection of the colonies present in Hereford Inlet particularly critical.

Least Tern

Statewide surveys of least tern have been conducted by NJDFW-ENSP and its cooperators since 1976. Breeding least terns were present at Stone Harbor Point each year between 1976-1985 (except 1983) with colony sizes ranging from 40-150 adults. This was followed by a period between 1986-1996 when no breeding activity was recorded at the site. As has been noted for other beach nesting bird species, this inactive breeding period at Stone Harbor Point was the result of the loss of suitable nesting habitat as the site became severely eroded. Among the beach nesting bird species, least terns were the first to recolonize Stone Harbor Point in recent years, when a small number of breeding adults were recorded at the site in 1997. Least terns have nested each year between 1997-2006, ranging from 15 total breeding adults in 1997 to 263 in 2006 (Table 4).

As is typical with this species, the size of the least tern colonies at Stone Harbor Point has varied greatly from year to year. Also, it should be noted that other least tern colonies have been present within the Hereford Inlet system, most notably large colonies at North Wildwood since 2002 (490 adults in 2003, for example). It is likely that there has been movement between these colonies within individual years so it is probably more effective to examine population trends for this species at a more regional scale. In terms of abundance of breeding adults, Hereford Inlet has been one of the two (Northern Monmouth County being the other) most significant regions for least terns in the state from 2003-2006.

The distribution of least terns at Stone Harbor Point has varied as the habitat has changed (Fig. 5). However, the least tern colonies have tended to be more focused in a discrete portion of the site than some of the other nesting species which have more typically used most of the available habitat in any given year. Locations of the colony have sometimes shifted within individual years as all or part of the colony failed.

Productivity for least terns since they returned to Stone Harbor Point in 1997 has been low, especially from 2003 to the present when the colony completely (or near completely) failed

Table 4. Least tern breeding results: 1976-2006.

Year	Peak Total Adults	Peak Incubating Adults (Pairs)	Total Chicks Fledged
1976	44	NA	NA
1977	40	NA	NA
1978	150	NA	NA
1979	126	NA	NA
1980	60	NA	NA
1981	80	NA	NA
1982	50	NA	NA
1983	0	NA	NA
1984	60	NA	NA
1985	40	NA	NA
1986-1996	0	0	0
1997	15	6	10
1998	162	72	28
1999	98	61	0
2000	56	28	20
2001	37	29	12
2002	57	31	12
2003	255	189	2
2004	65	40	0
2005	86	9	0
2006	263	195	1

NA= not available.

(Table 4). The low productivity over the past four years follows a statewide trend, although factors vary considerably at different sites within the state. Poor productivity at Stone Harbor Point has been the result of a combination of flooding and predation, primarily from laughing gulls in recent years.

Common Tern

Common terns have been surveyed in New Jersey since the 1970's through various methods and types of surveys. They have been included in periodic aerial colonial waterbird surveys, which have largely focused on back bay estuarine habitat. Colonies in Barnegat Bay have been censused on an annual basis by Dr. Joanna Burger at Rutgers University. Barrier island nesting sites have been surveyed by NJDFW-ENSP and its cooperators as part of their beach nesting bird project (in conjunction with monitoring of other species such as piping plover, least tern, and black skimmer), although these surveys have not necessarily been as intensive as

Figure 5. Distribution of least tern nest colony sites at Stone Harbor Point from 1998 - 2006. Note that in the 2006 color infrared aerial photography, vegetation appears red.

Table 5. Number of common terns breeding at Stone Harbor Point: 2001-2006.

	2001	2002	2003	2004	2005	2006
Total Breeding Adults	44	392	1,686	905	950	449

for the other species and productivity data has not always been collected in a consistent manner (primarily because they are not a listed species).

A complete set of data does not exist for Stone Harbor Point, but it is known that common terns began nesting at the site again in 2001 when a small number of adults (44) were found within the black skimmer colony. Common tern nesting peaked at the site in 2003 when 1,686 individual common terns were recorded. The colony remained near 1,000 individuals the following two years and fell again, by about half, in 2006 (Table 5).

The presence of common terns at Stone Harbor Point is strongly correlated with black skimmers, as the two species almost always nest together when found on barrier beaches in New Jersey. It is unlikely they nested at Stone Harbor Point during the period between 1987-1997 when no skimmers nested at the site (and little, if any, suitable habitat existed). However, they were present during that same period within skimmer colonies located at Champagne Island.

Common terns nest in New Jersey on both sandy beach substrate and on wrack or matted vegetation on marsh islands. In 2001 when just 44 adults were found breeding on Stone Harbor Point, approximately 500 adults were counted on an aerial survey of the marsh islands surrounding Hereford Inlet. When a similar aerial survey was conducted in 2004 only a few dozen common terns were detected on the same marsh islands but slightly over 900 individuals were then breeding at Stone Harbor Point. This data suggests that the tern's habitat preference shifted during that period. In fact, the extremely large common tern colony (1,686 individuals) at Stone Harbor Point in 2003 corresponds with when new breeding habitat areas were created at the site as part of a Borough restoration/mitigation project, as well as when the black skimmer colony likewise increased dramatically.

GIS mapping data has not been collected separately for common terns, but as previously indicated common terns and black skimmers nest together at the site, so the distribution of common terns at Stone Harbor Point since 2001 has been nearly the same as for black skimmers (Fig. 5).

Productivity of common terns at Stone Harbor Point has not been precisely tracked. However, again common tern colonies have roughly fared on par with black skimmers colonies at the site. Flooding, as well as predation of nests and chicks, primarily from laughing gulls, has impacted productivity. In 2006 the colony completely failed as a result of depredation and harassment from laughing gulls, although a reduced portion of the common terns moved to Champagne Island, as did black skimmers.

Gull-Billed Tern

This species has not been tracked in New Jersey as part of any comprehensive survey (only during the regular aerial surveys), although some incidents of breeding have been recorded at Stone Harbor Point in recent years as a result of monitoring of other beach nesting birds at the

site. Two breeding pairs of gull-billed terns were confirmed in both 2003 and 2004 within a large mixed colony of black skimmers and common terns. Sporadic reports of this species being observed during the breeding season at either Stone Harbor Point or Champagne Island, again within larger tern/skimmer colonies, have appeared on the New Jersey Audubon Society's Rare Bird Alert from the late 1990's to the present. Descriptions of adult behavior or observation of chicks in these reports suggest these were breeding pairs, although there have never been more than a couple of pairs reported at these sites in any given year.

American Oystercatcher

NJDFW-ENSP and its cooperators began conducting regular surveys of American oystercatchers breeding on sandy beach strand areas along the Atlantic Ocean (and some inlet islands) starting in 2003. A partial survey of only those sites monitored by ENSP, which did not include any assessment of reproductive success, was also conducted in 2002. Results of those surveys show a steady increase of pairs nesting on sandy substrate at Stone Harbor Point between 2002 and 2006, from just 4 pairs in 2002 to 17 pairs in 2006 (Table 6). American oystercatcher abundance and distribution has followed a trend similar to piping plover at the site – as the habitat has increased, the number of pairs has increased and the amount of occupied habitat has expanded. The 17 pairs nesting at Stone Harbor Point in 2006 was particularly significant, as it represented 29% of the known total pairs (59) nesting statewide on the Atlantic Coast beach strand.

Of those pairs nesting on sandy beach strand habitat at Stone Harbor Point since 2003, pair hatch success has widely varied between 12% and 80%, for an average of 40% looking at all years (Table 6). Productivity has also fluctuated greatly; productivity has ranged between 0.06 chicks per pairs to 0.70 chicks per pair, for an average of 0.30 chicks per pair from 2003-2006 (Table 7). The average fledge rate at Stone Harbor Point since 2003 (0.30) was very similar to statewide averages for the beach nesting portion of the population, which ranged from 0.25 to 0.31 chicks per pair from 2003-2006. Productivity necessary to sustain the population are not known, although because the oystercatcher is a relatively long-lived shorebird, the level is likely

Table 6. American oystercatcher (beach strand population) breeding results: 2002-2006.

	2002	2003	2004	2005	2006
Pairs	4	6	7	10	17
Pairs Hatched	NA	3	3	8	2
Chicks Fledged	NA	2	2	7	1
Pair Success	NA	50%	43%	80%	12%
Fledge Rate	NA	0.33	0.29	0.70	0.06

Note: Pair success equals the percentage of pairs that hatched at least one chick. Fledge Rate equals the number of chicks fledged per nesting pair. NA= not available.

lower than for some of its beach nesting counterparts (i.e. piping plover). The low productivity rates are due to a varying factors (see the Management Issues section), with flooding a factor in 2005 and 2006 and predation (especially by skunks) a factor in 2006.

Despite conservation concerns, it is widely acknowledged that American oystercatcher have been undergoing a northward expansion of their breeding range for the past several decades, including a return to areas that were historically occupied before market hunting and egg collecting greatly reduced the population in the 1800's. One factor that may be contributing to this recolonization of its historic range is the species usage of salt marsh habitat for breeding. New Jersey does not currently conduct any regular surveys of the back bay/marsh population, although it is now believed that the marsh nesters account for a significant percentage of the overall population within the state, even more than nest on beach strand habitat. A Rutgers University research study comparing breeding success of beach versus marsh nesting oystercatchers was conducted in New Jersey in 2005 and 2006 at several selected study sites, including Hereford Inlet. Although the results of that study are not yet published, they have shown wide distribution of nesting oystercatchers across all habitat types within Hereford Inlet (Fig. 6). Preliminary analysis of the data indicate that Hereford Inlet (when you pool the data for Stone Harbor Point, Humphrey's Island, Nummy Island, and Champagne Island) was the most productive site in the study for both years (Virzi 2005, 2006). However, reproductive success varied greatly across habitats and between years at Hereford Inlet, with Stone Harbor Point accounting for the largest percentage on chicks fledged in one year (2005) and Champagne Island in the other (2006).

American Oystercatcher (Wintering)

In addition to hosting breeding American oystercatchers, various sites within Hereford Inlet, including Stone Harbor Point, support a significant portion of the state's wintering population of this species. New Jersey represents the northernmost regular wintering range of the Atlantic and Gulf coast population. A range wide aerial survey conducted in the winter of 2002-2003 by the Manomet Center for Conservation Sciences in cooperation with members of the American Oystercatcher Working Group recorded nearly 11,000 individual birds. The New Jersey segment of the survey from Barnegat Inlet to Cape May Point, which was conducted by NJDFW-ENSP, found 973 birds, nearly 9% of the overall population.

Various aerial and ground surveys conducted in New Jersey in subsequent years during the same period as the baseline survey have shown a lower statewide population and some changes in distribution, but Hereford Inlet has figured prominently in each survey. The exact number of birds present in Hereford Inlet in the winter has varied in the years from 2002-2006, but this inlet has accounted for a significant portion of the statewide total, ranging from 17% to 46%. (Table 7).

Although oystercatchers are highly territorial during the breeding season, they gather in flocks, consisting of both adults and sub-adults, in the non-breeding season. Birds may disperse widely to forage during low tides, but congregate at high tide, typically demonstrating strong fidelity to specific sites. In New Jersey most high tide roost flocks are located within or close to inlet systems (Fig. 7). Because oystercatchers are concentrated during the high tide cycle, often in large flocks, they are particularly vulnerable to human disturbance at this time. Absecon and Hereford Inlets have consistently harbored the largest wintering flocks in the state.

Table 7. American oystercatcher wintering population.

	Nov. 25, 2002	Dec. 3, 2004	Dec. 6-16, 2004	Dec. 7-19, 2005	Dec. 10-15, 2006
Statewide Total	973	840	807	546	636
Hereford Inlet Total	193	350	370	95	190
% of Statewide Total	20%	42%	46%	17%	30%

Note: The Nov. 25, 2002 and Dec. 3, 2004 data are from aerial surveys. All other surveys were ground counts.

It should be noted that survey efforts in New Jersey for this species have primarily focused on breeding and "wintering" populations, but oystercatchers begin to gather in "staging" flocks soon after breeding ends in late July and continuing through the fall. This phenomenon has been noted at Stone Harbor Point/Hereford Inlet, although it has not been closely tracked or quantified to date.

Migrants and Foragers

A large number of birds use the Hereford Inlet complex to find food and as migratory stopover habitat. Migratory shorebirds such as the red knot, as well as songbirds and waterfowl, rely on the habitats of and near Stone Harbor Point every year, all throughout the year.

Migratory Shorebirds (Red Knot and Other Species)

Stone Harbor Point and Champagne Island have been known for decades to be crucial to migratory shorebirds. In the last ten years as a result of monitoring, radio telemetry and banding, the site's importance has been well documented both in the spring and fall during migratory movements of shorebirds through the area; as a summer concentration area for birds unable to complete the migration to the Arctic breeding area; and for immature shorebirds that won't breed until their second year of life. The importance of Hereford Inlet has also grown over the last decade because of more widespread use of surrounding waterways by boat and jet skis and an increase in the number of beachgoers. This increase in recreational activity has resulted in the concentration and reliance of birds on less developed portions of the beach and estuarine habitat, and puts a premium on the few areas that can be protected, such as Hereford Inlet. Stone Harbor Point and Champagne Island play a critical role as a major high-tide roost area and an important alternate foraging area for migrating shorebirds, which has become more important as the horseshoe crab egg resources on Delaware Bay have declined because of ongoing harvest of adult crabs.

During the past five years, intensive survey and telemetry studies have documented nearly the entire migrant population (20,000 individuals) of red knots, recently designated as a candidate species for federal listing under the ESA, roosting on Stone Harbor Point and

Figure 6. Distribution of American oystercatcher nests at Hereford Inlet from 2005 - 2006. Note that in the 2006 color infrared aerial photography, vegetation appears red and where nests appear over water, the land has shifted since the time of those nests.

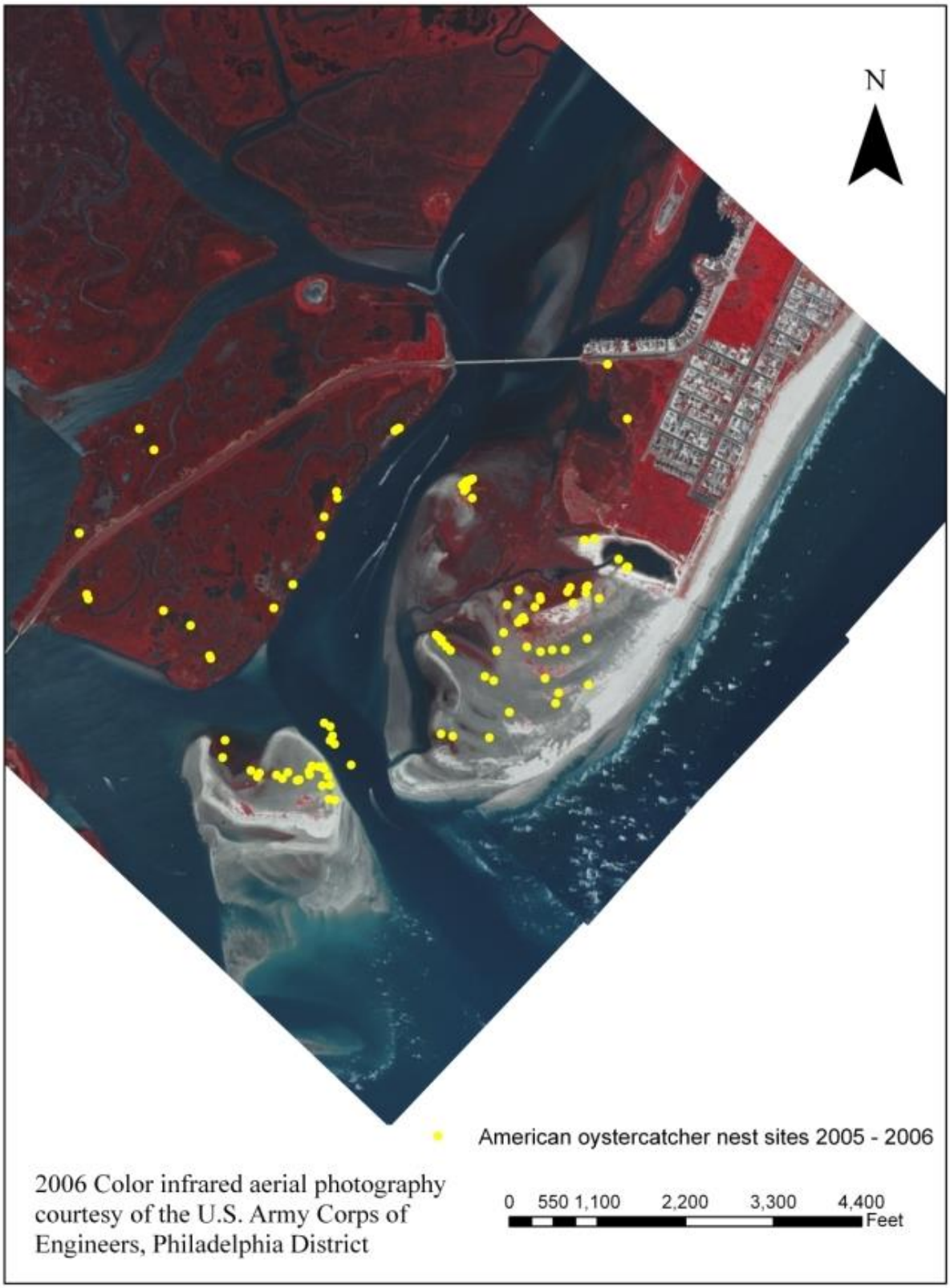


Figure 7. Map of key wintering high tide roost locations for American oystercatchers in Hereford Inlet. Note that in the 2006 color infrared aerial photography, vegetation appears red.

Champagne Island in May-June during the spring migratory period (Niles et al. 2007; Fig. 8). Safe roost sites are a critical and dwindling resource for shorebirds. Stone Harbor is one of only three high-tide roost sites in the entire Delaware Bay ecosystem (including Egg Island point in NJ and Mispillion River in Delaware) and is the only roost exposed on the highest spring tides. Other species observed roosting with red knots on spring high tides include dunlin, short-billed

Figure 8. Map of red knot sightings and shorebird roost sites at Stone Harbor Point. 20,000 red knots were observed roosting on the spit in 2005, and 10,000 red knots were observed roosting on Champagne Island in 2006. Map provided by NJDEP – ENSP.

dowitcher, sanderling, semipalmated sandpiper and ruddy turnstone, variously numbering between 10,000 to 30,000 individuals. Major portions of these species' populations pass through Delaware Bay in spring and are all in decline (Morrison et al. 2006).

Surveys conducted in spring, summer and fall (during southbound migration) have documented as many as 50,000 shorebirds roosting at various sites on Stone Harbor Point; up to 24 shorebird species have been observed at the Point (Table 8), with the highest number of species seen in September and October when up to 7,400 individual shorebirds have been recorded on one day.

Stone Harbor Point and Champagne Island (the Hereford Inlet Complex) also serve as important foraging areas where shorebirds can partially make up for short supply of crab eggs by foraging on small surf clams (*Donax variabilis*) and mussel spat (*Mytilius edulis*) in years when these ephemeral resources are abundant. This has become incredibly important as the horseshoe crab egg resource has declined.

Stone Harbor Point is also believed to be an important staging site in the fall for migrating piping plover, although this is not widely documented. A banded piping plover from the endangered Great Lakes population was spotted at Stone Harbor Point, in the fall of 2003 (Stucker and Cuthbert 2006). Up to 20 migrating piping plover have been seen at Stone Harbor Point in September, and up to a dozen in October, with a high count of 40 birds seen during the early fall migration (C. Kisiel, NJDEP, pers. comm.). Table 8 provides a complete list of shorebird species present at Stone Harbor Point from spring and fall surveys.

The protection of Stone Harbor (and Champagne Island) is an important element in the regional shorebird protection plan. Shorebirds are recognized in a number of regional assessments of bird habitat including those done by the USFWS, The National Shorebird Council and Western Hemisphere Shorebird Reserve Network (WHSRN). With more than 60% of the red knot population roosting on Stone Harbor Point and Champagne Island, it qualifies as a WHSRN site of hemispheric importance (30% threshold). The Point may qualify as a WHSRN site of international importance based on the total number of shorebirds seen there annually, and does qualify as a site of regional importance for piping plover, black-bellied plover, American oystercatcher, dunlin, and short-billed dowitcher. Further evidence of the growing importance of Hereford Inlet occurred in 2006 when after only one year of intensive protection, shorebird use expanded and the protected areas were enlarged.

Table 8. Shorebird species that have been documented at Stone Harbor Point during spring and fall migration season surveys.

