

Fire Island National Seashore

**THREATENED & ENDANGERED SPECIES MONITORING PROGRAM
2009 SUMMARY**



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Table of Contents

	<u>Page number</u>
1. Abstract.....	3
2. Introduction.....	3
3. Objective.....	6
4. Preseason Protocol.....	6
5. Monitoring.....	7
a. Piping plover monitoring.....	7
i. Preliminary monitoring	
ii. Incubation monitoring	
iii. Brood monitoring	
b. Colonial Waterbird Monitoring.....	9
c. Vegetation Monitoring.....	9
d. SEANET Monitoring.....	9
6. Results.....	10
a. Piping plovers (<i>Charadrius melodus</i>).....	10
i. Summary of nests	
b. Colonial waterbirds (<i>Sterna</i> spp).....	13
c. Vegetation (<i>Amaranthus pumilus</i> and <i>Polygonum glaucum</i>).....	14
d. SEANET.....	14
7. Discussion.....	15
a. T&E species.....	15
b. Disturbance issues.....	16
c. Regulation issues.....	17
d. Weather issues.....	18
8. Recommendations.....	18
9. Acknowledgements.....	20
Works cited.....	21

Appendix A: Figures, Tables and Pictures

	<u>Page number</u>
Table 1: Historic Productivity of Piping Plovers at FIIS.....	22
Table 2: FIIS 2009 Overall Piping Plover Productivity.....	23
Table 3: Long Island Colonial Waterbird Surveys for the 2009 season.....	24
Table 4: Seabird Ecological Assessment Network data: April-September 2009.....	25
Figure 1: Bar graph of brood outcome for 2009 Piping Plovers at FIIS.....	26
Figure 2: Pie graph displaying the outcome of all Piping Plover eggs at FIIS.....	27
Figure 3: Pie graph displaying the outcome of all Piping Plover chicks at FIIS.....	27
Figure 4: Chart displaying historical values for Piping Plover nests and fledglings on FIIS (2000-2009).....	28
Figure 5: Chart displaying historical values for seabeach amaranth and seabeach knotweed on FIIS (2003-2009).....	28
Figure 6: Approximate adult population of least tern colonies occurring throughout FIIS, 2009.....	29
Picture 1: Northern Gannet found on Lighthouse beach during SEANET survey, 8/19/09.....	30

Appendix B: Maps

	<u>Page number</u>
Map 1: Map of Fire Island National Seashore.....	31
Map 2: Lighthouse.....	32
Map 3: Saltaire to Atlantique.....	32
Map 4: Ocean Bay Park to Point O'Woods.....	33
Map 5: Sailors Haven.....	34
Map 6: Fire Island Pines.....	35
Map 7: Talisman/Barrett Beach.....	35
Map 8: Blue Point.....	36
Map 9: Davis Park.....	36
Map 10: Watch Hill.....	37
Map 11: Otis Pike Wilderness Area, West.....	38-39
Map 12: Otis Pike Wilderness Area, East.....	40-41

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1. ABSTRACT

Fire Island National Seashore (FIIS) is a National Park unit located just south of Long Island, New York. As part of the Threatened and Endangered Species Program monitoring effort conducted at FIIS, the status of six threatened and endangered (T&E) species were observed in 2009. Through daily monitoring and a collaborative park effort, a total of 19 piping plover (*Charadrius melodus*) nesting pairs were recorded within the park. With a total of 13 successful piping plover fledglings, nesting productivity reached an average of 0.68 piping plover chicks fledged per pair. Annual population surveys for least tern (*Sterna antillarum*), common tern (*Sterna hirundo*), roseate tern (*Sterna dougallii*) and black skimmer (*Rynchops niger*) species resulted in a total count of approximately 154, 505, 0 and 0 respectively. Seventy-eight seabeach amaranth (*Amaranthus pumilus*) plants and 185 seabeach knotweed (*Polygonum glaucum*) plants were documented for the Nature Conservancy's annual survey in the federal tracts of land at FIIS. FIIS staff worked cooperatively with Land Use Ecological Services staff; this contracting firm was partially responsible for monitoring symbolically fenced areas in Davis Park, Fire Island Pines and Ocean Bay Park for Threatened & Endangered Species as specified in the 2009 community beach nourishment project. Persistent educational and outreach efforts directed towards park visitors, island residents, and cooperating agencies, is critical for the continued success of this program.