American golden plover	Pectoral sandpiper	Western sandpiper
American oystercatcher	Piping plover	Whimbrel
Black-bellied plover	Purple sandpiper	White-rumped sandpiper
Dunlin	Red knot	Willet
Greater yellowlegs	Ruddy turnstone	
Killdeer	Sanderling	
Least sandpiper	Semipalmated plover	
Lesser yellowlegs	Semipalmated sandpiper	
Long-billed dowitcher	Short-billed dowitcher	

Migratory songbirds

Millions of migratory songbirds, of at least 75 species, move through the southern New Jersey coast each year and concentrate around Cape May (ACJV 2005). Yellow-rumped warblers, red-eyed vireos, black and white warblers, American redstarts, pine warblers and gray catbirds are the most abundant species (ACJV 2005). Bayberry provides songbirds with a valuable source of fruit to eat in the fall and winter months, and as a result Stone Harbor Point is used by a number of these migratory songbirds. The bayberry woodland at Stone Harbor Point provides nesting habitat for Carolina wren, gray catbird, Northern mockingbird, American robin, yellow warbler, common yellowthroat, boat-tailed grackle, Northern cardinal, Eastern towhee, and song sparrow (M. Fritz, NJ Audubon, pers. comm.). Several songbirds use the thickets during fall and spring migration, especially during the fall; during northwest winds, migrating birds that are blown off course out over the Atlantic may gravitate towards the bayberry thickets for shelter and rest as they return to land. As many as 22 species of warbler have been seen during the fall and 18 species in the spring. The tree swallow, gray catbird, brown thrasher, American robin, wood thrush, veery, hermit thrush, red-eyed vireo, Northern parula, blackpoll warbler, black-throated blue warbler, yellow-rumped warbler, prairie warbler, palm warbler, Eastern towhee, and song sparrow seem to rely on the bayberry thickets during migration more so than other species, but a number of unusual species may occasionally visit as well. Another 19 songbird species (Table 9) will overwinter at Stone Harbor Point in the bayberry (M. Fritz, NJ Audubon, pers. comm.).

Waterfowl

The waters and wetlands around Hereford Inlet and Stone Harbor Point attract a high number of migratory and overwintering waterfowl, and even a few who might stick around to breed during the summer. The Atlantic Coast Joint Venture has designated the southern Atlantic coast of New Jersey, including the Hereford Inlet – Stone Harbor Point complex, as a New Jersey Waterfowl Focus Area for its importance to breeding, migratory and overwintering waterfowl like American black duck and Atlantic brant. The southern New Jersey coast provides the most significant wintering area for these two species along the Atlantic flyway, with over 80,000 black ducks and 100,000 Atlantic brant (ACJV 2005). Other waterfowl that can be seen around the Point include buffleheads, Northern pintail, American wigeon, mallard, green-winged teal, gadwall, wood duck, mergansers, scaups, scoters, geese, common goldeneye, ruddy duck, and long-tailed duck (ACJV 2005). All of these species can be seen during migration, all but the wood duck can overwinter in the area, and the American black duck, mallard, gadwall, and Canada goose will nest in the Hereford Inlet area. Red-necked grebe, common and red-throated loons, and King and common eiders have been seen during migration and winter seasons as well (Table 10). Scores of Northern gannet, a seabird that sometimes ventures close to shore, can also be seen from spring through late fall from Stone Harbor Point (L. Armstrong, NJ Audubon, pers. comm.). Overwintering waterfowl are generally spread out in the coastal marsh and back bay areas, but when those areas freeze over the Hereford Inlet area becomes more important as it remains free of ice and waterfowl concentrate there (T. Nichols, NJDEP, pers. comm.).

Table 9. Songbirds that have been seen at Stone Harbor Point.

Nesting	Migratory (spring and fall)	Wintering
American robin	American robin	American goldfinch
Boat-tailed grackle	Blackpoll warbler	American robin
Carolina wren	Black-throated blue warbler	Brown thrasher
Common yellowthroat	Blue grosbeak	Carolina wren
Eastern towhee	Brown thrasher	Eastern towhee
Gray catbird	Gray catbird	Gray catbird
Northern cardinal	Grosbeaks	Hermit thrush
Northern mockingbird	Hermit thrush	House finch
Song sparrow	Lark bunting	Northern cardinal
Yellow warbler	Northern parula	Northern flicker
	Palm warbler	Northern junco
	Prairie warbler	Northern mockingbird
	Red-eyed vireo	Palm warbler
	Scarlet tanager	Ruby-crowned kinglet
	Tanagers	Song sparrow
	Thrushes	Swamp sparrow
	Townsend's warbler	White-throated sparrow
	Tree swallow	Winter wren
	Veery	Yellow-rumped warbler
	Vermillion flycatcher	
	Vireos	
	Warblers	
	Wood thrush	
	Yellow-billed cuckoo	
	Yellow-breasted chat	
	Yellow-rumped warbler	

Table 10. Waterfowl and seabirds that have been seen near Stone Harbor Point.

American black duck	Common merganser	Northern pintail
American wigeon	Gadwall	Red-breasted merganser
Atlantic brant	Green-winged teal	Red-necked grebe
Black scoter	Hooded merganser	Red-throated loon
Bufflehead	King eider	Surf scoter
Canada goose	Long-tailed duck	White-winged scoter
Common eider	Mallard	Wood duck
Common loon	Northern gannet	

Plants

Stone Harbor Point currently supports a variety of grasses, annual and perennial flowers, shrubs and even a few trees. Some of the plants are listed by the state of New Jersey as endangered or of special concern.

Seabeach amaranth

Seabeach amaranth is a federally-threatened plant that only grows on beaches along the Atlantic coast. This annual plant forms low-growing mats of spinach-green colored leaves and pink, red or reddish stems; the half-inch to inch long leaves turn deep red in the fall (Snyder 1996). Seabeach amaranth generally grows about a foot in diameter but can occasionally reach 35 inches in diameter. Seedlings start to grow in late spring or early summer and the plant continues to grow until late fall or early winter (USFWS 1996b). The plant spreads by seeds.

Seabeach amaranth is "an annual species with a fugitive lifestyle," shifting its distribution between patches of suitable habitat in any given year (USFWS 1996b). Seabeach amaranth is native to Atlantic coast barrier island beaches from Massachusetts to South Carolina. The species primary habitat consists of overwash flats at accreting ends of barrier islands, and lower foredunes and upper strands of non-eroding beaches. This species occasionally establishes small, temporary, and casual populations in secondary habitats including sound side beaches, blowouts in foredunes, and sand or shell dredge spoil or beach nourishment material. Seabeach amaranth does not occur on well-vegetated sites, particularly where perennials have become strongly established (Weakley and Bucher 1992).

In New Jersey, seabeach amaranth disappeared in the early 1900's, but reappeared in 2000 in Monmouth County, primarily on federal beach fill that restored its habitat (seabeach amaranth tends to be absent from highly eroded areas). Since then, the plant's distribution has spread throughout the state, although the heaviest concentrations are still in Monmouth County. There are no known occurrences of seabeach amaranth in Stone Harbor as of 2006; the closest plants were in Avalon in 2003 and at the Coast Guard Loran Station in 2004. Stone Harbor Point contains suitable habitat for this species, however, and it may appear there in the future.

Seabeach evening primrose

Seabeach evening primrose is a perennial plant with large yellow flowers that can be tinged with pink, growing 8 to 18 inches tall (USDA 2006). The flowers and a hairy fruit can usually be seen from May to October (USDA 2006, Kraus 1988). Seabeach evening primrose grows in beach and dune habitats, generally on foredunes above the limit of most storm tides. The plant often occurs with American beachgrass, seaside goldenrod, and silver bunch grass (NatureServe 2006).

Seabeach evening primrose can be found along the Atlantic coast of the U.S. from New Jersey and Pennsylvania south to Florida, and along the Gulf coast from Louisiana to Florida. In New Jersey, the plant has been observed in Atlantic and Cape May Counties (NatureServe 2006). The species is classified as endangered by the state of New Jersey. At Stone Harbor Point, an

evening primrose that may be the endangered seabeach evening primrose was observed in 2006 in moderately high numbers along the northern berm to the former CDF.

Seabeach sandwort

Seabeach sandwort is a state Species of Concern, last seen at Stone Harbor Point in 2001. This perennial plant has small white flowers that smell like honey. Seabeach sandwort grows up to 20 inches tall and spreads via rhizomes (eFloras.org 2007). It has been known to occur in all four oceanfront counties in New Jersey (USDA 2006). A colonizing species like seabeach amaranth, seabeach sandwort grows on the bare sand of upper beaches and can trap windblown sand to form small mounds, facilitating the formation of new dunes (Gagné and Houle 2001).

Sea purslane

Sea purslane was observed at the Point in 2003 and 2004 and is also a state Species of Concern. With pink or purple flowers in the summer and fall, sea purslane grows to four to sixteen inches big (eFloras.org 2007). This annual plant is known to occur along the oceanfront beaches in Monmouth, Ocean, Atlantic and Cape May Counties (USDA 2006). Sea purslane prefers sandy shores, beaches, dune swales, brackish marshes, banks along or near coasts, and similar habitats (eFloras.org 2007).

Seabeach knotweed

Seabeach knotweed is an annual plant visible on the New Jersey shore between May and November. Part of the buckwheat family, seabeach knotweed is characterized by a silvery color, stems branching outward and upward from the base of the plant, and a height between 8 and 27.5 inches. The flowers of seabeach knotweed are white with white or pink margins and bloom from May to November (USFWS 2006).

Most seabeach knotweed occurrences in New Jersey are on sandy beaches, dunes and dune-hollows where the plants generally occur above the limit of the tide. Similar to seabeach amaranth, seabeach knotweed is a pioneer species that prefers unstable habitats created by active sand deposition and overwash. The species can also be found along the margins of salt marshes and coastal ponds (USFWS 2006).

Seabeach knotweed ranges along the Atlantic coast from Maine to Florida. New York and Massachusetts have the only remaining locally abundant populations. In New Jersey, seabeach knotweed plants have been documented in Monmouth and Ocean Counties (NatureServe 2006). Seabeach knotweed is considered endangered by the state of New Jersey. Although no plants have been observed at Stone Harbor Point, suitable habitat exists and the species may occur there in the future.

Other Fish and Wildlife

Osprey

The bays behind Stone Harbor and Avalon supported 67 osprey nests in 2006, producing 72 young osprey; this is the highest number of osprey nests along the state's coast (Clark and Wurst 2006). Only a few of these nests are located near Stone Harbor Point, however, with a few on Nummy Island and other marsh islands and waterborne platforms. One osprey platform has been constructed on the northern soundside of Stone Harbor Point, but its ownership is uncertain. The osprey is state-listed as threatened by the state of New Jersey. Osprey are large raptors who feed primarily on fish, constructing nests on channel markers, artificial platforms and other elevated structures near or on water.

Herons, egrets and other marsh birds

A variety of herons, egrets and other birds can be found in the wetlands and waters around Stone Harbor Point. Historically, great egret, snowy egret, little blue heron, tricolored heron, glossy ibis, black-crowned night heron and yellow-crowned night heron nested in the woodland at the north end of the Point, but none have nested there since 1995. Nummy Island has supported nesting colonies of laughing gull, herring gull, great black-backed gull, Foster's tern, great egret, snowy egret, black-crowned night heron, little blue heron, and glossy ibis. Nearby at the Stone Harbor Bird Sanctuary, large numbers of herons (little blue, green, tricolored, Great blue, and black-crowned and yellow-crowned night heron), egrets (Great, snowy, common, and cattle egret) and glossy ibis used to nest; the rejuvenation project for the sanctuary hopes to restore the nesting populations of these species.

Table 11. Herons, egrets and other marsh birds that have been seen at or near Stone Harbor Point.

Black-crowned night heron	Cattle egret	Common tern
Great blue heron	Great (or Common) egret	Foster's tern
Green heron	Snowy egret	Glossy ibis
Little blue heron		Great black-backed gull
Tricolored heron		Herring gull
Yellow-crowned night heron		Laughing gull

Marine mammals

The Atlantic Ocean off of New Jersey is home to a number of marine mammals, including seals, dolphins, whales and on rare occasions the West Indian manatee (a federally-

threatened species usually found in warmer waters to the south). Harbor seals are the most common seal in southern New Jersey, wintering in the nearshore and estuarine waters more often in recent years. Dolphins swim in the offshore, nearshore and estuaries, feeding on a variety of fish and squid. Whales are typically found farther offshore, but occasionally an injured or dead whale might wash up on the beaches. The Marine Mammal Stranding Network in Brigantine responds to marine mammal strandings (injured or dead) on New Jersey's beaches, including those of Stone Harbor.

Turtles

Five species of sea turtles can sometimes be seen in the waters around Stone Harbor Point, foraging during the summer months. The loggerhead and Kemp's ridley sea turtles are more commonly seen, but the Hawksbill, leatherback and green sea turtles might also be glimpsed. Although sea turtles do not nest on New Jersey's beaches, the Northern diamondback terrapin does. The Northern diamondback terrapin spends its time in the estuaries, emerging in early summer to dig nests, burying their eggs in the sand at the Point. The Wetlands Institute operates a Terrapin Conservation Project to rescue terrapins caught trying to cross the road, hatching and raising salvaged eggs (from pregnant females killed by vehicles) in captivity and then releasing them back into the wild.

Fish

Fish are prey for many of the waterbirds who nest, migrate through and overwinter at Stone Harbor Point. Terns and skimmers are notable for flying low above the estuary and nearshore and plucking fish from the water. Herons and egrets will stand still in the shallows, watching and waiting for fish to swim by and provide them with a tasty meal. Over 100 species of finfish were documented in Hereford Inlet and its immediate surroundings during one study in the 1970s (USACE 1997). Year-round resident fish included bay anchovy, Atlantic silverside, mummichog, sheepshead minnow, windowpane, winter flounder, and tidewater silverside. Spot, white mullet, summer flounder, and black sea bass migrated through during the spring (USACE 1997). Many fish (e.g., Northern kingfish, summer flounder, bluefish, scup, black sea bass, weakfish, hake, mackerel, tautog, Atlantic cod) are recreationally valuable to surf fishermen and women who cast their lines from the Point into the surrounding waters (USACE 1997). Commercial fishermen and women do not tend to use Hereford Inlet, but recreational anglers may fish from their boats in and around the inlet, particularly during the warmer summer months when the local population swells with vacationers. Regionally important commercial fisheries include Atlantic menhaden, weakfish, flounder, bluefish, scup, mackerel, hake, black sea bass, shad, and butterfish (USACE 1997).

Table 12. Fish that are likely to be found in the waters around Stone Harbor Point.

Atlantic cod	Hake	Summer flounder
Atlantic menhaden	Mackerel	Tautog
Atlantic silverside	Mummichog	Tidewater silverside
Bay anchovy	Northern kingfish	Weakfish
Black sea bass	Scup	White mullet
Black sea bass	Shad	Windowpane
Bluefish	Sheepshead minnow	Winter flounder
Butterfish	Spot	

Invertebrates

The estuarine waters behind Stone Harbor Point are classified as seasonally open (November 1 through April 30) for shellfish harvesting, and the oceanic waters east of the Point and south of the 114th Street groin are classified as open year-round for the harvest of clams, mussels and oysters. The estuarine waters around Hereford Inlet and Stone Harbor Point contain high densities of hard clams and low densities of oysters (NJDEP 2005b). Blue crabs, shrimp, and American lobster also call these waters home. Other mollusks that can be found in the waters around the Point include bay scallop, ribbed mussel, common blue mussel, moon snails, and surf clams (USACE 1997). Ghost crabs are another invertebrate who lives at the Point, digging burrows in the dry sand and dunes. Common rock crab, fiddler crabs and salt marsh snails live in the bayside waters, marshes and mudflats.

The sand and mudflats that are exposed on falling and low tides contain numerous small invertebrates that are food for the shorebirds and waterbirds that use the area. Shorebirds will hunt and peck for amphipods, mole crabs, coquina clams, and polychaete worms in the exposed intertidal flats. USACE (1997) found that amphipods dominated the benthic invertebrates in Hereford Inlet, while polychaete worms dominated the bottom sediments of Great Channel. Red knot will prey on mussels and horseshoe crab eggs, and American oystercatchers will eat oysters. The invertebrate species found in the sand, mud and waters in and around the Point are an essential part of the foodweb, providing needed food for the birds.

Table 13. Invertebrates that are likely to be found in the waters around Stone Harbor Point.

Bay scallop	American lobster	Amphipods
Common blue mussel	Blue crab	Coquina clam
Hard clam	Common rock crab	Ghost crab
Moon snail	Fiddler crabs	Horseshoe crab
Oyster	Salt marsh snail	Mole crab
Ribbed mussel	Shrimp	Polychaete worms
Surf clam		

IV. MANAGEMENT ISSUES

Along with the blessing of abundant and diverse wildlife comes the responsibility of stewardship of this vulnerable component of the community. Striking a balance between natural resource protection and the many other uses of Stone Harbor Point will be an ongoing challenge for the Borough and its partners. In recognition of this need, this conservation plan identifies the key management issues that need to be addressed as well as the background, guidance and framework for management of this very special place.

Shorebirds and colonial waterbirds are threatened by human disturbance, habitat loss, predation, vegetation encroachment, and other threats (USFWS 1996a, 2005; Brown *et al*. 2001; Clark and Niles 2000; Watts 1999). Maintaining the integrity of barrier island beach habitat and minimizing productivity losses to human disturbance and predation are essential to recovering piping plovers and other beach nesting birds (Watts 1999, USFWS 1996a) and increasing survivorship of migratory birds. The Piping Plover Recovery Plan describes national and regional threats and conservation measures, as does the *U.S. Shorebird Conservation Plan,* the *Mid-Atlantic Coastal Plain Bird Conservation Plan,* the *North American Waterfowl Management Plan*, *The North America Waterbird Conservation Plan,* the Draft *Waterbird Conservation Plan: 2006-2010 for the Mid-Atlantic/New England/Maritimes Region,* and the *American Oystercatcher Conservation Plan for the Atlantic and Gulf Coasts of the United States* (USFWS 1996a, Watts 1999, Clark and Niles 2000, Brown *et al*. 2001, Kushlan et al. 2002, ACJV 2005, MANEM 2006, Schulte et al. 2006). At Stone Harbor Point, these threats have shifted in dominance over time, but all must be addressed in concert to effectively improve beach nesting bird productivity.

Predators

Aside from flooding, predators have been the most significant threat to beach nesting birds at Stone Harbor Point over the past ten years. The predator species and level of threat have varied between years, but problems have been associated with raccoons, skunks, red fox, feral and free-roaming cats, and gulls. Because the impacts of flooding have been mitigated slightly in recent years through the man-made and natural creation of more suitable nesting habit, and at the same time the impacts associated with predators, especially from laughing gulls, have risen, predators may be the most critical threat to beach nesting birds at Stone Harbor Point at this time.

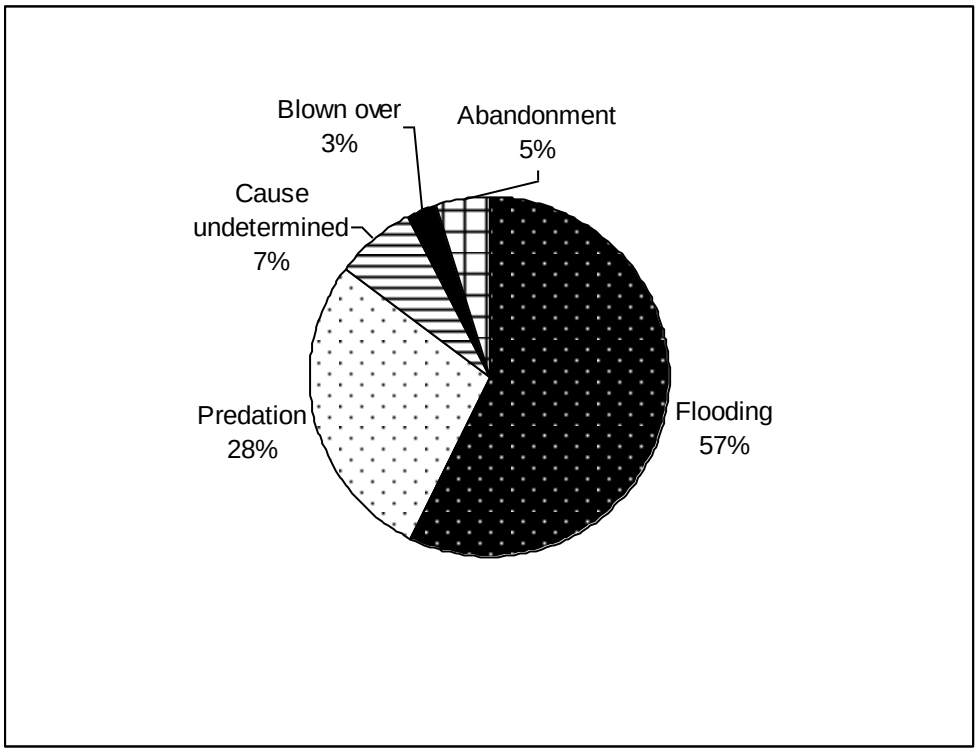
Although predator issues vary from site to site, the increase in predator problems at Stone Harbor Point follows a statewide trend. High levels of (piping plover) nest loss associated with predators, either through direct depredation of nests or abandonment of nests, as well as suspected brood loss due to predators continue to be the focus of concern with regard to improving reproductive success. New Jersey will not be able to contribute toward regional or Atlantic coast piping plover recovery without a significant improvement in productivity (Pover 2006). Predators continue to significantly impact the populations and reproductive success of colonial beach nesting species in New Jersey, such as black skimmers and least terns (NJDEP 2006).