2. INTRODUCTION

Fire Island National Seashore was established as a unit of the National Park Service on September 11, 1964, as authorized by United States Congress (Public Law 88-587). Fire Island is a 32-mile long barrier island located off the south shore of Long Island, N.Y. (Map 1, *see page 31*). Fire Island National Seashore occupies 26 miles of this island, punctuated by 17 private communities located predominately on the western half. There are no continuous paved or unpaved roads running the length of Fire Island, therefore, most of the Island's beaches are open to driving with some internal routes through various communities. The National Seashore land is bordered on the west by Robert Moses State Park and on the east by Moriches Inlet. Smith Point County Park, managed by Suffolk County, is within the boundary of FIIS and makes up the eastern seven miles of Fire Island.

The Lighthouse beach, so named for the Fire Island Lighthouse that once marked the western tip of the island, is bordered to the west by Robert Moses State Park. It expands eastward for approximately one mile to the town of Kismet, the westernmost community of Fire Island. This area sees exponential seasonal visitation increases due to its proximity to the Robert Moses Bridge (one of two vehicle access points to the island), the State Park with five large parking lots, and the ferry terminal in Kismet. For this reason, monitoring for threatened and endangered (T&E) species becomes increasingly difficult as visitor season progresses.

The private communities on Fire Island run east from Kismet for 11.5 miles to Davis Park and punctuate the Park's land. Some of the more well known National Park owned land tracts nestled between the

different communities are Sailor's Haven, Carrington Tract (located between the communities of Cherry Grove and Fire Island Pines), Talisman/Barrett Beach, and Blue Point Beach. Since the communities are inholdings that fall within the National Seashore boundaries, they must comply with NPS and other federal regulations. When T&E species are discovered on beaches in front of communities, outside contractors such as LandUse Ecological Services are often contacted to monitor these areas. In 2009, LandUse placed symbolic fencing in communities that supported the beach nourishment project in the spring of 2009 and played a key role in monitoring efforts this year.

Lying in the middle of the dense community area is a 1.3 mile stretch of land known as Sailors Haven. It is one of two stretches of beach on which no vehicles are allowed, but the internal vehicle route allows access to the east. It is bordered on the west by Oakleyville and on the east by Cherry Grove, which has no internal vehicle access. Within this natural area lies the Sunken Forest, one of only two examples of the globally threatened holly maritime forest in the world. The Sunken Forest and surrounding area are ribboned with paths and boardwalks for visitor use. The marina and visitors center located here also attracts high visitation during the summer months.

Talisman/Barrett Beach is located approximately two miles east of Sailors Haven, between the Fire Island Pines and Water Island. This 1.4 mile stretch of beach is generally less visited than other prominent FIIS beaches due to its remote location and limited access.

The Watch Hill area marks the boundaries of Davis Park, the easternmost community on Fire Island, and the Otis Pike High Dune Wilderness Area. Located here are a visitor center, marina with ferry terminal, campground, trails, and other visitor amenities, as well as a ranger station and employee housing. This area is often the home base from which more FIIS biologists work and live during the T&E species monitoring season.

The land between Watch Hill and Smith Point County Park is the Otis Pike High Dune Wilderness Area (OPWA). This seven mile stretch of beach is the only federally designated wilderness area in the state of New York, established for the purposes of maintaining wilderness character and preserving a variety of natural barrier island ecosystems. Historically, this area has contained the majority of piping plover nests as well as amaranth and knotweed plants. For the purposes of mapping, the OPWA is often divided into several sections: OPWA West and OPWA East extend over the entire area, bisected by the narrow inholding of Bellport Beach. The OPWA East is further distinguished by the Old Inlet and Overwash areas.

The area referred to as the Overwash once included some of the largest dunes on Fire Island. It was these dunes that helped name the wilderness as the Otis Pike High Dune Wilderness Area. A Nor'easter event in 2005 washed over these dunes to its current state as a sandy, mostly flat area. The Nor'easter event on April 16, 2007 further widened the Overwash in many areas. Consequently, the most recent aerial photographs (2004) do not reflect the current Overwash area. It expands east from Old Inlet for approximately 1.5 miles with a 0.25 mile width sprawling north from the former dune line. Primary dune regeneration has been observed though no official measurements have been taken. Sparse vegetation communities occur throughout this area, and it is characteristic of prime habitat for nesting shorebirds and germinating amaranth and knotweed.

Included in Fire Island National Seashore land is the historic William Floyd Estate, a 613 acre parcel of

land donated to the Park in 1965. This section of the park is located on the south shore of mainland Long Island, in the town of Mastic Beach. Although Cultural Resource and Invasive Plant Management efforts are implemented, no populations have federally listed T&E species have been observed to date, and therefore no T&E species monitoring occurs here.

Several small islands located in the Great South Bay fall within FIIS boundaries. During waterbird and shorebird breeding season, biologists conduct colonial waterbird surveys on these islands and other areas of Fire Island. Point counts of various colonial waterbird species were conducted twice during the season in conjunction with the NY State Department of Environmental Conservation (NYSDEC).

Sections of Fire Island National Seashore provide suitable breeding/germination habitat for a number of federal- and state-listed T&E species. Protected avian species observed on FIIS are the piping plover (*Charadrius melodus*), least tern (*Sterna antillarum*), common tern (*Sterna hirundo*), roseate tern (*Sterna dougallii*) and black skimmer (*Rynchops niger*). Protected vegetative species include seabeach amaranth (*Amaranthus pumilus*) and seabeach knotweed (*Polygonum glaucum*).

Of the six species observed, the piping plover constitutes the largest portion of the monitoring program effort. Listed as a federally threatened species in 1986, FIIS has worked extensively toward the recovery of the piping plover. FIIS works in collaboration with the US Fish and Wildlife Service (USFWS) within the parameters of their Piping Plover Recovery Plan to ensure the long-term viability of the Atlantic Coast piping plover population in the wild, thereby allowing possible future removal of this population from the Federal List of Endangered and Threatened Wildlife and Plants (USFWS 1996). One of five recovery criteria for the piping plover states that 2,000 breeding pairs must be successfully monitored and maintained for five consecutive years. Of the 2,000, 575 of those must be located within the states of New York and New Jersey. In 2007 a total of 586 nesting piping plover pairs were found in NY-NJ and 1,890 pairs were found on the Atlantic Coast (USFWS 2007). Other important delisting criteria for the piping plover species include achieving a five-year average productivity of 1.5 fledged chicks per nest and instituting long term agreements among cooperating agencies, landowners, and conservation organizations in order to maintain population and productivity.

Prior to the federal listing of the piping plover, the interior population of least tern was listed federally endangered in 1985 and is also a state listed threatened species in New York. The roseate tern was listed in 1987 as endangered both federally and statewide. According to the USFWS, once the Northeast nesting populations of roseate terns reach 5,000 in at least six large colonies with high productivity, they will be removed from the endangered species list.

Encompassing FIIS threatened and endangered vegetative species are seabeach amaranth (amaranth) and seabeach knotweed (knotweed). Amaranth was believed to have been extirpated in New York for over three decades until isolated populations began to appear on Long Island in the early 1990s. Amaranth was listed as federally threatened in 1993 and knotweed is listed as a New York State species of concern.

3. OBJECTIVE

It is the objective of Fire Island National Seashore to follow the management goals set forth in the Endangered Species Act (1973), Endangered Species Habitat Management Plan (1998), and the US Fish & Wildlife Piping Plover Atlantic Coast Population Revised Recovery Plan (1996) for the protection and productivity of nesting threatened and endangered species. These guidelines include monitoring breeding/germination populations, documenting productivity, limiting human disturbance to areas with suitable habitat, protecting listed species from potential predators, and educating the public. The purpose of this report is to present the results of the 2009 T&E species program conducted on Fire Island National Seashore and discuss areas of improvement for the upcoming field season.

4. PRESEASON PROTOCOL

In accordance with USFWS guidelines, preseason habitat fencing (symbolic fencing) is erected for the purpose of protecting avian species nesting habitat and potential vegetative species habitat. In 2009, symbolic fencing was constructed and established in early April, prior to the onset of the piping plover breeding season. Areas to be fenced were determined through the compilation of nest/plant data collected from previous years, early season plover observations, and through visual assessments.

All symbolic fencing on FIIS for 2009 was constructed using 5.5 ft Carsonite™ fiberglass posts, biodegradable or nylon flagging and sisal twine or nylon string. Carsonite™ posts' light weight offers an efficient alternative to steel posts used in years past, and the use of biodegradable materials in certain sections of beach (particularly the OPWA and Sailors Haven) helped reduce the environmental impact of lost fencing. Posts are placed approximately 12 paces apart and are connected using twine/string; strips of orange flagging are secured along the twine/string to visibly identify symbolic fencing. For every fourth post, an informative 'plover habitat' or 'endangered species area' sign provided by the USFWS is posted, notifying the public of the reason for symbolic fencing. Larger interpretive signs were situated at public access entrances to inform beachgoers about the piping plover.