Between 1999 and 2006, predation accounted for 28% of all piping plover nest failures at Stone Harbor Point (Fig. 9). Another 4% of the failed nests were lost due to abandonment, which

often results from predator activity or harassment. The cause of failure could not be determined for nearly 7% of the failed nests because there either wasn't enough compelling evidence to suggest the cause or more than one cause was possible. It is likely that at least some of the nests where a cause of failure could not be determined were the result of predators. Among the piping plover nests that failed due to predators, 70% were lost due to avian species (gulls) and 20% failed due to various mammalian predators (Fig. 9). Clutch reduction of piping plover nests has also been recorded at the site, with at least a half dozen nests having lost some (but not all) eggs before hatching in the period from 2003-2006. Gulls were the confirmed or suspected cause in most of those cases. Although NJDFW-ENSP has not directly observed any piping plover chicks being taken by predators at Stone Harbor Point, staff have observed laughing gulls preying on piping plover eggs; based on the high level of piping plover chick mortality and frequent observations of tern and skimmer chicks being taken (primarily by laughing gulls), predation is likely a major cause of piping plover brood loss at the site.

Predators have been identified as a cause of nest loss for American oystercatchers at Stone Harbor Point as well, including notable losses in 2006 due to skunks (Virzi 2006). Predators have had a particularly adverse impact on the reproductive success of colonial beach nesting birds at Stone Harbor Point, especially in the years from 2003-2006. Individual nests are not tracked for the colonial nesting species, but NJDFW-ENSP staff regularly observed or recorded substantial numbers of both chicks and eggs being taken or destroyed by laughing gulls within common tern, least tern, and black skimmer colonies during those years. In some years

Figure 9. Of the 71 nest piping plover nesting failures at Stone Harbor Point from 1999 to 2006, flooding was the leading cause. The 20 nesting attempts lost to predation were due to avian (70%), mammalian (20%) and unknown predators (10%).



harassment from laughing gulls (and possibly other predator species) is the most likely cause for colonies to shift locations at the Point, often to more flood-prone areas. In 2006, the entire black skimmer/common tern colony at Stone Harbor Point is theorized to have failed because of laughing gull nest depredation and harassment, resulting in the colony abandoning the site and relocating to Champagne Island.

Predator exclosures are the primary technique used to reduce predation by large avian and mammalian predators on piping plover nests. Numerous research studies and assessments of their usage (including in New Jersey) have demonstrated that exclosures are effective in increasing hatch success and ultimately productivity (Rimmer and Deblinger 1990, Melvin et al. 1992, Estelle et al. 1996, Murphy et al. 2003, Neuman et al. 2004, Ivan and Murphy 2005, Isaksson et al. 2007). However, due to the higher rate of nest abandonment associated with predator exclosures and the elevated risk of human vandalism and predator harassment at "identified" nests, NJDFW-ENSP uses exclosures on a selective basis, only at sites with a recent history of nest losses due to predation, or where managers have observed ongoing predator activity (Pover 2006).

As a result of this policy and other factors, NJDFW-ENSP's usage of exclosures at Stone Harbor Point has been sporadic since piping plovers recolonized the site in 1999. Moreover, exclosures have not consistently yielded increases in productivity when used at Stone Harbor Point. Of the 61 pairs that have nested at the site since 1999, 24 were exclosed resulting in a fledge rate of 0.38 chicks/per pair, whereas the 37 pairs that were not exclosed produced 0.24 fledges/per pair. There is not a notable difference between these fledge rates and both are substantially below the USFWS's recovery goals of 1.50 chicks fledged per pair for the Atlantic Coast population of piping plover (USFWS 1996a).

A strong increase in hatch success (70%) and a small gain in productivity (0.60 fledges per pair) were recorded at Stone Harbor Point in 2005 when exclosures were most widely used at the site. Nine (9) of the 10 pairs of piping plover present at the site were exclosed, accounting for all 7 of the nests that hatched and all 6 of the chicks that fledged that year. However, several other factors, including intensive mammal trapping and artificial elevation of some nests, may have had equally important roles in the increased reproductive success that year. Exclosures were only used on a limited basis in 2006 because a red fox dug under two exclosures and their usage had to be discontinued. The fox was eventually removed but NJDFW-ENSP decided to largely proceed without using exclosures for the remainder of the breeding season.

Exclosures have likely failed to significantly improve piping plover productivity at Stone Harbor Point because exclosed nests are still prone to flooding and brood loss has been very high at the site. There are other shortcomings associated with exclosures as well. They provide no protection for chicks once they hatch and leave the nest, and the approach does not protect other beach nesting birds (e.g. black skimmer, least tern, common tern, American oystercatcher) that typically nest along with piping plovers and also experience heavy losses to predators (Jenkins and Pover 2005). Exclosures can also be problematic if it is necessary to erect them near other breeding birds – nesting densities are high enough at Stone Harbor Point that disruption of the tern and skimmer colonies needs to be taken into consideration when deciding whether to erect exclosures at certain piping plover nests. Also, in 2004 NJDFW-ENSP staff observed laughing gulls using exclosures as a perch to aid in the depredation of eggs within an adjacent black skimmer colony.

NJDFW believes the continued use of predator exclosures (and electric fence), are still the most prudent measures to address the threat of predation on piping plover nests, but an

increased focus on localized predator removal and reduction is also necessary. This approach will also benefit other priority species, such as American oystercatcher, black skimmer, common tern and least tern, that nest at many of the same sites as piping plover (Jenkins and Pover 2004). Although predator control is probably not feasible in all cases due to limitations in resources (funding and staff), lack of efficacy of current techniques (for avian predators, especially gulls) and to some extent, public disapproval of such programs, it may be the most effective option in many cases (Jenkins and Pover 2005).

A mammalian predator removal program was introduced at Stone Harbor Point in 2005. The program was initially instituted to address concerns about small mammals, such as skunks and raccoons, as well as feral or free-roaming cats, which were believed to be the cause of egg and chick losses at the site. A total of 8 cats, 4 skunks, and 1 raccoon were trapped and removed from the site just prior to the 2005 nesting season (by April 15) through the combined efforts of NJDFW-Wildlife Control Unit and the Borough's Animal Control Officer (ACO). The Borough's ACO removed another skunk and raccoon later in the season after tracks were observed by NJDFW-ENSP staff. The Borough also removed additional cats from their Bird Sanctuary in 2005, which because of its close proximity to Stone Harbor Point, may have benefited beach nesting birds as well. Productivity for piping plover, American oystercatcher, and black skimmer improved, to varying degrees, that year. Results of mammalian predator control at Stone Harbor Point indicate that trapping programs can effectively increase reproductive success (NJDEP 2005c).

A similar trapping program was conducted in 2006, although results were mixed. A total of 3 skunks and 1 raccoon were removed prior to the nesting season. Notably, no cats were trapped at the Point. The low number of mammals trapped and removed may have been be the result of lower abundance from previous trapping efforts, although tracks observed near or in the nesting areas later in the year indicated predator problems still existed. Attempts to trap these individuals, primarily skunk, later in the 2006 breeding season were not successful. As previously indicated, a red fox was observed at the site in 2006, the first confirmed sighting in recent years. The fox was trapped by NJDFW-Wildlife Control Unit in May, but not until it had caused the failure of two exclosed piping plover nests, and impacted NJDFW's decision to use predator exclosures at the site.

Targeted mammalian trapping has been effective in some instances, but losses due to avian species, especially from the large laughing gull colonies located near Hereford Inlet, remain an unsolved challenge (NJDEP 2006). To date, no practical or effective methods to address the impact of gulls on beach nesting birds at Stone Harbor Point has been identified. It is unlikely that other measures to increase productivity at the site will be successful if this issue is not also addressed. It should be noted that according to colonial waterbird surveys conducted by ENSP, laughing gull numbers have remained stable during the period 1979 to 2004; the 2007 statewide survey counted approximately 48,000 pairs of laughing gulls, with a significant concentration near the Point. The problem of laughing gull depredation/harrassment on Stone Harbor Point is exacerbated by the proximity of the Point to one of the Northeast's largest laughing gull breeding colonies and the reduction of breeding birds into fewer and fewer remaining suitable habitats. The management of laughing gulls and their depredation on nesting shorebirds and waterbirds at the Point should include the full range of potential management options (from non-lethal to lethal) in an integrated predation management program that incorporates the needs of all nongame species and their habitats.

In addition to the mammalian trapping efforts, the impacts of feral cats on beach nesting birds at Stone Harbor Point appear to have also been abated, in part, through a series of ordinance and policy changes within the Borough. Prior to 2005 when the Borough began to address feral cats, the parking lot at 123rd Street and the adjacent bayberry/shrub area hosted a large, well-known feral cat colony. The Borough adopted a Trap-Neuter-Return program, which included provisions to address predator problems at Stone Harbor Point (and the Bird Sanctuary). Feeding of wildlife (including cats) is no longer permitted within the Borough, except by registered caregivers. No cat colonies are permitted from 111th Street south, in effect creating a buffer around Stone Harbor Point. "No Feeding Wildlife" signs have been posted at the 123rd Street parking lot and the Borough's cat policies have been well publicized. Finally, the Borough has worked with NJDFW-ENSP to implement the previously discussed trapping program at the Point. As a result of these combined efforts, there is currently no evidence of cats being present at or near the 123rd Street parking lot, and it is not believed any dumping or feeding of cats has occurred in the area since the ordinance changes were made. No evidence of cats was observed by NJDFW staff in or near the nesting area at Stone Harbor Point in 2006. The mammalian trapping program, which targets cats if they are present, continued at Stone Harbor Point in 2007 – one cat was captured and removed from the site prior to the nesting season..

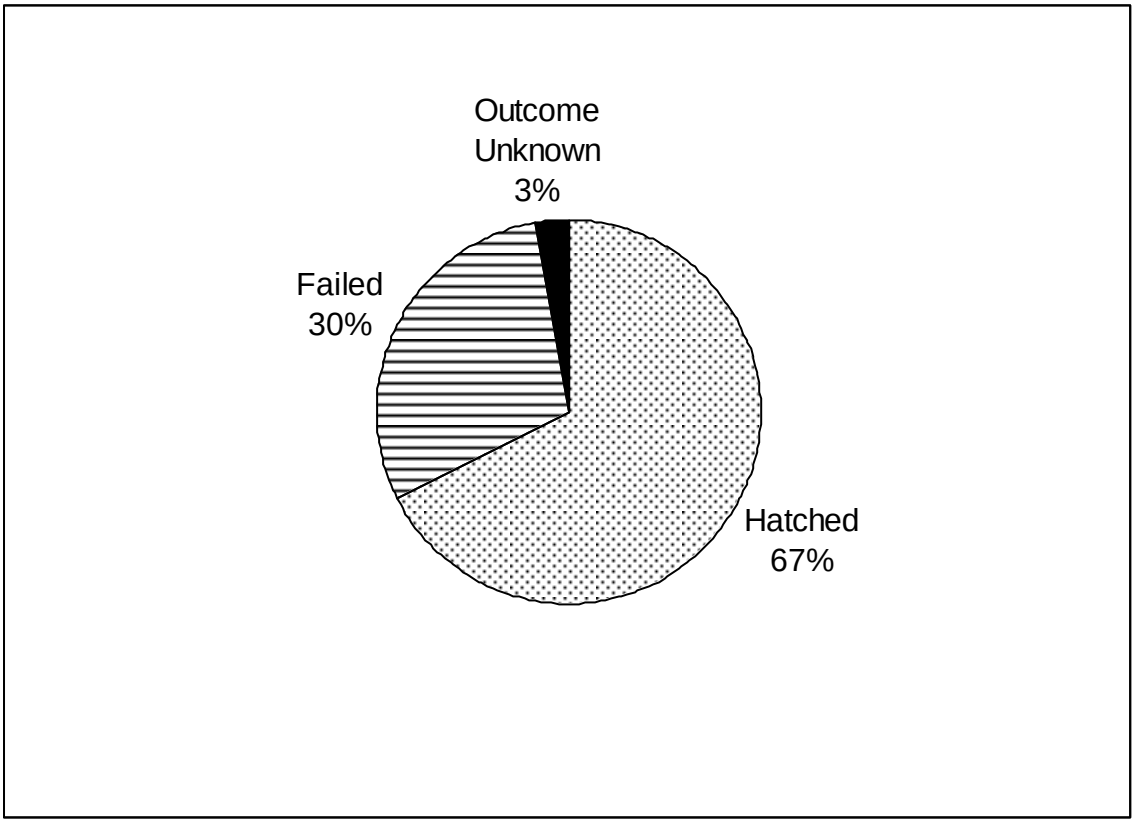
Flooding

Flooding has been the most significant cause of poor reproductive success among beach nesting birds at Stone Harbor Point since these species recolonized the site starting in 1997. Flooding at the site has been caused by a combination of spring tides, wind and storm driven tidal surges, and severe rain storms.

Just over two-thirds (68%) of the known piping plover nests failed at Stone Harbor Point from 1999-2006 (Fig. 10). Of the failed nests, flooding was, by far, the leading cause, accounting for 58% of the failed nests (Fig. 9). Flooding was also believed to be a factor in piping plover chick loss at the site in some years, although it is difficult to determine exact causes because chick mortality is typically not observed. However, in some instances Stone Harbor Point has been near completely overwashed when piping plover chicks were present, and most or all of those chicks were not located following those events, which suggests flooding was either the direct or indirect cause of mortality in those cases. Flooding was also identified as a major cause of nest loss for American oystercatchers breeding within Hereford Inlet, including at Stone Harbor Point, in 2005 and 2006.

Of the colonial beach nesting birds such as black skimmer, least tern, and common tern flooding has significantly limited reproductive success at Stone Harbor Point. Flooding led to the complete failure of back skimmer colonies in 1999 and 2001, and contributed to at least some nest and/or chick loss in most other years since 1999 (2006 being an exception). Skimmers and common terns have been able to avoid losses in some years because they generally select higher nest sites at Stone Harbor Point (i.e. on dunes, forming dunes, hummocks). Furthermore, when skimmers have lost nests as a result of spring tides they have gone on to successfully fledge young later in the season in some years. On the other hand, flooding has had a particularly acute impact on least terns, which often nest in more low-lying areas at Stone Harbor Point. Flooding (coupled with predator threats) was a primary reason for the total or near total reproductive failure of least terns at Stone Harbor in 1999 and from 2003-2006.

Figure 10. Two-thirds of the 105 piping plover nesting attempts at Stone Harbor Point from 1999 to 2006 failed, 30% hatched and 3% had unknown outcomes.



Just prior to the 2003 nesting season, the Borough of Stone Harbor, placed ~ 20,000 cubic yards of sand at the site, which was intended to increase the amount of available nesting habitat and minimize the impacts of flooding by raising the elevation in some areas. During the breeding season immediately following the placement of sand, these two areas (particularly the larger one) attracted a large number of skimmers, terns, piping plover, and American oystercatcher. Extremely high tides still destroyed many of the nests that year, although common terns and black skimmers renested in the same location and ultimately were able to fledge a moderate number of young. The restored areas have been used by nesting species with varying levels of success since they were created, although usage has gradually decreased as habitat quality has degraded (as a result of vegetation encroachment) and as other nesting habitat at the site has become available. Colonial nesters did not use the habitat in 2005 or 2006. There are clear benefits for beach nesting birds if areas with higher elevation are created at Stone Harbor Point, although if vegetation encroachment is not addressed any benefits will only be short term. Furthermore, significant gains in productivity for beach nesting birds will not be achieved by restoration efforts alone - if persistent predator issues at the site are not addressed as well.

In 2005, NJDFW-ENSP experimented with “raising” selected piping plover nests at Stone Harbor Point and the northern tip of North Brigantine Natural Area, two sites that were particularly prone to flooding. Small circular sand mounds (approximately 1 foot in height and 2 yards in diameter) were created exactly where the selected nests were located. Nests that were likely to be destroyed by normal spring tides were chosen. Furthermore, because it was thought

that placing the nests on raised mounds would make it easier for predators to detect and destroy nests, only those nests that were to be protected with predator exclosures were selected. Of the seven nests that were raised in 2005, six (86%) successfully hatched, including all four (100%) of the nests raised at Stone Harbor Point. None of the nests would have survived the normal full-moon tides if they had not been raised. Pair hatch success for piping plovers at Stone Harbor Point that year was 70%, up from just 44% the year before. However, only two chicks fledged from the raised nests at Stone Harbor Point, and productivity for the site remained low, as post-hatching brood losses were high.

The nest raising technique proved successful in increasing hatch rates, and at least at North Brigantine Natural Area significantly increased productivity, but nonetheless there are limitations. The technique is very labor intensive and the sand mounds tend to flatten over the approximate month-long incubation period, so maintenance is required. No nest abandonment has occurred with raised nests although this remains a concern because the technique has only been tested on a small number of nests. Also, the nest raising is only effective for minor flooding – major tidal surge would still destroy nests. Overall, this may be an effective strategy to protect a limited number of nests from flooding, and is probably most useful targeting flood-prone nests that would otherwise be lost just days before hatching and/or where pairs would not renest because it is too late in the season. However, this is not likely a solution to flooding problems on a large scale or for the long term.

Human Disturbance

There are a wide range of human activities, largely associated with the recreational usage and maintenance of beaches, which can directly or indirectly harm or harass beach nesting birds and migrant shorebirds. At Stone Harbor Point these activities include: pedestrian and general recreational usage of the beach; dogs; kite-flying, especially kiteboarding and kitebuggying; motorized vehicle usage, including ORV's operated by the public and vehicles/equipment used by the Borough; mechanical beach raking; removal of large debris; and boat and personal watercraft usage. Moreover, a number of monitoring, management and outreach activities are currently carried out on Stone Harbor Point. It is essential that these activities be carefully coordinated to avoid unintended impacts to wildlife and plant species. Human disturbance can also result from crowds generated by community sponsored fireworks. Because the fireworks displays themselves can directly impact nesting birds, this category is being covered separately. The following is a more detailed assessment of the impacts of human disturbance on beach nesting birds at Stone Harbor Point for each of the different types of disturbance.

Pedestrian and Recreational Usage

Among the various types of human activities that may have adverse impacts on beach nesting and migrant birds, pedestrian and general recreational usage of the beach are the most ubiquitous. The Borough of Stone Harbor, which is a small community with a winter population of 1,128, swells to some 25,000 residents in the summer. Cape May County is an extremely popular summer and fall tourist destination with its beaches being the prime attraction. In 2006 Stone Harbor sold 25,257 seasonal beach badges, 9,166 weekly badges, and 7,199 daily badges.

These sales figures only offer a partial assessment of beach usage, as multiple beach visits can result from each badge sold and they do not account for usage in the mornings and evenings when badges are not required.

Cape May County is also world renowned as a bird watching destination, and Stone Harbor Point is one of the more premier birding locations in the region. The New Jersey Audubon Society sponsors regular bird walks at the site. The Wetlands Institute conducts bird walks as well, but also brings school groups and teachers to Stone Harbor Point. The exact number of people that these nature-based activities attract is difficult to estimate, although the Wetlands Institute reported that 784 students, 150 birders and an undetermined number of summer camp participants were brought to the site in 2006; New Jersey Audubon Society estimated between 5-30 participants for each of the Tuesday evening birding tours it sponsored from April 1-June 30 and from September 1-October 31. The Borough expects that two wildlife-viewing platforms, which it hopes to construct at Stone Harbor Point sometime in 2007, will generate even more interest in the site.