Throughout sections of FIIS, restrictions and/or beach closures are implemented regarding vehicles and pets. While some beaches on Fire Island are open to driving, vehicles are prohibited from a 0.7 mile section of the beach at Sailors Haven year-round, and the OPWA is closed to vehicular traffic from March through September to coincide with the piping plover breeding season. Additional closures of areas to ORVs occur when nesting/hatching of nests is imminent, due to the documented negative effects vehicular driving on the beach has on the nesting success of breeding shorebirds, as well as the germination of threatened/endangered plants. As with driving, domestic dogs (*Canis lupus familiaris*) have also proven harmful to the success of some shorebirds and are thereby ordered to be restrained at all times on a leash which shall not exceed six feet in length while on the beaches of a national seashore (36 CFR2.15). Pets are entirely prohibited from areas of beach with unfledged chicks of piping plover or other protected species present on federal tracts. Several Executive Orders (EOs) by the Town of Brookhaven were issued on non-federal tracts within FIIS in 2009 to protect nesting and unfledged piping plovers from unleashed dogs on the beach.

At the beginning of the nesting season, additional preventative measures are implemented for the protection of the piping plovers. In order to protect nests from avian and mammalian predators, wire

exclosures are erected and placed around the nest site. Exclosures are ten feet in diameter and are constructed using 2 x 4 inch galvanized welded mesh fencing. The fence is then buried approximately 12 inches deep and supported by four Carsonite™ posts which are buried and attached to the fencing using multi-purpose zip ties. In order to deter avian predators, a ¾ inch nylon mesh is placed over the top of the exclosure and tied down with zip-ties.

4. NEW FOR 2009

As mentioned, FIIS staff worked cooperatively with Land Use Ecological Services staff during the 2009 T&E season, especially due the unexpected number of nesting piping plovers on non-federal tracts this season. This contracted private consulting firm was responsible for monitoring symbolically fenced areas in Davis Park, Fire Island Pines and Ocean Bay Park for threatened & endangered species as specified in the 2009 community beach nourishment special-use permit. Extensive symbolic fencing for T&E species was placed on community beaches in late-March of 2009. LandUse staff monitored piping plovers and least terns nesting on community beaches during the week while FIIS staff monitored the entire island on the weekends. There was overlap in monitoring during the week since FIIS staff regularly traveled through areas to be monitored by LandUse.

FIIS staff also starting conducting SEANET (Seabird Ecological Assessment Network) surveys this year in conjunction with T&E species monitoring. SEANET was initiated by the Tufts Center for Conservation Medicine, in collaboration with the Lloyd Center for Environmental Studies in Massachusetts, and brings together scientists and concerned citizens in a long-term collaborative effort to identify and mitigate threats to marine birds on the North Atlantic seaboard.

5. POPULATION MONITORING

5a. Piping plover monitoring

i. Preliminary monitoring

Piping plover migration to Fire Island occurs between late February and March, with tern species arriving in late April and early May. During these early weeks when plovers are establishing nesting territories, the entire island is scanned for activity. Areas where birds are seen regularly are more intensely monitored and symbolic fencing is erected and adjusted accordingly. The OPWA, which in years past has consistently yielded the highest piping plover productivity, is monitored closely beginning in late March. By mid-April, monitoring is conducted at least five times a week by foot throughout the Wilderness Area. Possible piping plover activity on federal tracts: Watch Hill, Talisman, Sailors Haven and the Lighthouse beach are also closely monitored, as well as non-federal tracts. Off-road vehicles (ORV) may be utilized as a means of transportation to these areas.

Daily monitoring surveys and biological data are conducted and collected by qualified field biologists walking along the beaches. Before nesting occurs, observations of individuals or pairs of piping plovers are recorded. Information recorded includes: time/date, weather conditions, number of birds, displayed behaviors, and geographic coordinates using a handheld Global Positioning System (GPS) unit.

This preliminary monitoring process continues until the discovery of the first nests, usually in early May. Breeding pairs of plovers are identified using binoculars and observed for specific territorial, courtship and nesting behaviors. These behaviors include (but are not limited to) parallel runs, aerial displays, scraping, broken-wing display, and vocalization (Cairns 1982).

ii. Incubation monitoring

Piping plovers generally lay one egg every other day until they reach a complete clutch size of 4 eggs, though in some instances a nest may contain 3 eggs. The latter are typically re-nests of recent nests considered failed. Regardless of nest location along FIIS, all plover nests were exclosed and protected within symbolic fencing borders, creating a buffer zone of no less than then 50 meters on all sides. In areas that were heavily populated by beachgoers, the buffer zone was enlarged in order to decrease the amount of human disturbance and allow for greater habitat protection.