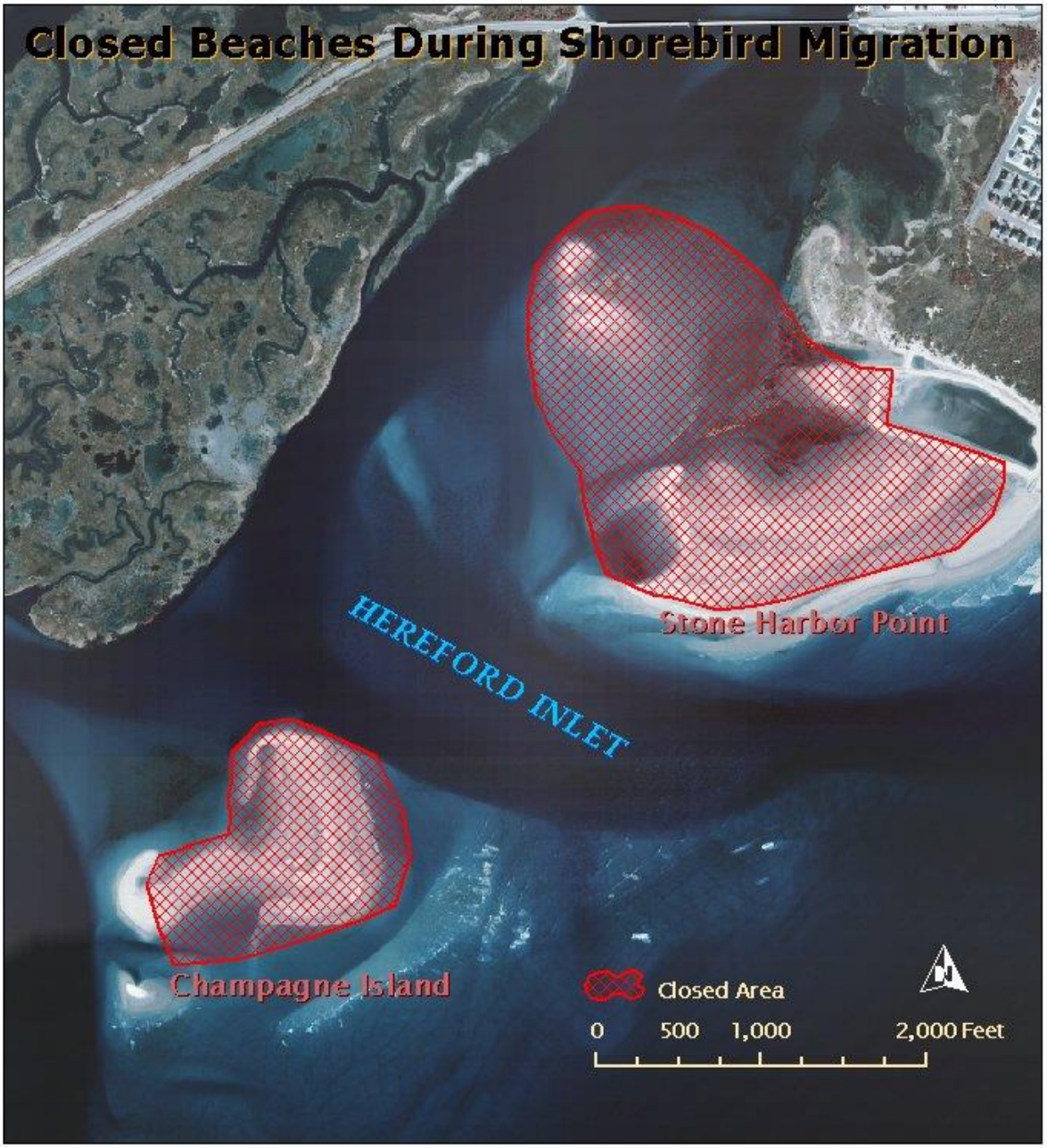
Aside from the above-mentioned nature programs, the majority of people visiting the beaches in Stone Harbor do not necessarily frequent the Point, as public usage is distributed along the Borough's entire beachfront. A variety of the activities, such as swimming, surfing, and ball playing, which typically attract the greatest number of beachgoers, are not permitted at the Point. Because swimming is not permitted, the number of sunbathers at the Point is very low. The site's remoteness (i.e., long walk to access), relative to the other Borough beaches, also reduces the frequency of human usage to some degree. Most of the recreational human activity at Stone Harbor Point is limited to more passive pursuits, such as beach walking, shell collecting, fishing, bird watching, and nature photography.

Nonetheless, even passive usage of the beach can be a threat to beach nesting and migrant birds if it is not carefully controlled or managed. Beachgoers can inadvertently step on hard-to-see eggs and small chicks, and beachgoers nearly always walk directly through roosting or foraging flocks of shorebirds unaware that they are causing disturbance. The primary management tool to protect beach nesting and migrant birds from the impacts of human disturbance at public beaches in New Jersey is the erection of protective fence and signage to restrict human access into sensitive nesting areas. At Stone Harbor Point, string and post "symbolic" fence, interspersed with "Area Closed – Endangered Birds Nesting" signs (Fig. 11), is erected from April 1 to at least Labor Day (or until all nesting is completed). All suitable nesting habitat and a large portion of the foraging areas are protected in this manner (Fig. 12). Nesting areas are also patrolled by NJDFW-ENSP monitors on a regular basis, including on both weekend days between Memorial Day and Labor Day. A larger, outer ring of posts with signs is erected to protect roosting and foraging areas for migratory shorebirds and beach nesting birds along the bayside of the Point.

No known piping plover nests failed at Stone Harbor Point due to direct human disturbance (i.e. crushing or vandalizing nests) in the period from 1999-2006 (Fig. 9). Human disturbance of tern and skimmer breeding colonies has been observed by NJDFW-ENSP monitors, but no known incidents of pedestrians crushing eggs or chicks have been documented. Although beachgoers do periodically walk through protected (i.e. fenced or posted) nesting areas, NJDFW-ENSP believes the majority of direct impacts to beach nesting birds at the site are limited through existing monitoring and management programs. More frequent monitoring, including during non-peak hours could further minimize potential impacts of human disturbance.

Figure 11. String and post “symbolic” fence, interspersed with “Area Closed – Endangered Birds Nesting” signs, restrict human disturbance in bird nesting areas during the nesting season.

Figure 12. A large portion of Stone Harbor Point is posted with signs and symbolic fencing to limit human disturbance in bird nesting and foraging areas. Map provided by NJDEP – ENSP.



Although direct human impacts remain a concern, indirect impacts and harassment of nesting birds due to human activities can be equally serious, and are more difficult to manage and measure. When disturbed by humans, adult piping plovers may temporarily leave their nest or young, exposing the eggs or small chicks to potentially deadly heating or cooling. Entire tern and skimmer colonies may be similarly affected. When adult beach nesting birds have to leave their chicks or nests unattended to defend against humans, the chicks or eggs are also more

vulnerable to attack by predators. This dynamic is especially relevant at Stone Harbor Point, where opportunistic gulls, especially laughing gulls, have had a particularly devastating impact on beach nesting birds since 2003. Even a slight disruption of the care of nests or young has resulted in nest/chick losses from gulls (T. Pover, NJDEP ENSP, personal observation & communication). In addition, increased frequency of short-duration disturbances will increase the probability of nest/chick loss. Finally, prolonged human disturbance can also lead to abandonment of nests or colonies. Foraging and roosting shorebirds are completely excluded from beaches with heavy beach recreation activity. On less-densely populated beaches, beach walkers invariably walk directly through foraging and roosting flocks unaware that they are having an impact. These frequent disturbances cause shorebirds to spend more time in vigilance behavior and less time foraging, preening and resting. Frequent disturbance ultimately leads to reduced survival probability.

The most severe indirect impacts of human disturbance can also be minimized to some extent by establishing protective buffers around nests, breeding colonies, and foraging and roosting areas. Extensive protective fence and signage is employed by NJDFW-ENSP at Stone Harbor Point. As nesting and migrant shorebird use has expanded in the past few years, adequate buffering of all nests/colonies has become more difficult.

Furthermore, piping plover and American oystercatcher chicks move outside of fenced areas to forage and rest, making them especially vulnerable to human disturbance. This is particularly the case with piping plover chicks which often feed in or near the intertidal zone, the area where pedestrian usage is primarily focused at the Point. Human disturbance outside the fenced areas currently is addressed largely through "foraging area" warning signs (Fig. 13) which are posted once piping plover nests begin hatching, although these signs likely have limited effectiveness.

Dogs

Unleashed dogs chase or harass beach nesting and migrant birds and can destroy nests, kill chicks or cause migrant shorebirds to cease using an important foraging and roost area. Even when leashed, dogs can disturb individual nesting pairs and their young or colonies of birds. Dogs are perceived by migrant shorebirds as predators and therefore have a disproportionately greater impact (Burger et al. *In Press*). Shorebirds disturbed by humans will return to foraging beaches while shorebirds disturbed by dogs are less likely to return after disturbance. Beach nesting birds such as piping plovers react to dogs like other predators and cannot perceive whether they are leashed or not. A more detailed discussion of the relationship between dogs and piping plover is included in the USFWS fact sheet *Cats and Dogs and Birds on the Beach: A Deadly Combination* (Appendix B).

Under the Borough of Stone Harbor's current pet ordinance, dogs are not permitted on their beaches, including at Stone Harbor Point, from June 1 to September 30. Dogs must be on a leash at all times on any public property within the Borough except for at Stone Harbor Point during the period from October 1- March 15, when they are allowed to roam free. The June 1 "start date" for the ban of pets on the beach does not correspond with the dates for the beach nesting bird breeding season or spring migration period. Piping plovers begin arriving back in New Jersey from their wintering grounds in March with territorial and pair behavior beginning as early as March 15, and egg-laying beginning in April. American oystercatchers also begin

Figure 13. "Foraging area" warning signs are posted at Stone Harbor Point once piping plover nests begin hatching to educate pedestrians about the presence of birds foraging outside of fenced areas.

THE NEST HATCHED
USE CAUTION !
Endangered piping plover chicks feeding and resting in area

Plover chicks may be seen feeding in tidal areas or resting near dunes. Please ***do not approach*** *adult or young birds. Avoid activity in the vicinity of the birds as it may separate family groups, increasing the possiblity of predation or cause undo stress of the young resulting in their death.*

Piping plovers are protected by state and federal law. Fines up to $10,000.00 may apply.
N.J.S.A. 23:2A-6

arriving on breeding territories in New Jersey by early March. Terns and skimmers begin arriving on their breeding grounds in mid-May. The breeding season is well underway for many of these species by the time (June 1) dogs are prohibited (under the existing ordinance) from Stone Harbor Point. While, migrant shorebirds arrive en masse during spring migration (May through early-June) and fall migration (mid-July through October), shorebirds are present in good numbers (hundreds to thousands) year round and will remain into winter until a hard freeze drives the majority farther south in January and early February. Shorebirds begin returning in March and April with largest numbers in May and early June as the annual migration cycle repeats itself.

The current ordinance will be revised (upon implementation of this conservation plan) to prohibit pets at Stone Harbor Point year-round in order to minimize the impact of dogs on all beach nesting, migratory and wintering bird species. This action would be consistent with the USFWS's *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitats on the U.S. Atlantic Coast* and with policies currently being endorsed by the USFWS-NJFO and NJDFW-ENSP in developing municipal management plans for the protection of federal and state-listed beach-dependent species. The current September 30 "end date" for the pet ban on borough beaches may be sufficient to protect breeding beach nesting birds at Stone Harbor Point, except in those limited cases when black skimmers are still present in early October. But this "end date" is not sufficient to minimize the impacts on migratory or wintering shorebirds, especially since pets are currently permitted to run free (off leash) at Stone Harbor Point beginning October 1. Thousands of migrating shorebirds use the Point for migration through the month of October, and hundreds to thousands of shorebirds remain into November and December. American oystercatchers overwinter at and near the Point, in high enough numbers that the *American Oystercatcher Conservation Plan* (Schulte et al. 2006) recognizes the Hereford Inlet complex as nationally important for wintering oystercatchers. Flocks of more than 250 American Oystercatchers have been routinely observed in fall with up to 25% of the flock comprised of hatching-year birds (A. Dey, ENSP, pers. comm.). Because shorebirds and waterbirds use the Hereford Inlet complex throughout the entire year, they are vulnerable to disturbance from dogs year-round, and a year-round prohibition on dogs at the Point is the best means to avoid this disturbance.

Aside from timing considerations, enforcement of the current pet ordinance is problematic, although by no means unique to Stone Harbor. Most coastal communities ban dogs on their beaches for at least some period in the spring and summer months, primarily as a matter of health and public safety. The public generally complies with these ordinances on beaches where and when lifeguards (or law enforcement officers) are present, but adherence is lax on more isolated beaches such as Stone Harbor Point. Furthermore, dog walking is a popular beach activity in the morning and evening hours when lifeguards (or large sunbathing crowds) are not present on the beach. A statewide summary of piping plover management drafted by NJDFW-ENSP for the 2000 breeding season identified the "enforcement of the dog policy" as the major management priority at Stone Harbor Point at that time. The presence of NJDFW-ENSP's beach nesting bird monitors helps minimize the presence of dog-walkers, however, they are not necessarily present on a daily basis in the early morning or evening hours when more dog-walkers are present. Additional signage, education and enforcement are necessary to alleviate this threat.

Kites, Kitesurfing and Kite Buggies

Piping plovers are generally intolerant of kites - it is believed that they may perceive kites as avian predators. Kites may cause adult plovers to temporarily leave their nests or young unattended, making them vulnerable to overheating, cooling, or depredation. Fencing, when sufficiently buffered from nests or colonies, may limit some impacts of kites to breeding birds, but it does not protect piping plover chicks which move outside fenced areas to forage or rest.

Kites currently are prohibited on beaches within the Borough of Stone Harbor during the hours that the beach is made available for bathing. Because NJDFW-ENSP's beach nesting bird monitors are primarily present at Stone Harbor Point during the time of day when kites are prohibited, kites are not frequently observed at the site. More kite flyers are likely present in the late afternoon and early evening hours, although more observational data are needed to determine if this is a severe threat at this site. USFWS's *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitats on the U.S. Atlantic Coast* recommend that kite flying be prohibited within 650 ft (200 m) of breeding activity between April 1 and August 31; this buffer would encompass the entire Stone Harbor Point barrier spit north to the 127th Street groin.

Although regular kite flying may be a modest threat at Stone Harbor Point, the impacts from kite boarding/surfing and kite buggying are potentially more significant. These relatively new recreational activities require large open spaces, free of crowds, for staging (launching/landing). Unlike regular kite flyers, kitesurfers are frequently observed at Stone Harbor Point by NJDFW-ENSP's beach nesting bird monitors. Instructors have been occasionally observed teaching novice or beginner kiteboarders, indicating a local business has operated at this location. The primary staging area for kitesurfers is just south of the 127th Street terminal groin (the northeast corner of Stone Harbor Point). Although this area might appear to be an ideal location to minimize the disturbance impact on nesting birds, the fenced breeding area closest to this location harbored the greatest concentration of piping plover nests and the main portion of the least tern colony during the 2006 breeding season. Once launched into the water surf kites do not present a threat to nesting birds, but the land based set-up (and practice flying the kite) can be a sustained activity that increases the risk of disturbance to nesting birds. Furthermore, there is concern that the large, often difficult to control kites (especially in heavy winds or with novice users) may fall in the protected nesting area, crushing nests or young. The USFWS recommends that the 650 ft (200 m) buffer for kite flying include activities such as kitesurfing as well (A. Hecht, USFWS, pers. comm.).

Kite buggies, which are observed less frequently at Stone Harbor Point, are propelled at relatively high speeds along the hard pack sand in areas that foraging or resting plovers may be present. No extensive data beyond the observations made by seasonal bird monitors currently exists. Existing Borough ordinances prohibit both kitesurfing (Stone Harbor Borough Code, § 156-6) and kite buggies (Stone Harbor Borough Code, §156-9, 156-16(D) and (G)) throughout the Borough, but these prohibitions have not been advertised nor enforced. This conservation plan includes measures to improve the advertisement and enforcement of these prohibitions, including the use of large warning signs placed at the entry points to the Point (see the next section, V. Conservation Actions).

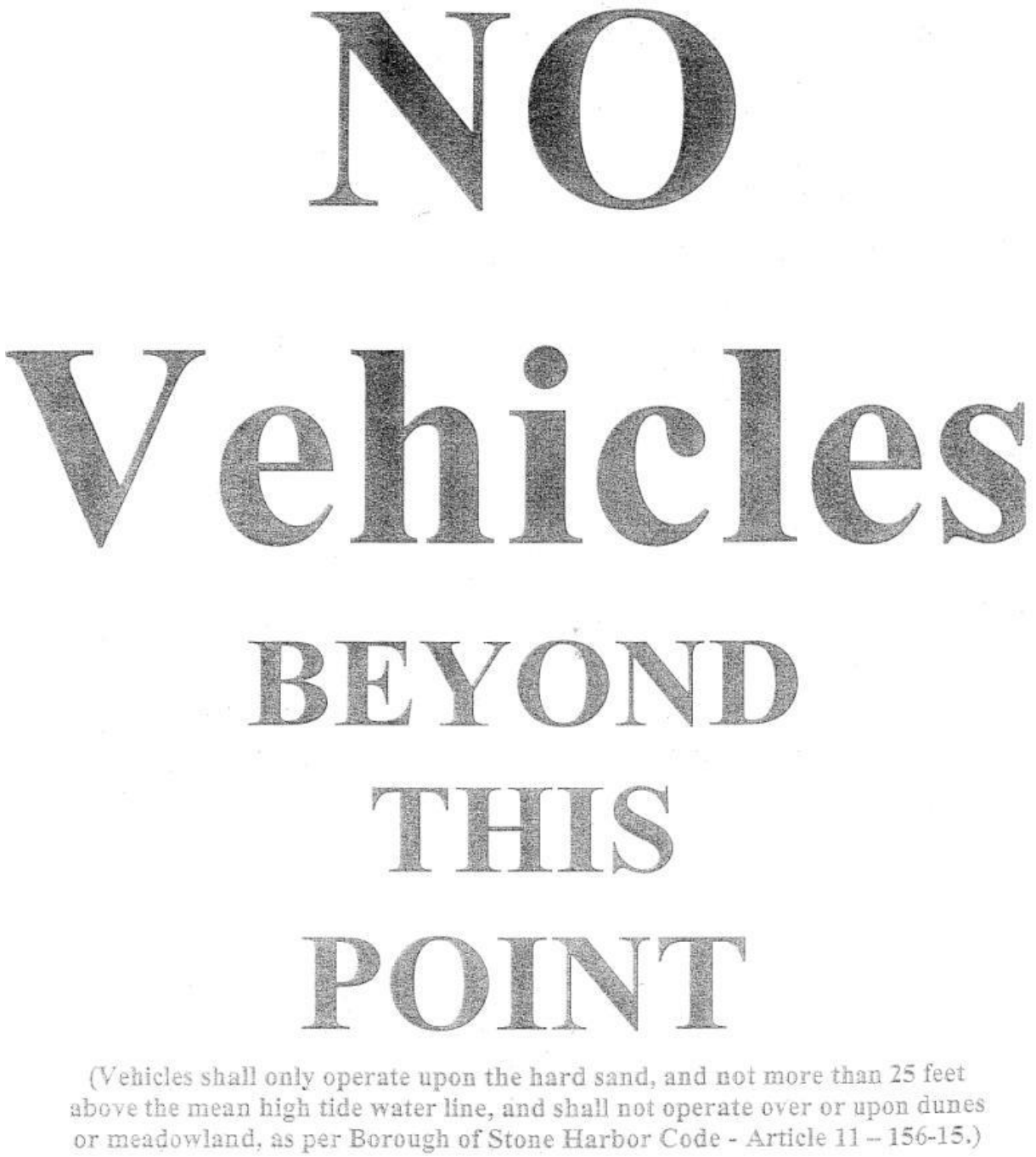
Motorized Vehicles

Threats to beach nesting birds from motorized vehicles include direct impacts such as running over nests or flightless chicks and more generalized disturbance of territorial, nesting, or foraging activities. Vehicles can also create ruts, which are especially difficult for unflighted piping plover chicks to navigate, and in some cases can trap young and lead to them being run over. Vehicle usage is generated by a variety of sources, including from ORV's driven by the public and municipal vehicles or equipment operated by the Borough for purposes of health and public safety. Beach rakes used to clean beaches can have particularly harmful effects on nesting birds and their habitat. Because mechanical beach raking is a unique (highly regulated) activity, it will be discussed separately following this section.

The public is allowed to operate 4-wheel drive vehicles at Stone Harbor Point for the purposes of fishing from the day after Labor Day until March 15 during the hours between 4 AM and 1 AM. A speed of 15 MPH or less must be maintained. Vehicles are only allowed to operate on the hard sand, not more than 25 ft above the mean high water line of the Atlantic Ocean (except when entering or exiting the beach), and not on dunes or meadowlands. A permit must be obtained from the Borough to operate a vehicle on the beach; 317 permits were issued in 2006. Permits are issued from September 1st through September 30th each year. Decals are issued to permitees, and certain emergency equipment must be kept in the vehicle. This is difficult to translate into a figure on ORV usage as multiple beach trips result from each individual permit. Vehicle usage appears to be heaviest at Stone Harbor Point from the day after Labor Day until November 20th when the Annual Striper Tournament is in progress.

The dates during which public ORV usage is allowed at Stone Harbor Point do not conflict with the active breeding period for beach nesting birds, with the exception of black skimmers, which often still have nests or unfledged young in September (and sometimes even as late as early-October). Allowing breeding bird fence/signage to remain up in the vicinity of skimmer colonies into the fall period can help minimize impacts from vehicles, although adults and young generally begin moving outside the fence at this time. Strict enforcement of the Borough's ordinance which does not permit vehicles more than 25 feet above the high tide line should further protect any remaining skimmers. In the fall of 2006, the Borough allowed NJDFW-ENSP to post signs (Fig. 14) near the eastern edge of Stone Harbor Point to indicate the area above the high tide line where public vehicles were not allowed. Although the signs were rudimentary and it was only done on an experimental basis, this technique showed promise, and along with additional enforcement and outreach, could be an effective tool in managing vehicle usage at the site. Neither the Borough's vehicle ordinance nor current management practices address all of the impacts on migratory shorebirds, including piping plovers in migration, as these species also utilize the intertidal zone and lower beach at Stone Harbor Point, areas where public ORV usage is permitted during the fall and winter periods. As stated earlier, use of symbolic fencing to protect more of the Point proper and the backside of the Point, including sand spits, will ensure black skimmers and migrant shorebirds have undisturbed roost and foraging sites. During the fall of 2006, researchers frequently observed private ORV's driving out to the Point, and as with beach walkers, ORV's frequently drive directly through roosting and foraging shorebird flocks without an understanding that they are causing disturbance (A. Dey, ENSP, pers. comm.). Outreach materials could be included with permits to educate ORV users about disturbance to beach nesting and migrant shorebirds.

Figure 14. ENSP posted signs near the eastern edge of Stone Harbor Point to indicate the area above the high tide line where public vehicles were not allowed.



Municipalities also operate vehicles on their beaches to provide regular services such as trash removal, law enforcement, and lifeguards, as well as to respond to emergencies. Bathing is not permitted at Stone Harbor Point so there are no lifeguard stands located there. As a result no

regular vehicle usage is necessary at the site for lifeguards. No trash cans are located on the beach at Stone Harbor Point, so again there are no regular vehicle trips generated from this type of municipal service. There is an occasional need to remove large debris or other material that may be a threat to public safety. Law enforcement responds to emergencies as necessary. Both law enforcement and beach patrol have periodically communicated a need to patrol Stone Harbor Point, although at this time, under advisement from NJDFW-ENSP, the Borough has restricted all vehicle usage at Stone Harbor Point in accordance with the USFWS's *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitats on the U.S. Atlantic Coast.* All suitable nesting habitat is protected with fence starting ~ April 1 and remains in place until at least August 31, which protects all known nests/nesting territories from direct impacts and undue disturbance resulting from vehicles. Municipal vehicle usage at Stone Harbor Point is further restricted to only bonafide emergency responses from the time the first piping plover nest hatches until all chicks are fledged (can fly). The vehicle restriction also extends to usage of the service road located behind the oceanfront dune during those periods when unflighted piping plover chicks are present (or likely to be present) in this area. Maintaining this vehicle policy should sufficiently address any threats to beach nesting birds associated with municipal vehicle usage. Any change in policy during the breeding season would likely require use of a vehicle escort provided by the Borough as outlined in USFWS guidelines (USFWS 1994).

Beach Raking

Mechanical beach raking, which is a common technique used by many New Jersey beach communities to clean their beaches of trash and other debris, can have both direct and indirect impacts on the nesting success of beach nesting birds, especially piping plover. Eggs in nests that are not protected (fenced off) can be inadvertently crushed. Well-camouflaged unflighted chicks resting on the upper beach or moving to and from the intertidal zone to forage are particularly vulnerable to being run over. Raking can diminish the suitability of nesting habitat by removing shell fragments and sparse vegetation. It can also reduce the suitability of foraging by removing natural wrack, which is an important feeding substrate for piping plovers.

Beach raking is regulated through the state's Coastal Zone Management Rules by the NJDEP Division of Land Use Regulation. Under standards for beach and dune activities applicable to routine beach maintenance, beach raking (or other mechanical manipulation of the beach) is prohibited between April 1 and August 15 in areas documented (by NJDFW) as habitat for threatened or endangered beach nesting shorebirds and designated protection zones for seabeach amaranth. Furthermore, raking is limited to recreational beach areas defined as areas within 100 yards of a staffed lifeguard stand. As of 2006, the "no-rake zone" in Stone Harbor as designated in the coastal zone rules was from 122nd Street south (west) to the terminus of the inlet point, in effect, all of Stone Harbor Point. Beaches north of the Point are raked daily by the Borough from May 1 through September 15. The Borough does not currently rake any portion of Stone Harbor Point at any period during the year. Maintaining this current policy would eliminate any expected impacts to beach nesting birds or their habitat at Stone Harbor Point associated with this beach maintenance activity.

Boats and Personal Watercraft Usage

The importance of Stone Harbor and Champagne Island to migratory and wintering shorebirds has grown over the last decade because of the increased use of the surrounding waterways by boats and personal watercraft like jet skis. Where once most boat activity was restricted to fishing and to waters deep enough for boats with propellers, now all waters are used by powerboats and jet skis with shallow-depth water jet propulsion. No intertidal or island habitat is free from disturbance. This intrusion has concentrated as more and more coastal areas are developed, leaving less habitat for both boats and birds.

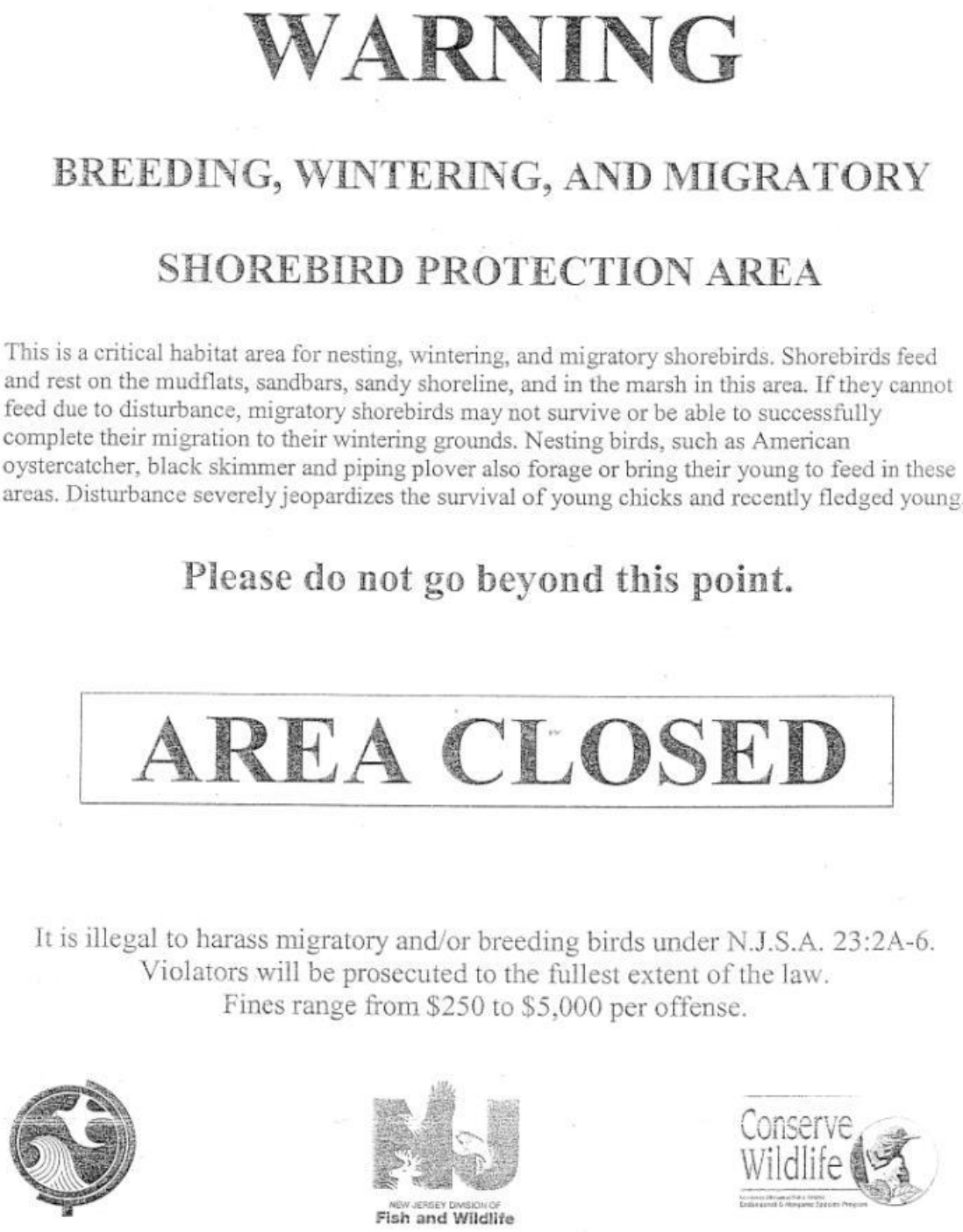
The need to reduce human and watercraft disturbance on and around Stone Harbor Point, Hereford Inlet (Champagne Island) and in the surrounding Great Channel is of critical importance for migratory shorebirds. First, Stone Harbor Point and Champagne Island are used as both day- and night-time roost sites by large numbers of shorebirds including red knots. On the highest spring tides, other known roost sites at Mispillion River, Delaware, and Egg Island Point, NJ, become flooded, and Stone Harbor Point is the only available alternate roost site in proximity to the Delaware Bay stopover area. The concentration of the baywide red knot population and large numbers of other shorebirds into one roost location leaves them extraordinarily vulnerable to oil spills like the *Anitra* spill in 1996, ground predators, and human disturbance (pedestrians, four-wheel drive vehicles, and watercraft). Moreover, disturbance by dogs has an even greater impact than humans, causing shorebirds to leave foraging beaches and not return in a given day. This threat is pervasive – boaters landing on Champagne Island frequently bring dogs that are allowed to run free on the island.

Second, Nummy Island, the mudflat islands north of Ocean Drive bridge and mudflats at the back of Stone Harbor Point (Fig. 16) are used as alternate foraging areas by red knots in years when mussel spat of the right size is abundant. As horseshoe crab eggs on Delaware Bay have become scarce, red knots will opportunistically feed on mussel spat attached to the base of *Spartina* spp. and other vegetation on the low-tide mudflats on Stone Harbor Point and in the surrounding Great Channel area. Continual disturbance by watercraft flushes birds, increasing their energetic expenditure (flying and vigilance), reducing their foraging time, or precluding their foraging altogether.

Hereford Inlet is a popular location for boat and personal watercraft usage, primarily during the summer months but also in the late spring and well into the fall season. A free boat ramp is located immediately west of Stone Harbor Point on Ocean Drive just beyond the Stone Harbor border at the “free bridge”. During the summer months, a private jet-ski concessionaire maintains a free-standing floating “dock” in the Great Channel between Nummy Island and Stone Harbor Point. Champagne Island attracts a large number of boats and personal watercraft, which generates spillover effects on Stone Harbor Point. Data on the number of boats traveling through or landing within the inlet system are not available, although observations indicate that usage is extensive.

ENSP and Conserve Wildlife Foundation of New Jersey (CWFNJ) biologists routinely observe shorebirds being flushed from one island to the next by watercraft, and back-and-forth from Stone Harbor Point to Champagne Island by vehicles, pedestrians with dogs and boaters with off-leash dogs landing on Champagne Island. Undisturbed roosting and foraging are critical for migratory shorebirds to rest, gain sufficient weight to continue migration, and successfully breed in the Arctic. In red knots, adult survival has been statistically shown to depend on the weight gain they achieve in Delaware Bay – knots departing the Bay with higher rates have

Figure 15. Signs identify the bayside shoreline of Stone Harbor Point as a “Breeding, Wintering, and Migratory Shorebird Protection Area” to discourage the landing of boats and personal watercraft.



higher survival than birds leaving at lower weights (Baker et al. 2004). It is highly likely this model holds true for other Arctic-breeding shorebirds that use Stone Harbor Point, Champagne Island and the surrounding habitats.

Boats or personal watercraft trying to land directly on Stone Harbor Point generally do so along the southern (inlet) and western (back bay) portions of the site. For the most part these "landing" areas are buffered from the primary areas where birds nest, although in 2006 a pair of piping plovers and three pairs of American oystercatchers nested on a narrow spit at the southwest corner of the site – directly where boats have tried to land. The inlet and back bay portions of Stone Harbor Point, although not the primary nesting area, are essential foraging areas for piping plover and American oystercatcher, including their young. Moreover, these areas provide critical foraging, resting, and staging habitat for a wide assemblage of migratory and wintering shorebirds. The shallows in these back areas are also important for foraging terns and skimmers. Boats or personal watercraft operating and landing in these areas interfere with feeding activities and disturb roosting and foraging shorebirds.

Starting in 2005 at the request of NJDFW-ENSP, the Borough of Stone Harbor has allowed the posting of "Area Closed" signs (with no rope/string) along the entire southern and western edge of Stone Harbor Point as defined by the low tide line (Fig. 12). Signs identify this as a "Breeding, Wintering, and Migratory Shorebird Protection Area" were posted starting in May and extending until at least Labor Day (Fig. 15). The initial intent of this signage was to minimize the impacts of pedestrian access and boat/personal watercraft usage in these areas on migratory shorebirds, although it has helped limit impacts on nesting species as well, especially as nesting has notably spread-out at the site over the past two years. Although the signage appears to have been successful in limiting the majority of disturbance in this area, there needs to be an enforcement component associated with this effort to ensure its long-term effectiveness. Maintenance of the signs/posts is labor intensive, especially since they are partially underwater during the high tide cycle, and must be done on an ongoing basis to prevent signs/posts from being washed away.

The operation, launching, and storage of catamarans or other sail craft could result in similar types of disturbance as motorized watercraft, but this activity is highly regulated within the Borough and is not considered a threat to nesting birds at Stone Harbor Point at this time. Under Borough ordinance, sail craft can only enter and exit the beach at 122nd Street, and can only be launched, landed, or stored in the designated area between the 122nd Street and the 127th Street groin, areas that are north of and largely physically separated from Stone Harbor Point. Eighty permits are issued each year to allow for the use of sail craft (catamarans <20 ft). Licenses are valid from April 1 through October 31, inclusive, and there is a fee. This activity provides for enjoyable passive-use of the beachfront area, and does not impact the beach nesting area (west of the bulkhead). ENSP does not have any records of piping plovers nesting in this area since breeding surveys began in the 1980s, but continues to monitor this area for breeding birds.

Figure 16. Migratory and wintering shorebirds forage along the bayside of Stone Harbor Point, Nummy Island, and the mudflat islands north of Ocean Drive bridge.

Scientific Research and Species Monitoring

In 2006 and 2007 about a half dozen separate research and/or monitoring projects aimed at studying and protecting nesting and migratory birds were conducted at Stone Harbor Point. These projects, which for the most part are expected to continue in a similar manner in 2008, include:

1) Beach nesting bird monitoring and management conducted by NJDFW-ENSP as part of statewide program to track populations and reproductive success of piping plover, least tern, black skimmer, and American oystercatcher; and provide protection for these species through various management techniques, patrolling, and outreach. Monitors were present at the site approximately every other day, as well as both weekend days, and their duties included systematic nest searching within protected (fenced) areas.

2) Red knot research, which includes various inter-related projects, coordinated by NJDFW-ENSP in New Jersey as part of international efforts to study and protect red knots. Research at Stone Harbor Point is primarily focused on the spring migratory period (May-June) when red knots and other shorebirds use the Delaware Bay area (including Hereford Inlet) as a key migratory stopover site. Research activities include surveys, radio telemetry, capturing (with a cannon net) and banding shorebirds, resighting individual birds, foraging studies, etc. Fall migratory surveys are also being conducted.
3) A study of the reproductive success of beach versus marsh nesting American oystercatchers conducted through intensive monitoring to determine the number and location of breeding pairs/nests, the causes of nest and chick loss, and factors impacting reproductive success. Study includes the capture of breeding pairs (with a noose carpet) and near-fledges for banding. The study is being conducted by Tom Virzi, a PhD candidate at Rutgers University.
4) A study investigating factors influencing piping plover breeding habitat selection, focusing on micro-habitat variables such as type and percent of vegetation cover, percent of shell cover, sand characteristics, etc. Study activities include taking measurements of variables at nests, which are taken under supervision of NJDFW-ENSP during regular nest searches or just prior to individual nests being exclosed. The study is being conducted by Brooke Maslo, a PhD candidate at Rutgers University.
5) Least tern research to study the impact of disturbance on least tern incubation patterns and breeding success. The study utilizes iButtons® (temperature data loggers) and intensive monitoring to try to detect the timing of abandonment or predation events. Another aspect of the study is to compare success of nests on the periphery of the colony to nests in the center. Observational aspects of the study are conducted from the periphery of colonies, however, iButtons® are placed in individual nests and some monitoring requires gathering data in close vicinity to or within the colony. The study is being conducted by Ilene Eberly, a Master's student at Antioch New England Graduate School.
6) Shorebird surveys are being conducted during the spring and fall migratory periods as a volunteer Citizen Scientist project in partnership with NJDFW-ENSP and the NJ Audubon Society. Surveys measure abundance of species present, species behavior and levels of human disturbance.
7) American oystercatcher winter surveys, encompassing monthly surveys in early December, January and February are conducted by NJDFW-ENSP or volunteer partners (i.e., The Wetlands Institute in 2006/2007).

Although each of these research projects or monitoring protocols have been separately designed to minimize impacts to their focal species, nonetheless:

1) The cumulative impacts of these projects within a given breeding/migratory season should be more closely considered.
2) The various projects should be carefully coordinated with each other to avoid inadvertent negative impacts to breeding or migratory species present at the site.
3) Certain types of activities undertaken as part of research/monitoring projects (i.e. vehicle usage to transport materials, shorebird trapping and associated activities)

should be carefully coordinated and planned with regards to seasonal timing and areas conducted to avoid disturbance to critical species, and to ensure all researchers adhere to the strictest ethical and methodological standards and avoid cumulative impacts to breeding and migratory species.

Fireworks

Both the direct and indirect impacts of fireworks are covered under the USFWS's *Guidelines for Managing Fireworks in the Vicinity of Piping Plovers and Seabeach Amaranth on the U.S. Atlantic Coast* (Appendix C). Any fireworks in close proximity to Stone Harbor Point would also raise similar concerns for the other beach nesting birds present at the site. In fact, there would be heightened concern for the colonial nesting species because fireworks could cause the abandonment of an entire colony. This would be particularly problematic for black skimmers because the colony in Hereford Inlet has represented a significant portion of the statewide population the past several years.

In the Borough of Stone Harbor, July 4th fireworks are traditionally launched from 80th Street, a sufficient distance from Stone Harbor Point to allay concerns about any direct impacts on nesting birds (~2.25 miles, much greater than the 0.75 mile buffer recommended by USFWS). North Wildwood typically has a July 4th fireworks display as well, but again they are launched a considerable distance from Stone Harbor Point. In many cases, the crowds that come to the beach to view the fireworks are a greater concern than the fireworks themselves. These crowds can be difficult to control or keep out of fenced areas (due to the size of crowds and the fact that it is dark). Furthermore, personal fireworks are sometimes illegally launched during July 4th celebrations, especially in beach areas away from the community-sponsored events. Based on observations by NJDFW-ENSP staff over the past ten years, the size and behavior of crowds at Stone Harbor Point during the Borough's July 4th fireworks does not constitute any reasonable threat to nesting birds. As a precaution, NJDFW-ENSP usually posts a monitor at the site during the evening of any scheduled July 4th fireworks.

Habitat Loss and Degradation

The amount of habitat available for migratory and beach nesting birds at Stone Harbor Point has fluctuated widely in recent decades, from virtually no suitable nesting habitat prior to the late 1990s, to the 200+ acres of habitat available in 2006. The historic loss of habitat was largely due to shoreline stabilization projects updrift of the Point, which cut off the natural supply of sediment to the spit. With the creation of the large scale federal beach fill and dune project on Seven Mile Island, the sediment supply was significantly restored and habitat returned to the Point. So long as the federal beach fill project is continued, the habitat available to migratory and beach nesting birds at Stone Harbor Point is expected to remain relatively stable in the near future.

Habitat degradation, therefore, is a more likely to threaten beach nesting birds, as vegetation encroaches into the preferred sparsely vegetated nesting habitat. As vegetation encroaches onto the spit, the amount of bare or sparsely vegetated sand available for nesting will decline. Thick vegetation also may allow cover for predators. At the same time, however,

vegetation will trap sand and slowly raise the elevation of the spit, potentially creating more nesting areas elevated above the danger of flooding.

High ORV use can also degrade habitat through the creation of tire ruts and disturbance of foraging areas, but ORV use at the Point is currently restricted to hard packed sand where this impact should be minimized.

Oil Spills and Contaminants

Migratory shorebirds and waterbirds are threatened by oil spills and contaminants, which can cover birds and eggs with oil, contaminate food supplies, and otherwise damage the coastal ecosystem (USFWS 1996a, Brown et al. 2001, Clark and Niles 1999). In May 1996, the Motor Tanker *Anitra* spilled approximately 42,000 gallons of oil in Delaware Bay, which led to the contamination of 90 miles of beaches along the southern New Jersey and Delaware Bay coastlines, including the beaches of Stone Harbor; the Borough of Stone Harbor assisted in the recovery efforts, with the regional command post located at the Borough's Fire Department. In the *Anitra* spill, many shorebirds (mainly sanderlings) were lightly to moderately oiled on their breast feathers. Subsequent studies conducted by Dr. Joanna Burger documented that oiled birds will spend more time preening oil off of feathers and less time foraging. The result is that birds lost weight during spring migration – a time when putting on weight to reach still-frozen Arctic breeding grounds, and successfully reproduce, is critical.