Upon discovery of a nest, an alphanumeric tag is used to identify each nest; a nest number and year are assigned chronologically, using an “A” for first nesting attempt, “B” for second, and so on (eg.1A-09). Universal Transverse Mercator (UTM) North American Datum (NAD) 83 coordinates are recorded for each nest site using a Garmin™ Global Positioning System (GPS) unit and extracted onto an ArcGIS™ (Geographic Information System) aerial image of Fire Island for monitoring and data management purposes.

Monitoring efforts for nesting activity are increased after pairing or copulation is observed. Field biologists lead intensive daily monitoring observations for the purpose of quickly identifying nests and exclosing them at full-clutch status. This effort helps ensure minimal disturbance towards breeding pairs and allows for accurate estimation of hatch and fledge dates. An average hatch date of 27 days from the full clutch date is determined utilizing a chart produced by New York State Department of Environmental Conservation (NYSDEC). Each day, a nest is carefully observed with binoculars from a distance no less than 50 meters, and the activity of the birds is recorded. Daily nest site observation information is recorded on individual data sheets for each nest then transferred to an Excel spreadsheet.

iii. Brood monitoring

Daily brood monitoring is initiated after the first piping plover egg is hatched. Cautious attention is given to all plover chicks, since chicks are most vulnerable to predation during their first one or two weeks after hatching. Data collected for each brood consists of: number and behavior of adults, number of chicks observed, and location. Careful efforts are made to properly distinguish amongst chicks, especially where nests are in close proximity to each other. Age, size, and plumage are the major factors in differentiating chicks. During instances of missing chicks, field biologists are to scan the vicinity of the nest site for those unaccounted for a period of five days in accordance with USFWS guidelines. It takes 25-35 days after hatching for a plover chick to fledge. Chicks are either considered fledged when witnessed thirty-five days after they have hatched or when a sustained flight of fifteen meters is observed before then. When a nest is situated near a vehicle beach access route, a fledge date of thirty-five days is implemented to ensure the safety of the brood (USFWS 1995).

5b. COLONIAL WATERBIRD SURVEY

Population counts for colonial waterbirds were conducted twice during the 2009 season in June, once before the 15th and once after. Sponsored by the NYSDEC, the Long Island Colonial Waterbird Survey (LICWS) monitors the presence and populations of various colonial waterbirds. Many of the sites surveyed were located on Fire Island's ocean and bay beaches between the Lighthouse Tract and Smith Point County Park. These areas were monitored by qualified field biologists and accessed by either ORV or on foot. Several bay islands that fall within the boundaries of the park are also monitored for waterbirds, including (but not limited to): Sexton Island, West Fire Island, East Fire Island, Long Cove, Ridge Island, Pelican Island, John Boyle Island, and Hospital Island. These bay islands can only be reached by either motorboat or canoe, and access may be limited by inclement weather, remoteness of location, and time constraints.

5c. VEGETATION MONITORING

Amaranth and knotweed begin to germinate on FIIS in early July. Generally, these species tend to grow in large clusters, but isolated plants have been observed as well. These plants also tend to grow in early successional dune habitat—the same type as preferred by piping plovers and least terns for nesting. For this reason, symbolic fencing established for plover and tern nesting habitat remain up during germination period for amaranth and knotweed. Fencing may be adjusted after initial sweep counts to provide a twenty-five meter buffer around plants. Field biologists conduct vegetation monitoring sweep counts throughout FIIS, both on foot and using an ORV, traveling parallel to the toe of the dune. A Garmin™ GPS unit is used to collect data points for the locations of amaranth and knotweed plants, and individuals or clusters are marked with pinflags or stakes. All plants located outside of existing symbolic fencing should be marked, enclosed within fencing, and recorded with a GPS. Other data collected include location, plant condition, relative size, cluster number, potential threats, weather conditions, and general observations in accordance with data sheets provided by The Nature Conservancy. GPS data are transferred to a computer, corrected, and displayed on an ArcGIS™ aerial image of Fire Island. Sweep counts for amaranth and knotweed continue throughout August and early September until plant growth and reproduction ceases.