In June 1990, the BT Nautilus spilled 280,000 gallons of oil in Kill van Kull (New York-New Jersey Harbor), injuring piping plovers and other coastal wildlife along the New Jersey coast. Although no birds were injured at Stone Harbor during the BT Nautilus spill, oil spills remain a serious threat to shorebirds and waterbirds in coastal New Jersey. Following the *Anitra* spill, the state of New Jersey established specific protection measures for tidal inlets to contain any spills before they reach sensitive estuaries. The NJDEP and NOAA have mapped the southern New Jersey coastal area, including Delaware Bay and the Hereford Inlet complex, for sensitive natural resources requiring prioritization during spill responses. The Borough of Stone Harbor does not have a separate oil spill response plan, but defers to state and federal authorities. The Borough's Office of Emergency Management has a Coordinator who serves as the Borough's point of contact for any spill or contaminant response, and who can be reached at (609) 368-2111.

V. CONSERVATION ACTIONS

Goals

The goals of the Stone Harbor Point Conservation Plan are to provide a framework for cooperation and coordinated stewardship among the Borough of Stone Harbor and its multiple conservation partners including regulatory state and federal agencies (i.e., USFWS, NJDEP, USACE) and non-regulatory partners such as CWFNJ, NJ Audubon and the Wetlands Institute. The conservation plan defines and describes the roles and responsibilities of these local, state and federal regulatory partners, including the Borough, the NJDFW, and the USFWS in the protection and management of listed and other protected species at Stone Harbor Point. The long-term protection and recovery of listed beach bird species (and other listed species as deemed appropriate) as well as their beach habitat at Stone Harbor Point are targeted in order to contribute to the state and national Recovery Plan goals and objectives for these species.

Conservation measures have been identified to increase the population numbers and productivity of federally and state-listed bird species (and simultaneously foster the continued recovery of other rare species in Stone Harbor) by addressing the threats and factors limiting their recovery, including detrimental human activities and predation. Finally, the conservation plan is integrative and adaptive to changing conditions, providing effective conservation actions for the Point's beach birds and their habitat to foster stewardship and cooperation between partners.

Ecological Objectives

The Borough prepared a bird management plan in 2002 (Borough of Stone Harbor 2002), but since that time the Point has accreted significantly and nesting by shorebirds and colonial waterbirds has increased. Use of the Point by non-breeding birds, such as migrating red knot and piping plovers, is not included in the 2002 bird plan. Seabeach amaranth, a federally threatened plant, has returned to NJ beaches, but is not currently known to occur in Stone Harbor. This conservation plan updates the 2002 Borough of Stone Harbor Beach Nesting Bird Management Plan to improve the status and productivity of beach nesting birds, address seabeach amaranth if it occurs at the Point in the future, and protect non-breeding birds and other important plants and wildlife. Beach nesting birds in the Hereford Inlet area shift their concentrations between Stone Harbor Point, Champagne Island, North Wildwood and occasionally Avalon as habitat changes each year and in response to threats such as flooding and predator activity. Stone Harbor Point remains an important component in this regional context, and significantly improving the productivity of the birds nesting at the Point is a key objective for a number of these species. The following specific ecological objectives are intended to achieve the goals of the Stone Harbor Point Conservation Plan, subject to habitat availability and suitability:

Piping Plover

- Maintain an average nesting population of at least 10 pairs for five years
- Maintain an average productivity greater than or equal to the USFWS recovery goal of 1.5 chicks fledged per pair for five years (USFWS 1996a)
- Maintain annual predation losses of eggs, young or adults (as measured by losses of nesting attempts or hatched chicks to predation) at or below acceptable levels
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

The number of piping plover pairs nesting at Stone Harbor Point has increased in the last few years, to 10 pair in 2005 and 17 pairs in 2006. The five year average number of nesting pair is 10 (Table 1). This conservation plan aims to maintain the recent population growth of piping plovers, with a goal of at least 10 pairs over a five year average, and to increase productivity to the levels recommended in the USFWS Recovery Plan (USFWS 1996).

Black skimmer

- Maintain at least one nesting colony at Stone Harbor Point or Champagne Island with an average nesting population of 300 to 350 pairs for five years
- Productivity of at least 2.8 chicks fledged per pair when a colony is present (MANEM 2006)
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

Black skimmers have nested in seven different areas of Stone Harbor Point in the last nine years (Fig. 4). From 2002 to 2006, the average number of breeding black skimmers was 322 pair at the Point (Table 2). This conservation plan recommends maintaining one overall nesting colony and to increase their productivity to sustainable levels as defined by the Mid-Atlantic / New England Maritime Regional Working Group for Waterbirds (MANEM).

Least tern

- Maintain at least one nesting colony with an average nesting population of 90 to 100 pairs for five years
- An average productivity greater than or equal to the MANEM (2006) sustainability criteria of 0.6 chicks fledged per pair
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

Least terns have nested in seven different areas of Stone Harbor Point in the last nine years (Fig. 5). From 2002 to 2006, the average number of breeding least terns was 93 pairs at the Point (Table 4). This conservation plan recommends maintaining one overall nesting colony and to increase their productivity to sustainable levels as defined by MANEM (2006).

Common tern

- Maintain at least one nesting colony at Stone Harbor Point, Champagne Island or in nearby marshes with an average nesting population of 400 to 450 pairs for five years
- Productivity of at least 0.8-0.9 chicks fledged per pair when a colony is present (MANEM 2006)
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

Common terns have nested in six different areas of Stone Harbor Point over the last nine years. For the last five years, the average number of breeding common terns was 438 pairs at the Point (Table 5). The conservation plan recommends maintaining the existing nesting colony and to increase their productivity to sustainable levels as defined by MANEM (2006).

American oystercatcher

- Maintain an average nesting population of at least 10 pairs for five years
- Improve productivity, with adaptive management of specific productivity goals
- Determine the factors needed to maintain a long-term wintering population of 100 to 400 individuals within the Hereford Inlet complex (Stone Harbor Point, Champagne Island, Humphrey's Island, Nummy Island, and all surrounding shoals, sand bars and spits)
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

This conservation plan proposes to maintain recently improved number of nesting pairs of American oystercatchers, which reached 17 pairs in 2006, with an average number of at least 10 pair. The five year average number of breeding oystercatchers at Stone Harbor Point is 9 (Table 6). The conservation plan aims to maintain the inlet area's overwintering habitat for 100 to 400 birds (Table 7) and to increase breeding productivity to more sustainable levels. As specific productivity goals are developed, such as through studies underway or as the American Oystercatcher Conservation Plan is implemented (Schulte et al. 2006), this conservation plan will adaptively manage to contribute towards those goals.

Gull-billed tern and Royal tern

- Productivity of at least 1.5 gull-billed tern and 1.0 royal tern chicks fledged per pair when nesting occurs (MANEM 2006)
- Maintain (or improve as necessary) nesting, foraging, roosting and shelter habitat

Red knot

- Establish baseline abundance of red knot at Stone Harbor Point during migration, summer and wintering periods and document specific locations used
- Establish monitoring protocols

- Protection of migrating or summering (non-breeding) individuals/flocks as documented at the Point
- Protection of foraging and roosting habitat as documented at the Point
- Maintain (or improve as necessary) foraging, roosting and shelter habitat

Migratory shorebirds

- Protection of foraging, roosting and shelter habitat

Migratory songbirds

- Protection of foraging, roosting and shelter habitat
- Protection of bayberry habitat for migratory songbirds

Waterfowl

- Protection of foraging and shelter habitat

Plants

- Protection of federally or state-listed plants as discovered and documented

Other Fish & Wildlife

- Maintain at least one active osprey nesting site in any given year
- An average osprey productivity greater than or equal to the sustainability criteria of 0.80 chicks fledged per pair (Clark and Wurst 2005)

Actions to Address Threats and Species Recovery

A wide range of both man-made and natural activities and events threaten shorebirds and colonial waterbirds at Stone Harbor Point. The Borough and its conservation partners have identified a range of management actions that aim to avoid and minimize these threats, and aid in the recovery of these species so that the ecological objectives described in the previous section can be reached and maintained over time.

The Borough currently allows several recreational activities on the oceanfront beach at Stone Harbor Point, including surf fishing, seining, shell collecting, bird watching, nature classes, dog walking (when permitted) and vehicle access (when permitted). Sail craft may only be stored and launched on the east side of the bulkhead, (non-nesting area) if proper permits are

obtained. Some of the seasonal windows allowing these recreational activities have been modified for the protection of the valuable beach nesting and migratory bird populations at the Point, and further modifications are identified within this plan.

Because of its remote location, and proximity to the dangerous currents of Hereford Inlet, swimming is prohibited at Stone Harbor Point. Warning signs are posted in the 123rd Street parking lot. The Borough does not provide lifeguard staffing at beaches south of 122nd street, thus any beach south of there is not a "protected" swimming beach. In addition, several activities are prohibited as per laws set forth in Stone Harbor Borough Code Chapter 156-6 (Table 14).

Table 14. Current Stone Harbor prohibitions on recreational activities on Borough beaches (Stone Harbor Borough Code, Chapter 156-6). These restrictions are applicable (except where noted) between the 15th day of May and the 25th day of September during the hours of 8:00 AM and 6:00 PM, inclusive.

- Bathing is only allowed on protected beaches and when lifeguards are present
- No surf fishing on bathing beaches *during the hours that the beach is made available for bathing (10 AM to 5 PM)*, and only between jetties
- No alcohol or picnicking
- No changing clothes
- No playing baseball, football, softball, metal horseshoes or beach darts
- No littering
- No blocking ingress or egress to beaches with vehicles or rowdy crowds
- No driving on beach without permit
- No flying kites of any size shape or description, or propelling or causing movement of any object through the air, whether manually, mechanically or electrically *during the hours that the beach is made available for bathing (10 AM to 5 PM).*
- No fires, except by special permission of the Mayor
- No dogs except as permitted (permitted at the Point on-leash March 15 – May 31, off-leash October 1- March 15)
- No power driven boat, jet ski or other power driven watercraft within 300 ft of bathers; or within 300 ft of the seaward side of the line drawn from the seaward end of any two stone revetments.
- Sailboat launching only from designated beach, and by permit
- Anyone violating these provisions shall, upon conviction thereof, be subject to a minimum fine of $30 and other penalties, including suspension or revocation of any beach identification badge or permit.

The Mayor has the right to close the beaches in the case of emergencies or for protection of the beach and dunes, or if after consultation with state and/or federal regulators, such closure is determined by the Natural Resources Committee to be necessary for the protection of wildlife (amended 8-2-05 by Ordinance 1240). The following management actions, including those that may modify the current ordinances on recreational activities listed above, will avoid or minimize impacts to shorebirds, waterbirds and beach plants at the Point, while allowing the area to remain open to responsible recreational use.

Beach Management and Maintenance

Beach management and maintenance can adversely impact shorebirds and colonial waterbirds by altering nesting, roosting and foraging habitat. The Borough will minimize, and in some cases avoid, the impacts of beach management and maintenance activities on beach nesting birds, migratory shorebirds, colonial waterbirds, and federally and State-listed plant species with the following conservation actions.

Beach and Dune Protection

The Borough has a vital interest in protecting its dune systems, as they are the first line of defense against coastal storms. Table 15 summarizes the existing rules for dunes in Stone Harbor.

Table 15. Existing rules prohibit several activities for the protection of dunes in Stone Harbor.

- Sand removal or vegetation removal from dunes
- Trespassing on dunes
- Entry into the Conservation Management District south of 122nd Street in all locations where dunes, dune grasses or other vegetation is planted for the development of dunes
- Sand scraping or harvesting without written approval by the Borough and state / federal authorities and as regulated by the state's Coastal Zone Management rules

If seabeach amaranth or other listed plants (e.g., seabeach purslane or seabeach sandwort that have historically occurred at the Point) are documented at Stone Harbor Point, avoidance of these areas by people and vehicles would provide the first level of protection. Enforcement of the Borough's beach and dune protection measures would provide another level of protection (e.g., keeping people from walking in dune areas where the plants could be trampled or otherwise disturbed). The Borough will consult with USFWS and NJDEP on appropriate measures to protect listed plants and their habitat as they occur, which may include the following:

- Create and maintain buffers around individual plants or clusters of plants to minimize human and vehicle disturbance. Buffers for seabeach amaranth plants are generally 10 ft (3 m) in size and include symbolic fencing (USFWS 2005). Some posting signs can be provided by the USFWS.
- Avoid any potential impacts to listed plants that may occur including maintaining the prohibition of beach raking at the Point
- Consult with USFWS and NJDEP on the need to enhance or restore listed plant habitat through the removal of other vegetation, including invasive or non-native species if listed plants are in danger of losing habitat to encroaching vegetation

Beach and Dune Replenishment / Nourishment

The Borough has an interest in maintaining its beach and dune systems, for their value as natural, recreational and storm damage protection resources. Table 16 summarizes the existing local rules for replenishing and nourishing beaches and dunes in Stone Harbor; the state and federal governments also regulate beach and dune construction activities.

Table 16. Existing local rules regulate the replenishment or nourishment of the beaches and dunes in Stone Harbor.

- Dune replenishment activity shall take place during periods prescribed by specific regulations, except in the case of emergency circumstances, which constitute an immediate threat to the public health, safety and welfare as declared by appropriate Borough officials.
- Replenished dunes shall be immediately protected by the erection of sand fences.
- In the event that the replenishment sand, or a portion thereof, is obtained from an off-site location, the added sand shall be of such grain size, shape, color and other characteristics as will be compatible with the existing on-site sand.

In December 2005, the USFWS issued a Programmatic Biological Opinion for the Philadelphia District of the USACE which itemized conservation measures and recommendations to protect piping plovers, seabeach amaranth and state-listed species in federal shore protection project areas, including Stone Harbor (USFWS 2005). The Borough will manage dune and beach nourishment activities at the Point in accordance with this Programmatic Biological Opinion:

- Schedule beach nourishment activities to avoid or minimize the impacts of construction activities during the nesting season of piping plovers in areas where piping plovers are likely to nest, such as at Stone Harbor Point (USFWS 2005):
  - In piping plover nesting areas, no construction will take place between March 15 and August 15 of any year, the nesting season for piping plovers.
  - Buffers will be maintained around nesting and foraging areas, extending from the water's edge landward to the furthest seaward extent of a man made or natural feature (e.g., dune, boardwalk, bulkhead) which would prevent piping plover chicks from traversing the area.
  - Buffers will generally be 3,300 ft (1,000 m) in size but may be reduced in size on a case-by-case basis by the USFWS if no potentially suitable piping plover habitat is likely to be present within the buffer area during the affected nesting season.
  - Once all piping plover chicks have fledged, but while they remain within their nesting area for foraging, protective buffer areas will be reduced to 984 ft (300 m).
- If seabeach amaranth or other listed plants are documented at Stone Harbor Point, avoid conducting beach and dune replenishment or nourishment activities within those areas (USFWS 2005):
  - If any activities are scheduled to occur during the growing season of seabeach amaranth (May 15 to December 1), a Corps or contract biologist, botanist, or designated representative will survey the project area for this species twice a month from July 1 to

October 1, and also immediately prior to any construction or other work. Plant locations, numbers, and sizes will be recorded.
  - Material and equipment will not be stockpiled in areas known to have listed plants.
  - Buffers of 10 ft (3 m) will be established with symbolic fencing around individual plants or groups of plants.
  - If seabeach amaranth becomes established within a nourishment project area, the USACE and USFWS may restore seabeach amaranth areas likely to be destroyed via transplanting individual plants, collecting and propagating seeds for replanting after construction, or stockpiling of the sand substrate (which is likely to contain seeds) and redistributing that material on top of the nourishment profile at the end of construction.
  - Long-term management measures (e.g., protection zones, restrictions on beach raking, protective fencing, monitoring) will be established in accordance with the USFWS Programmatic Biological Opinion with the USACE.
- Schedule and implement beach nourishment and associated project activities to avoid construction within 984 ft (300 m) of least tern and/or black skimmer colonies during the nesting season (USFWS 2005).

Large Debris Removal

- Should the use of a backhoe or rake be necessary (hazardous / potentially dangerous waste removal) on the Point beach during nesting season of March 15 – Labor Day, the work crew must be led by a recognized qualified escort, on foot to accompany such vehicles as per USFWS guidelines (USFWS 1994). The Borough should make a reasonable attempt to coordinate removal activities with ENSP, if practical (i.e. time or circumstances allow).

Beach Raking

- Maintain the prohibition on raking any portion of Stone Harbor Point south of 122nd Street at any period during the year through in-reach and staff training; ensure that staff comply with prohibition
- Emergency raking to remove medical waste, hazardous trash, or other unusual debris will be allowed during the nesting season (March 15 – Labor Day) if the following conditions are met:
  - raking occurs only during daylight hours,
  - a recognized qualified escort on foot precedes the rake,
  - the rake does not exceed 5 MPH,
  - a log is maintained by the beach manager of the date, time, vehicle number and operator, and purpose of each trip through areas where unfledged chicks are present,
  - the Borough will coordinate with NJDEP – DLUR as necessary to ensure compliance with state Coastal Zone Management regulations,
  - the Borough will contact USFWS and ENSP for on-site advice prior to any entry into fenced areas, and
  - the Borough will provide ENSP written notification (notice by fax with confirmation of receipt to the DFW Tuckahoe Field Office is acceptable) prior to any such emergency

removal and will take all reasonable measures to ensure the safety of any beach nesting bird nests and chicks known to be present.

Refuse Containers

- Locate refuse and recycling containers at Stone Harbor Point parking lot throughout the year. During the summer months (from May 15th through September 15th), trash pickup at this location is conducted daily. Off-season, these receptacles are emptied once per week, or more frequently if needed for special events and holiday weekends.
- No refuse or recycling containers will be placed on the beaches or observation platforms at the Point in order to avoid providing a supplementary food source for predators.
- Use "animal proof" trash can lids in parking areas surrounding the Point

Predator Management

Predation is one of the most limiting factors on shorebird and colonial waterbird productivity at Stone Harbor Point. The Borough will minimize, and in some cases avoid, the impacts of predation on beach nesting birds with the following conservation actions.

- Allow ENSP to use predator exclosures to protect piping plover nests from predators as needed in accordance with USFWS guidelines (USFWS 1996c)
- Partner with ENSP to continue to trap and remove or relocate mammalian predators (e.g., red fox, skunk, raccoon) as needed in accordance with the NJDEP *Policy on the Relocation of Wildlife* (NJDEP 1996)
- Maintain the prohibition on feral cat colonies south of 111th Street
- Maintain the trapping and removal program of feral cats at Stone Harbor Point and the Bird Sanctuary
- Encourage fishermen through outreach and education to not leave fish offal on the beach that can serve as an attractant to laughing gulls
- Engage USDA – APHIS (U.S. Department of Agriculture, Wildlife Services - Animal and Plant Health Inspection Services) to evaluate and, as determined necessary by the Borough and its conservation partners (e.g., ENSP, USFWS), implement predation management options for laughing gulls, consistent with avian damage management methods developed for New Jersey by USDA (2003)
- Solicit a partnership with the owners of Nummy Island (the Bayowners Association and any others) and Middle Township to manage predators such as feral cats and other predators that move between Nummy Island and Stone Harbor Point, potentially through the elimination of any feral cat colonies on the island and/or through predator control of other predators by USDA – APHIS

Human Disturbance

Human disturbance can adversely impacts shorebirds and colonial waterbirds in a number of ways, including recreational use, pets, vehicles, fireworks, scientific research, and species

monitoring. The Borough will minimize, and in some cases avoid, the impacts of human disturbance with the following conservation actions:

Recreational Use

- Manage recreational activities in a manner consistent with USFWS guidelines for piping plover nesting areas (USFWS 1994, Appendix D) and expand their use to include all beach-nesting birds:
  - Continue to install symbolic fencing and warning signs around piping plover nests and unfledged chicks, creating a protective buffer at least 164 ft (50 m) around nests above the high tide line, in conjunction with ENSP
  - Continue to install symbolic fencing and warning signs where territorial beach nesting birds are observed to prevent disruption of territorial displays, courtship, and nest establishment, in conjunction with ENSP
  - Prohibit kite flying on beaches between March 15 and September 30, 24 hours a day
  - Continue to prohibit fireworks on beaches within 0.75 mile where shorebirds and waterbirds nest from March 15 until all chicks are fledged
- Prohibit kitesurfing south of 127th Street year-round
- Prohibit ball playing, Frisbee, and picnicking south of 127th Street from March 15 to September 30, 24 hours a day
- Clarify that kite buggies are off-road vehicles that are not allowed under existing rules as they are not used for beach fishing nor are they four-wheel drive

Pets

- Prohibit pets from Stone Harbor Point (south of 127th Street) year-round to avoid impacts to nesting, migrating and wintering shorebirds and waterbirds
- Enforce the prohibition on pets through ticketing and fining of violations, particularly during the early morning and early evening hours when dog-walking is most frequent
- Educate kayakers and boaters on the bayside that pets are not allowed at the Point at any time of year by placing warning signs along the water's edge, placing brochures and/or notices at kayak and canoe rental businesses, and informing boat rental businesses about the restriction

Vehicles and Watercraft

The Borough has an interest in protecting its beach and dune systems while allowing recreational and official vehicle use. Table 17 summarizes the existing rules for using vehicles on the beaches and dunes at Stone Harbor Point.

Table 17. Existing rules regulate the use of vehicles and watercraft on the beaches and dunes at Stone Harbor Point (Stone Harbor Borough Code, § 156-15).

- Sailcraft and catamarans shall be restricted to the beach area between 123rd Street and the 127th Street groin, by permit only, and from April 1 to October 31
- Permits for public ORV use of Stone Harbor Point shall be issued for the season, which will run from the day after Labor Day to March 14
- Permits shall be issued between September 1 and 30 (as a means to indirectly limit the level of ORV use at the Point)
- Permitted vehicles shall only operate upon the hard sand and shall not be operated more than 25 feet above the mean high water line of the Atlantic Ocean, except when entering or exiting the beach
- No vehicles shall be operated at a speed in excess of 15 MPH
- Permitted vehicles shall only be operated by the person to whom the permit has been issued and only between the hours of 4 AM to 1 AM
- Permitted vehicles may enter the beach areas only for the purposes of fishing, and when the fishing is completed, they shall be promptly removed from the beach
- All permitted vehicles shall only be usable for beach fishing and shall have four-wheel drive or shall otherwise be suitable for operation in the sand
- Access to the beach from the ramp in the parking and turning area adjacent to the 127th Street groin shall be along the new access road running from the 123rd Street parking lot, west of the bulkhead. The old access road, having its entrance at 122nd Street and Second Avenue and proceeding west for approximately 150 feet before turning and heading to the beach, shall be closed to vehicular traffic with the exception of emergency vehicles and Borough vehicles on Borough business.
- These provisions shall not apply to Borough employees who may be required to enter upon the beaches in the performance of their municipal duties or functions, nor to any government agency, its employees, agents, contractors and subcontractors, who may be engaged in beach restorations or protection work.
- Anyone violating these provisions shall, upon conviction thereof, be subject to a minimum fine of $100 and other penalties, including suspension or revocation of the permit.
- The Mayor, or in his or her absence the Acting Mayor, shall have the right to close beaches to all but emergency vehicles, if after consultation with state and/or federal regulators, such closure is determined by the Natural Resources Committee to be necessary for the protection of wildlife.

In addition to these existing protection measures, the Borough will manage vehicle use of Stone Harbor Point with the following management actions:

- Manage ORV use in accordance with USFWS guidelines (USFWS 1994, Appendix D):
  - Continue to prohibit ORV access into or through posted nesting areas
  - Continue to restrict official ORV travel to a designated vehicle corridor established outside of the posted nesting areas until such time as piping plover chicks hatch

  - Once piping plover chicks are hatched, and until such time as all chicks have fledged (generally 35 days later), official ORV travel shall continue to be restricted to legitimate emergencies only and shall be subject to the following conditions:
    - Speed limit of 5 MPH
    - Limited to daylight hours only
    - Be guided by a recognized qualified monitor who has first determined the location of all unfledged plover chicks
    - Avoid driving on the wrack line
    - Avoid creating deep ruts that can impede chick movements
    - Maintain a log of the date, time, vehicle number and operator, and purpose of each trip through areas where unfledged chicks are present
  - Use of 4-wheel motorized all-terrain vehicles (ATVs) or non-motorized all-terrain bicycles is preferred rather than 4-wheel drive full-sized vehicles for monitoring and law enforcement travel whenever possible because of the improved visibility afforded operators
- Prohibit landings of any power-driven boat, jet ski, or other motorized watercraft on any Borough beach (inclusive of any portion of the area south of 127th Street) at any time, except as needed for emergency response
- Investigate whether the use of remote cameras (such as the one mounted on the Golden Inn in Avalon) to monitor emergencies and law enforcement needs at the Point would be effective in reducing law enforcement response time, unnecessary patrol effort and increase effectiveness of enforcement. Cameras could be mounted and broadcast over the internet in partnership with a user group such as surfers who wish to remotely monitor surfing or fishing conditions; if used, cameras should be mounted in a manner to avoid perching by avian predators near nesting areas
- Investigate whether other law enforcement travel means (non-motorized versus motorized) meet both the USFWS guidelines (USFWS 1994) and law enforcement requirements; if ATV are used, USFWS guidelines require a speed limit of 5 MPH and a walking escort in advance of the ATV when traveling on the Point when unfledged chicks are present
- Increase enforcement of the ORV speed limit, hours of operation (4 AM to 1 AM), by permit only, and limits to the hard packed sand and within 25 ft of mean high tide line
- Confiscate ORV permits for egregious violations
- Require standardized placement of ORV permit decals (e.g., right rear bumper) to make law enforcement more efficient
- Increase education and outreach to public ORV users about the importance of the Point to nesting and migratory shorebirds and colonial waterbirds, the zone where ORV use is allowed, the impacts of driving through roosting and foraging flocks, and the seasonal window for public ORV use
- In consultation with ENSP and USFWS, design new No Vehicle signs to improve their durability and visibility to indicate the 25 foot limit above the high tide limit where public ORV is allowed during the fall and winter months; seek sources of funding to construct and install the signs along the eastern edge of the Point
- Allow NJDEP breeding bird fencing and signs to remain posted in the vicinity of black skimmer colonies during September and October, as these birds may nest past Labor Day, and coordinate with ENSP on whether municipal ORV use should be delayed until after Labor Day

- Maintain the closure to vehicles along the bayside shoreline and interior portions of the Point year-round for the protection of foraging and breeding shorebirds; partner with NJDEP in posting "Area Closed" signs, both with and without rope or string, along the entire southern and western edges of Stone Harbor Point as defined by the low tide line from May 1 (or earlier if conflicts arise) until at least Labor Day (and at other times as needed in critical areas), identifying the area as a "Breeding, Wintering, and Migratory Shorebird Protection Area," in order to minimize disturbance from vehicles, boats, personal watercraft and pedestrians
    - Signs should be constructed of durable materials (e.g., plastic) that minimize maintenance needs, as they are partially submerged during high tides
    - Inspect and repair posts and signs every two weeks as needed
    - Replace signs that are washed away as quickly as possible, preferably within one week
    - Enforce the protection of bayside foraging areas through increased enforcement of the seasonal closure area to pedestrian, boat and personal watercraft use
    - Place protective fencing and signs straight to the water's edge to prevent ORV travel on the bayside foraging areas year-round, which is not hard packed sand as required for ORV use
- Encourage the NJDFW Bureau of Law Enforcement and/or State Marine Patrol to assist in law enforcement and management of personal watercraft and boat landings on the Point and other protected areas
- Gain permission from Middle Township (or property owner) to post a sign at the boat / personal watercraft launching site at the bridge on Nummy Island to educate users to avoid protected areas on the bayside of the Point
- Seek a partnership with the private vendor who rents personal watercraft in the Borough to post a sign at his launch site educating users to avoid protected areas on the bayside of the Point
- Stone Harbor Borough does not retain any property ownership of any portion of Champagne Island (although a portion of the Island may fall within the Borough's *municipal* boundary), which is heavily used by boats and personal watercaft. The Borough has no management obligation if it has no ownership claimhowever the Borough will:
    -
    - Encourage the NJDFW, which was recently granted management rights to the tidal area of the island by the NJ Tidelands Council, to actively manage the island to protect nesting, roosting and foraging shorebirds and colonial waterbirds, and
    - Encourage the state to actively manage the island to protect nesting, roosting and foraging shorebirds and colonial waterbirds through increased enforcement from state law enforcement agencies

Fireworks

- Manage fireworks in accordance with the USFWS guidelines for fireworks in the vicinity of piping plovers and seabeach amaranth (USFWS 1997, Appendix C):
  - Avoid launching fireworks within at least 0.75 mile of piping plover nesting and/or foraging area
  - Avoid launching fireworks in areas where seabeach amaranth or other state-listed plants may be trampled
  - Designate access routes for personnel deploying fireworks and other public safety personnel in accordance with ORV guidelines (USFWS 1994)
  - Maintain protective fencing around piping plover nesting areas and, if present, at least 10 ft (3 m) around seabeach amaranth plants or groups of plants
  - If large crowds are expected near piping plover nesting areas:
    - Close parking lots and beach access points in the vicinity of breeding piping plovers
    - Consult with ENSP to increase (as appropriate) the size of protective fencing around piping plover nests according to the size of crowd expected, from the normal 164 ft (50 m) to 328 ft (100 m) for large crowds
    - Increase, in consultation with ENSP, the nighttime visibility of protective fencing by using reflectorized tape or substituting snow fencing, plastic orange highway construction fences, or wire mesh fencing for string fencing; remove snowfences or highway construction fences the next day if they will impede chick movements
    - Fence and post foraging territories of unfledged chicks, as delineated by a qualified biologist
    - Provide adequate numbers (consistent with the expected crowd size) of monitors and law enforcement personnel in the vicinity of piping plover breeding areas and seabeach amaranth locations to patrol fenced areas from when spectators begin congregating on the beach until the crowd disperses after the event
    - Remove any trash and litter from the beach immediately following the event; leave any trash located within fenced areas until daylight when it can be removed by or under the supervision of biological monitors; prohibit the use of vehicles to remove trash at night within 328 ft (100 m) of unfledged plover chicks
    - Conduct intensive biological monitoring for 4 days prior to, during and for 2 days following the event
- Post a monitor (usually NJDFW-ENSP personnel) at the Point site during the evening of any scheduled July 4th or other fireworks event to discourage human disturbance to nesting areas from spectators
- Continue to launch any public fireworks from the northern portion (e.g., 80th Street) of the Borough of Stone Harbor, to avoid any direct impacts to nesting shorebirds and waterbirds at the Point

Scientific Research and Species Monitoring

- Encourage ENSP to continue to coordinate the numerous scientific research and species monitoring projects conducted at the Point and increase coordination by hosting an annual

convention-style workshop, open to the public, to exchange information, results, and identify future research needs
- Request that researchers and monitors identify strict protocols with specific times and/or areas for certain activities (i.e. vehicle usage to transport materials, cannon netting, intensive monitoring that requires frequent walking through nesting or foraging areas) that may disturb critical species
- Require that all scientific researchers accessing the Point follow the USFWS guidelines for managing recreational activities (USFWS 1994), including having a recognized, qualified vehicle escort and maintaining a log of all vehicle use in nesting areas
- Require scientific researchers to notify the Borough annually of their projects so that law enforcement personnel are aware they have scientific handling and collection permits from the state and are permitted to be in restricted areas; maintain a list of contact information for use in the case of emergencies (e.g., an oil spill) and for dissemination of workshop invitations and other outreach materials

Habitat Restoration and Enhancement

In some circumstances, enhancing or restoring habitat for shorebirds and colonial waterbirds may help reach and maintain ecological objectives for population levels and nesting productivity. The Borough will manage bird habitat at Stone Harbor Point with the following conservation enhancement and restoration actions:

Flooding

- As long as flooding persists as a significant limiting factor in achieving and maintaining conservation goals (i.e., bird nesting populations and productivities), evaluate opportunities to construct additional raised sand nesting areas similar to those built in by the Borough 2003, with minimal disturbance to the surrounding environment; new areas should be raised one foot above the elevation of the 2003 project to reduce flooding of nests and vegetation should be maintained at sparse levels

USACE Ecosystem Restoration Project

- As a municipal sponsor of the federal and state Townsends Inlet to Cape May Inlet Shore Protection Project, encourage the USACE to limit the scope and scale of the ecosystem restoration project for the Point to be "less is more," designing features that mimic natural geomorphology and vegetation, such as not using a monoculture of dune plants planted on uniform spacing, not using a geotube structure within any new dunes, not planting bayberry and cedar within shorebird and colonial waterbird nesting and foraging areas, minimizing the use of beach fill, and including gaps within any new dunes to allow overwash
- Consider both breeding and foraging habitat (and for both breeding species and migratory species) in any large or small scale restoration project

Other Habitat Restoration and Enhancement Activities

- Identify the party who installed the osprey nesting platform on the bayside of the Point, who (if anyone) maintains it, and partner with them to maintain the platform and any others within the Borough; if no responsible party is identified, assume ownership and maintenance responsibilities for the nesting platform, possibly through a partnership with the Wetlands Institute or as a school environmental education project
- Monitor the encroachment of thick or woody vegetation into bare sand or sparsely vegetation nesting habitat and adaptively manage to control any encroachment that significantly reduces nesting habitat, including the removal of invasive or non-native species; thick vegetation may be removed (with appropriate permits) if reduced habitat is identified by NJDEP – ENSP or USFWS as a significant limiting factor in achieving or maintaining conservation goals (i.e., bird populations and productivity levels)
- Allow overwash to occur naturally at the Point during storm events with no manipulation of the substrate or habitat by artificial means (e.g., bulldozers or other heavy equipment); allow any breaches or new inlets at the Point to remain open and evolve naturally unless they are deemed a threat to property or human safety
- Allow the tidal pool within the former CDF and the surrounding berms to shift and evolve naturally in order to maximize foraging and fishery habitat

Education and Outreach

Education and outreach to visitors and residents can reduce human disturbance and associated impacts to shorebirds and colonial waterbirds. The Borough will educate the public about the importance and value of Stone Harbor Point with the following education and outreach actions, developed in consultation with the USFWS, NJDEP and NJAS.

- Create a Borough webpage devoted to Stone Harbor Point similar to the new Bird Sanctuary webpage, that contains the following information:
  - Electronic copy of the Conservation Plan
  - Identifying information and photographs of important bird species
  - Warnings of fines for violations of any of the Borough's rules and regulations relating to Stone Harbor Point
  - List of allowable activities and seasons
  - List of restricted activities and seasons, including impacts of disturbance from walking and driving through roosting / foraging flocks
  - Results of monitoring reports / info
  - Maps of important resource areas and wildlife groups (shorebirds, waterbirds, waterfowl, fish, invertebrates, plants)
  - Information about the Birding Trail
  - Information about the observation platforms
  - Links to NJAS and Wetlands Institute nature programs

  - Clarify that the seasonal window for public ORV use at Stone Harbor Point (the day after Labor Day - March 14) is different than that for beaches north of 122nd Street (October 1 – March 31)
  - Links to other agencies, partners and educational websites:
    - USFWS Piping Plover website (http://www.fws.gov/northeast/pipingplover/)
    - USFWS New Jersey Field Office (http://www.fws.gov/northeast/njfieldoffice/)
    - NJDEP ENSP website (http://www.njfishandwildlife.com/ensphome.htm)
    - Conserve Wildlife Foundation of New Jersey (http://www.conservewildlifenj.org/)
    - CATS Indoors! (http://www.abcbirds.org/cats/)
    - Realty Owners Association of Stone Harbor (http://www.theseashoreatitsbest.com/)
    - NJAS (http://www.njaudubon.org/)
    - Wetlands Institute (http://www.wetlandsinstitute.org/)
    - Marine Mammal Stranding Network (http://www.marinemammalstrandingcenter.org/main.htm)
    - NOAA's National Marine Fisheries Service, Northeast Regional Office (http://www.nero.noaa.gov/nero/)
    - Striper Tournament (http://www.stoneharborfire.com/StriperTournament.html)

- Nominate the Hereford Inlet complex (Stone Harbor Point and Champagne Island) as a Western Hemisphere Shorebird Reserve Network site of hemispheric, international, and/or regional importance for shorebirds

- Develop an educational brochure about beach nesting birds and migratory shorebirds and waterbirds, coordinating with USFWS, ENSP and potentially NJAS and Wetlands Institute, containing the following information:
  - importance of Stone Harbor Point to nesting and migratory shorebirds and colonial waterbirds and other wildlife
  - protection measures used to aid in the recovery of nesting and migratory shorebirds and waterbirds (e.g., fencing)
  - fines for violations of any of the Borough's rules and regulations
  - year-round prohibition on pets at the Point, including the bayside areas
  - the seasonal window for public ORV use at Stone Harbor Point is different than that for beaches north of 122nd Street and the zone where ORV use is allowed
  - things that the public can do to help the protected wildlife (e.g., not walking along the bayside shoreline in order to minimize disturbance to congregations of birds and generally avoid walking directly through flocks that are foraging and roosting to avoid disturbance, staying outside the fences at all times, not leaving litter, not feeding gulls, keeping pets on leashes when they're allowed on the beach)
- Distribute the educational brochure (described above) at / to:
  - kayak and personal watercraft rental businesses
  - ORV permit holders
  - sailcraft license holders
  - beach tag holders
  - Borough hall
  - Realty Owners Association of Stone Harbor
  - Chamber of Commerce

  - observation platforms
  - Wetlands Institute
  - NJAS
  - Borough website
  - Local businesses (e.g., those with existing racks of tourism-oriented brochures)
  - South Jersey Kite Flyers (http://www.geocities.com/sjkf.geo/)
- Update the Rules pamphlet issued with ORV permits to include a warning with description about the presence and reason for posts, signs and protective line fencing; identifying fines for violations of any of the Borough's rules and regulations; and notice that permits may be confiscated for violations
- Distribute an educational pamphlet regarding cats to residents, vacation homeowners and renters (e.g., those developed by the Cats Indoors! program). The pamphlet should discourage the pet owners from allowing their cats to roam freely outdoors, and from leaving cats behind when they exit Stone Harbor. The pamphlet should also discourage feeding of feral (wild and unknown) cats and describe the Borough's ordinance on feral cats and any ongoing TNR programs. Visitors should be advised not to leave cats behind when they leave Stone Harbor.

- Develop public relations stories for local newsletters and news media about endangered shorebirds and waterbirds and what the public can do to help increase nesting success on our beaches:
  - advertise Stone Harbor as an ecotourism destination
  - the importance of Stone Harbor Point to plants and wildlife
    - types and status of plants and wildlife
    - population numbers and their importance regionally and nationally
    - nesting and foraging habitat descriptions
    - recognition as an NJAS Important Bird Area, important area for wintering waterfowl and American oystercatchers, priority site for coastal wading birds, and part of the federal Coastal Barrier Resources System
  - protection measures used to aid in wildlife recovery:
    - year-round prohibition on pets at Stone Harbor Point
    - protective fencing
    - seasonal restriction on public ORV and other rules on ORV use
    - seasonal restriction on kites
    - no active management (e.g., beach raking)
  - encourage use of observation platforms to limit disturbance
  - encourage recreational users not to walk along the bayside shoreline in order to protect foraging, migratory and wintering shorebirds by minimizing disturbance to congregations of birds
  - nature programs led by NJAS and Wetlands Institute
  - high scientific value of Stone Harbor Point to researchers
  - items for radio and/or television Public Service Announcement(s)
- Seek local opportunities, perhaps through local businesses, to develop and distribute promotional items such as dog leashes, magnets, pens/pencils, floating keychains and koozies with information about the Point's natural resources; partner with the Realty Owners

Association of Stone Harbor and/or Chamber of Commerce to provide promotional items and educational brochures in a welcoming packet for summer residents and visitors

- Improve the visibility of the protective posts and line fencing by increasing the density of the posts and adding flagging to the oceanfront line fencing; the Borough will seek funds for the additional signs and posts
- Create and install two large signs at the 123rd Street parking lot and on the oceanfront beach near the 127th Street groin (for those walking down the beach to the Point) that notifies the public that they are about to enter a conservation area that protects rare and endangered birds and wildlife and asking them to observe protective restrictions (with relevant codes and fines cited) including:
  - No pets
  - No kitesurfing or buggies
  - No kites, picnics, ball-playing or frisbee 3/15 – 9/30
  - No walking on dunes
  - No feeding birds or wildlife
  - No littering
  - No swimming
  - No landing of personal watercraft or boats
  - Stay outside protective fencing at all times
- Create and install two signs at the access road at the 123rd Street parking lot and on the oceanfront beach near the 127th Street groin for vehicle use that notifies the public that no vehicles are allowed beyond this point from March 15 to Labor Day and that ORV use is subject to the following rules (with relevant codes, fines and penalties cited):
  - Public ORV allowed by permit only from the day after Labor Day – March 14, 4 AM – 1 AM daily
  - 15 MPH speed limit
  - Drive only on hard pack sand within 25 ft of high tide line
  - Stay outside of protective fencing at all times
  - No driving on bayside
- Pursue placement of a large sign at the tip of the Point that would educate boaters and personal watercraft users of the restrictions on pets and boat / personal watercraft landing at the Point
- Partner with NJAS to install a sign at the 123rd Street parking lot / access road advertising NJAS summer bird walks depart from here, with a contact phone number to sign up for the next one
- Update the existing No Feeding Wildlife signs to include seagulls in particular, and make them more visible by increasing their number and/or strategic placement
- Develop a local volunteer stewardship program where volunteers can become involved with conservation of the Point's resources through participation in activities such as:
  - the ENSP-led or Borough-led installation of posts, signs and line fencing
  - the regular monitoring of the condition of posts, signs and line fencing, particularly following storms and during the fall months; the Borough (using ENSP-trained volunteers and/or personnel) may repair, replace and reinstall small sections of downed fencing to prevent public safety hazards, and notify large sections of lost fencing to ENSP for repairs
  - the design, production and distribution of education and outreach materials

  - other protection, outreach and education programs
- Use the observation platforms and Birding Trail projects as outreach outlets for the Stone Harbor Point Conservation Plan:
  - Include a notice about protective fencing, signs and posts on the educational kiosks on the observation platforms
  - Include osprey, waterfowl, and endangered plants in the educational kiosks and materials associated with the observation platform project and the Birding Trail project
  - Encourage photographers to use the second viewing platform for nature photography and observation in order to limit disturbance in bird nesting areas
- Develop environmental education materials for grades K-4 and 4-8 on the natural resources of the Point, with possible financial support from large corporations and content support and/or funding support from CWFNJ, Sea Grant, the Wetlands Institute, Nature of Learning grant program, and the USFWS shorebird sister schools program; encourage use of the education packet in the spring so that children can educate summer visitors; include field trips to the Point
- Work with ENSP and CWFNJ to identify and secure funds to hire a steward for the fall months (and to supplement current monitoring during the breeding season) that can educate visitors during the late nesting season and migratory season, monitor ORV and kite disturbance, maintain signs and fencing, and aid in migratory bird surveys; investigate whether the Delaware Bay Steward Program should be funded to expand to Stone Harbor and Champagne Island

- Increase education to Borough personnel through:
  - Inform in writing all appropriate Borough departments (e.g., police, public works) of the need to avoid vehicle travel in all nesting areas from March 15 through Labor Day except in the case of legitimate emergencies and enforcement situations. The access gate to the Point beach will be closed and locked during this time. Critical emergency personnel should be provided with a key to this lock (i.e., beach rescue, ambulance, police), and, as needed, ENSP monitoring personnel.
  - Maintain the Beach Nesting Birds Update fax distribution list from ENSP to relevant Borough officials during the nesting season so that current information is available to key personnel; add the Borough's Public Relations specialist to the distribution list
  - Provide an educational presentation (coordinate with USFWS and/or ENSP) for lifeguards, public works and law enforcement personnel in the summer training sessions to educate them about the shorebirds and waterbirds using the Point, the importance of the Point to those birds, the protective measures in place to protect the birds, and procedures in case of emergency (including phone numbers of appropriate parties / agencies)

Biological Monitoring

Biological monitoring is a necessary component of evaluating the status and trends of shorebird and waterbird population and productivity levels. The NJDEP - ENSP and the CWFNJ are currently responsible for the shorebird and colonial waterbird monitoring conducted at the Point and expect to continue such monitoring for the foreseeable future. The Borough

desires to support the biological monitoring of the natural resources at Stone Harbor Point with the following conservation actions.

- Conduct biological monitoring in accordance with the monitoring protocols described in Appendix E
- Seek opportunities and/or partnerships to conduct annual surveys by a recognized qualified biologist of the Point for the presence, abundance and distribution (if any) of seabeach amaranth and other state-listed plants
- Restrict to the extent practicable biological monitors to conducting their work on foot, on non-motorized all-terrain bicycle, or ATV instead of with 4-wheel drive full-sized vehicles to minimize ORV impacts
- Post the results of biological monitoring reports on the Borough's website annually and create hyperlinks (as available) to full reports
- Distribute contact information for biological monitors and agency emergency contacts to key Borough personnel, including public works, police, lifeguards, and the Natural Resources and Bird Sanctuary Committees
- As needed, host meeting(s) with ENSP, USFWS and/or other biological monitoring personnel to exchange data results, evaluate the status of reaching ecological goals and objectives, and identify any needed changes to the following year's monitoring and protection measures
- Protect marine mammals and sea turtles through active support of the Marine Mammal Stranding Network:
    - Report all strandings promptly to the Marine Mammal Stranding Network in Brigantine, NJ, at (609) 266-0538
    - Train Borough staff to recognize strandings and report them to the Marine Mammal Stranding Network
    - Ensure coordination with ENSP prior to authorizing vehicle access by Marine Mammal Stranding Network responders during the bird nesting season

Research

The biological diversity and importance of Stone Harbor Point attracts a high level of scientific research. Some knowledge gaps remain, however, that may aid in the understanding and protection of the natural resources at the Point. Long-term research and monitoring of bird populations yields valuable scientific and management information not only for the Borough, but for the state and region as well. The Borough desires to support scientific research of the natural resources at Stone Harbor Point with the following conservation actions.

- Partner with NJAS and other appropriate agencies/organizations to survey migratory songbird use of the bayberry scrub-shrub habitat at Stone Harbor Point, and develop protection measures as needed based on the evaluation of the importance of the habitat to migratory songbirds and consistent with the NJ Wildlife Action Plan (NJDEP 2005a)
- Partner with NJDEP-ENSP and other appropriate agencies/organizations to create a map of the Point with regularly updated aerial photography and that identifies and updates important areas for shorebirds and nesting birds; if the Point is found to be important to other bird

groups such as waterfowl or songbirds, revise the map accordingly to include areas important to those groups; evaluate whether the map should be posted on the Borough's website for educational purposes

- Protect Northern diamondback terrapin through active support of the Wetland Institute's Terrapin Conservation Project:
  - Allow reintroduction of captive reared young to the Point as needed
  - Allow research access to nesting terrapins as needed and in a manner consistent with other elements of this conservation plan (e.g., coordinating with ENSP and/or Borough to avoid disturbance/impacts to other critical species)

Unexpected Emergencies

In the case that an unexpected emergency situation occurs, such as planes landing within the fenced protection area at the Point as occurred in 2007, the Borough will coordinate with the NJDEP – ENSP, USFWS and other relevant response authorities prior to undertaking any actions within protective fenced areas (during the nesting season). Standard protection measures outlined by the USFWS guidelines, such as the use of escorts, will be used wherever possible.

Conservation Plan Updates

It is the Borough's desire to use adaptive management to protect the natural resources of Stone Harbor Point, amending conservation measures annually as needed due to changing conditions and in coordination with the USFWS and ENSP. This Stone Harbor Point Conservation Plan will be revised and updated at least once every five years.

Implementation Manual

This section provides a stand-alone key to implementing the Stone Harbor Point Conservation Plan, summarizing the biological seasons, conservation zones, seasonal windows for specific activities, a calendar of events, and an emergency contact list.

Biological Seasons for Shorebirds and Waterbirds

Beach-nesting bird breeding season: March 15 – August 31 (may extend into early October if late season nesting by black skimmers occurs)
Spring migration season: May 1 – June 7
Fall migration season: July 10 – November 15
Overwintering season: November 15 – March 15

Conservation Zones and Seasons

<u>Recreational activities</u>

Alcohol use: Prohibited on all Borough beaches between the hours of 8 AM and 6 PM from May 15 to September 25; unrestricted at all other times

Ball playing (e.g., baseball, football, softball), horseshoes and beach darts: Prohibited on all Borough beaches between the hours of 8 AM and 6 PM from May 15 to September 25; prohibited 24 hours a day from March 15 to September 30 south of 127th Street

Feeding wildlife: Prohibited throughout the Borough with the exception of backyard-style bird feeders

Fires: Prohibited on all Borough beaches, except by special permission of the Mayor

Fishing: Limited to zone outside of the protective fencing around nesting and bayside foraging areas and to non-bathing beaches (i.e., south of 122nd Street)

Frisbee: Limited to the hours that the beach is not available for bathing, from 5 PM to 10 AM, except for the area south of 127th Street where it is prohibited from March 15 to September 30, 24 hours a day

Kite flying: Prohibited on all Borough beaches from March 15 – September 30, 24 hours a day

Kitesurfing: Prohibited year-round south of 127th Street

Picnics: Prohibited on all Borough beaches from March 15 to September 30; unrestricted at all other times

Photography: Limited to zone outside of the protective fencing around nesting and bayside foraging areas

Seining: Limited to zone outside of the protective fencing around nesting and bayside foraging areas and to non-bathing beaches (i.e., south of 122nd Street)

Shell collecting: Limited to zone outside of the protective fencing around nesting and bayside foraging areas

Sunbathing: Limited to zone outside of the protective fencing around nesting and bayside foraging areas

Swimming: Prohibited year-round at the Point
Limited to oceanfront beach north of 122nd Street

Walking and running: Limited to zone outside of the protective fencing around nesting and bayside foraging areas

Pets

Dog walking: Prohibited year-round at Stone Harbor Point

Vehicles and Watercraft

Catamarans and Sailcraft: April 1 – October 31
License from Borough required
Limited to zone between 122nd Street and 127th Street groin on the oceanfront beach

Kayaks and canoes: No staging, launching or landing along the bayside and inlet shorelines where posted as shorebird and waterbird protection area

Kite buggies: Prohibited on all Borough beaches

Personal watercraft and boats: No staging or launching along the bayside and inlet shorelines where posted as shorebird and waterbird protection area; no landing on any Borough beach (inclusive of the area south of 127th Street) at any time, except as needed for emergency response

Public ORV: Day after Labor Day – March 14
Permit required, issued from September 1 – 30
Limited to zone of hard packed sand and no higher than 25 ft above mean high tide line along the oceanfront and inlet shorelines only
Speed limit 15 MPH
Limited to hours of 4 AM to 1 AM

Calendar of Events

January

- Begin monitoring of red fox, and if presence/activity detected begin trapping effort; continue as needed through nesting season

February

- Trap and remove feral cats and other small mammals (i.e., raccoon, skunk) south of 111th Street and on Stone Harbor Point, continued through October as needed
- Post information about the date and need for volunteers to assist in installing protective fencing on the Borough's website and other relevant media

Mid-March

- Inspect all signs for needed repairs and replacements (do this monthly until October 31)

March 15

- Close beach to public ORV use
- Close Stone Harbor Point south of 127th Street to kite flying, picnics, ball playing, and frisbee (March 15 – September 30)
- ENSP-led surveying and monitoring shorebird and colonial waterbird nest establishment a minimum of one to two times per week (March 15 – April 15)

April 1

- Install signs, posts, fencing and flagging, using volunteers to assist ENSP
- Open beach between 122nd and 127th Street to catamarans and other sailcraft, by license only
- Limit beach raking to areas north of 122nd Street and within 100 yards of a staffed lifeguard stand (April 1)

April 15

- ENSP-led surveying and monitoring of piping plover nests a minimum of three weekdays per week, continued through Labor Day
- ENSP-led patrols of nesting areas every Saturday and Sunday to minimize human disturbance to nesting and incubating birds and chicks, continued through Labor Day
- ENSP-led surveying and monitoring of colonial waterbird nesting colonies a minimum of three times per week, continued until nesting is complete
- ENSP-led census of colonial waterbird colonies every two weeks, continued until nesting is complete

May

- Limit official ORV use to bonafide emergency responses after first piping plover nest hatches until all chicks are fledged (can fly), including use of service road behind the oceanfront dune (~ May 15)
- Install shorebird foraging area signs along the bayside shoreline (~ May 1)
- ENSP / CWFNJ-led survey of spring shorebird migration once a week (May 1 - 31)

June

- NJAS-led shorebird survey to count species and number of individuals

July

- Post a monitor at Stone Harbor Point during the evening of any scheduled July 4th fireworks to prevent human disturbance of the nesting area
- ENSP / CWFNJ-led survey of fall shorebird migration every two weeks (July – Oct.)
- Conduct seabeach amaranth and state-listed plant survey

September 1

- Issue ORV permits to operate a vehicle on the beach (Sept. 1 – 30)

Day after Labor Day

- If all nesting is complete, adjust protective fencing as needed to protect roosting and foraging areas for migrating shorebirds and waterbirds from ORV disturbance
- Post signs above the high tide line to delineate where public ORV use is not allowed
- If all nesting is complete, allow kite flying at the Point
- Allow public ORV use of the Point, by permit only, limited to areas of hard sand and no more than 25 feet above the high tide line, speeds of 15 MPH or less, and between 4 AM and 1 AM
- Striper Tournament starts, continues through November 20

October 1

- Open beaches for kite flying, picnics, ball playing and frisbee

November 1

- Close beach between 122nd and 127th Street to catamarans and other sailcraft
- Remove protective fencing for migratory shorebirds and waterbirds (unless critical needs are identified that require further protection)

Emergency Contact List

Todd Pover Beach Nesting Bird Project Manager CWFNJ on behalf of NJDEP - ENSP Woodbine, NJ	(609) 628-0401
USFWS New Jersey Field Office Pleasantville, NJ	(609) 646-9310
USFWS Law Enforcement Office Elizabeth, NJ	(973) 645-5910
NJDEP Southern Regional Law Enforcement Office Sicklerville, NJ	(856) 629-0555 weekdays 1-877-927-6337 weekends
Amanda Dey, Senior Biologist William Pitts, Wildlife Technician Migratory Shorebird Project Endangered & Nongame Species Program, NJDEP Robbinsville, NJ	(609) 259-6967/6963 (609) 259-8155 FAX Amanda.dey@dep.state.nj.us William.pitts@dep.state.nj.us
Tuckahoe Field Office Division of Fish & Wildlife, NJDEP	609-628-2103 609-628-2734 FAX

Stone Harbor Borough Office of Emergency Management	(609) 368-2111
Stone Harbor Borough Police Department	(609) 368-2111
Marine Mammal Stranding Network Brigantine, NJ	(609) 266-0538

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Acronyms

ACO	Animal Control Officer
AIWW	Atlantic Intracoastal Waterway
APHIS	Animal and Plant Health Inspection Services, a division of the U.S. Department of Agriculture, Wildlife Services
ATV	All-terrain vehicle
CAFRA	New Jersey Coastal Area Facility Review Act
CBRA	Coastal Barrier Resources Act
CDF	Confined Disposal Facility
CWA	Clean Water Act
CWFNJ	Conserve Wildlife Foundation of New Jersey
cy	Cubic yard
DLUR	Division of Land Use Regulation, New Jersey Department of Environmental Protection
ENSP	Endangered and Nongame Species Program, New Jersey Department of Environmental Protection
ESA	Endangered Species Act of 1973
ft	Feet
GIS	Geographic Information System
IBA	Important Bird Area
ISS	International Shorebird Survey
m	Meter
MBTA	Migratory Bird Treaty Act
NGVD	National Geodetic Vertical Datum
N.J.A.C.	New Jersey Administrative Code
NJAS	New Jersey Audubon Society
NJDEP	New Jersey Department of Environmental Protection
NJDFW	New Jersey Division of Fish and Wildlife
N.J.S.A.	New Jersey Statutes Annotated
ONLM	Office of Natural Lands Management
OPA	Otherwise Protected Area
ORV	Off-road vehicle
PRISM	Program for Regional and International Shorebird Monitoring
SHBS	Stone Harbor Bird Sanctuary
TNR	Trap-Neuter-Return
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WHSRN	Western Hemisphere Shorebird Reserve Network
WS	Wildlife Services, a division of the Animal and Plant Health Inspection Services, U.S. Department of Agriculture

Scientific Names

BIRDS	
American black duck	*Anas rubripes*
American green-winged teal	*Anas crecca*
American oystercatcher	*Haematopus palliatus*
American robin	*Turdus migratorius*
American wigeon	*Anas americana*
Atlantic brant	*Branta bernicla*
Black scoter	*Melanitta nigra*
Black skimmer	*Rynchops niger*
Black-crowned night heron	*Nycticorax nycticorax*
Blackpoll warbler	*Dendroica striata*
Black-throated blue warbler	*Dendroica caerulescens*
Boat-tailed grackle	*Quiscalus major*
Brown thrasher	*Toxostoma rufum*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta Canadensis*
Carolina wren	*Thryothorus ludovicianus*
Cattle egret	*Bubulcus ibis*
Common eider	*Somateria mollissima*
Common goldeneye	*Bucephala clangula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common tern	*Sterna hirundo*
Common yellowthroat	*Geothlypis trichas*
Dunlin	*Calidris alpine*
Eastern towhee	*Pipilo erythrophthalmus*
Gadwall	*Anas strepera*
Glossy ibis	*Plegadis falcinellus*
Gray catbird	*Dumetella carolinensis*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Gull-billed tern	*Sterna nilotica*
Hermit thrush	*Catharus guttatus*
Hooded merganser	*Lophodytes cucullatus*
King eider	*Somateria spectabilis*
Laughing gull	*Larus atricilla*
Least tern	*Sterna antillarum*
Little blue heron	*Egretta caerulea*

Little blue heron	*Egretta caerulea*
Long-tailed duck	*Clangula hyemalis*
Mallard	*Anas platyrhynchos*
Mergansers	*Mergus* sp.
Northern cardinal	*Cardinalis cardinalis*
Northern gannet	*Sula bassanus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Parula americana*
Northern pintail	*Anas acuta*
Osprey	*Pandion haliaetus*
Palm warbler	*Dendroica palmarum*
Piping plover	*Charadrius melodus*
Prairie warbler	*Dendroica discolor*
Red knot	*Calidris canutus rufa*
Red-breasted merganser	*Mergus serrator*
Red-eyed vireo	*Vireo olivaceus*
Red-necked grebe	*Podiceps grisegena*
Red-throated loon	*Gavia stellata*
Roseate tern	*Sterna dougallii*
Ruddy duck	*Oxyura jamaicensis*
Ruddy turnstone	*Arenaria interpres*
Sanderling	*Calidris alba*
Scaups	*Aythya* sp.
Scoters	*Melanitta* sp.
Semipalmated plover	*Charadrius semipalmatus*
Semipalmated sandpiper	*Calidris pusilla*
Short-billed dowitcher	*Limnodromus griseus*
Snowy egret	*Egretta thula*
Snowy egret	*Egretta thula*
Song sparrow	*Melospiza melodia*
Surf scoter	*Melanitta perspicillata*
Tree swallow	*Tachycineta bicolor*
Tricolored heron	*Egretta tricolor*
Veery	*Catharus fuscescens*
White-winger scoter	*Melanitta fusca*
Wood duck	*Aix sponsa*
Wood thrush	*Hylocichla mustelina*
Yellow warbler	*Dendroica petechia*
Yellow-crowned night heron	*Nycticorax violaceus*
Yellow-rumped warbler	*Dendroica coronata*
FISH	
Atlantic cod	*Gadus morhua*
Atlantic menhaden	*Brevoortia tyrannus*

Atlantic silverside	*Menidia menidia*
Bay anchovy	*Anchoa mitchilli*
Black sea bass	*Centropristis striata*
Bluefish	*Pomatomus saltatrix*
Butterfish	*Perpilus triacanthus*
Hake	*Urophycis* sp.
Mackerel	*Scomber* sp.
Mullet	*Mugilidae* sp.
Mummichog	*Fundulus heteroclitus*
Northern kingfish	*Menticirrhus saxatilis*
Scup	*Stenotomus chrysops*
Shad	*Alosa mediocris*
Sheepshead minnow	*Cyprinodon variegates*
Spot	*Leiostomus xanthurus*
Striped bass	*Morone saxatilis*
Summer flounder	*Paralichtys dentatus*
Tautog	*Tautoga onitiss*
Tidewater silverside	*Menidia peninsulae*
Weakfish	*Cynoscion regalis*
White mullet	*Mugil curema*
Windowpane	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
MAMMALS	
Bottlenose dolphin	*Tursiops truncatus*
Cat	*Felis catus*
Harbor seal	*Phoca vitulina*
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Skunk	*Mephitis mephitis*
West Indian manatee	*Trichechus manatus*
INVERTEBRATES	
American lobster	*Homerus americanus*
Bay scallop	*Aequipecten irradians*
Blue crab	*Callinectes sapidus*
Common blue mussel	*Mytilus edulis*
Common rock crab	*Cancer irroratus*
Coquina clam	*Donax variabilis*
Eastern oyster	*Crassostrea virginica*
Fiddler crab	*Uca* sp.
Ghost crab	*Ocypode quadrata*
Hard clams	*Mercenaria mercenaria*
Horseshoe crab	*Limulus polyphemus*

Mole crab	*Emerita talpoida*
Moon snail	*Polinices heros*
Ribbed mussel	*Modiolus demissus*
Salt marsh snail	*Melampus bidentatus*
Shrimp	*Penaeus* sp.
Surf clam	*Spisula solidissima*
REPTILES	
Green sea turtle	*Chelonia mydas*
Hawksbill turtle	*Eretmochelys imbricata imbricata*
Kemp's Ridley sea turtle	*Lepidochelys kempii*
Leatherback sea turtle	*Dermochelys coriacea*
Loggerhead sea turtle	*Caretta caretta*
PLANTS	
American beachgrass	*Ammophila breviligulata*
Black grass	*Juncus gerardi*
Eastern red cedar	*Juniperus virginiana*
Eelgrass	*Zostera marina*
Marsh elder	*Iva frutescens*
Northern bayberry	*Myrica pensylvanica*
Prickly pear cactus	*Opuntia* sp.
Red algae	*Gracilaria* sp.
Rockweed	*Fucus* sp.
Saltgrass	*Distichlis spicata*
Saltmarsh aster	*Aster tenuifolius*
Saltmarsh cordgrass	*Spartina alterniflora*
Saltmeadow cordgrass	*Spartina patens*
Sea lavender	*Limonium carolinianum*
Sea lettuce	*Ulva* sp.
Seabeach amaranth	*Amaranthus pumilus*
Seabeach knotweed	*Polygonum glaucum*
Seabeach purslane	*Sesuvium maritimum*
Seabeach sandwort	*Honckenya peploides*
Seaside evening primrose	*Oenothera humifosa*
Seaside goldenrod	*Solidago sempervirens*
Silver bunch grass	*Panicum amarum var. amarulum*
Spaghetti grass	*Codium fragile*
Swamp rose-mallow	*Hibiscus palustris*
Yarrow	*Achillea* sp.

APPENDICES