5d. SEANET MONITORING

There are 3 designated beaches surveyed for SEANET: Lighthouse, Sailors Haven and the OPWA. Surveys are conducted twice a month, preferably during low tide or after high tide (as the tide is going out). A 'Beached Bird Survey Data Form' must be filled out for each survey and data such as beach number/ID, weather conditions and observations/measurements of any beached birds observed during the survey is included. SEANET defines a beached bird as, "any carcass or any partial carcass with a measurable bill, tarsus or wing. Parts of a skull, a keel, or a pile of feathers do not constitute a beached bird and should not be reported" (Ellis & Hart 2009).

All observations/measurements were followed on the data form if a beached bird was encountered (Ellis & Hart 2009). In addition, GPS locations and photographs are taken of the specimen in accordance with SEANET protocols. After all measurements and photographs are performed the specimen was either properly marked with a small orange plastic cable tie or removed from the beach in a garbage bag and properly disposed of in a trash receptacle. Marking or removal is extremely important because it

prevents you from re-counting the same bird on each beach walk or on another SEANET beach if the bird washes out. Data sheets for each survey are then entered directly into SEANET's online database at <http://wildlifedisease.nbi.gov/seanet>.

6. RESULTS

6a. PIPING PLOVERS (*Charadrius melodus*)

Monitoring for the 2009 piping plover breeding season on Fire Island began when the first piping plovers were observed in early April and continued through late August. In the months between May and June, piping plover nests were discovered and documented throughout FIIS.

A total of 19 nesting pairs were documented, from which there came 24 nesting attempts throughout the island. Fifteen nests hatched and nine successfully fledged chicks. Nests were lost due to abandonment, predation, destroyed/vandalized, or failure to successfully hatch. Six nests hatched chicks but were subsequently not observed on the beach and assumed predated (Table 2, *see page 23*).

A total of 90 eggs were laid and 53 of these total eggs hatched, with the remainder failing as a result of predation, abandonment, destroyed/vandalized or other circumstances (Figure 2, *see page 27*). Thirteen chicks total went on to fledge, yielding a productivity of 0.68 for 19 breeding pairs (Table 2, *see page 23*; Figure 3, *see page 27*).

A breakdown of the number of eggs that hatched and their survival rate is displayed in a bar graph showing the number of chicks that survived past one day, those that lived past two weeks and those that went on to fledge. Only 53 out of 90 eggs hatched chicks, with only 14 chicks surviving past 2 weeks (Figure 1, *see page 26*).

i. Summary of piping plover nests

The entirety of plover nest activity on the western half of the island was as follows: one at Lighthouse beach (9A), one at Sailors Haven (1A), one at Point O' Woods (1B), one at Ocean Bay Park (1C), and one at the Fire Island Pines (14A). Three nest attempts occurred in Davis Park (5A, 6A, 18A). One nesting attempt occurred at Watch Hill (7A).

The Otis Pike High Dune Wilderness Area (OPWA) yielded sixteen nesting attempts which were divided by location: OPWA West (Watch Hill to Bellport Beach) and OPWA East (Bellport Beach to the Wilderness Visitor Center). OPWA East includes Old Inlet and the Overwash which have historically been highly productive sections of OPWA East for piping plovers. There were five nest attempts in the OPWA West (3A, 8A, 8B, 12A, 15A), one in the OPWA East (10A), five at Old Inlet (4A, 4B, 13A, 16A, 16B), and five nest attempts in the Overwash (2A, 2B, 11A, 17A, 19A). Below is a summary of each nesting attempt.

Nest **1A-09** was found with 3 eggs on April 27th on the west-end of Sailors Haven, marking the start of piping plover nesting season. The nest was not immediately exclosed due to unsuitable weather conditions during the week (USFWS 1996). It was considered predated on May 3rd after the 4 eggs

were no longer present and mammalian tracks were observed in the vicinity (tracks were not distinguishable due to consistently rainy conditions that week).

On May 11th, nest **1B-09** was found in Point O' Woods with 1 egg, and 3 eggs were observed on May 14th. When FIIS staff went out to exclose the nest on May 15th there were no eggs present and fox tracks were observed in the vicinity.

On May 23rd, nest **1C-09** was found in the community of Ocean Bay Park with 3 eggs and it was exclosed that same day. The re-nest reached a full clutch and successfully hatched three chicks on June 22nd. Neither the chicks nor the adults were seen again after this date, despite intense searches for this brood by LandUse and FIIS staff. One West District Visitor & Resource Protection Ranger observed 2 adults and 1 chick near the west-end Sailors Haven dune crossing on June 28th but this brood was not observed anytime thereafter.

Nest **2A-09** was discovered on May 5th in the west end of the Overwash area with 1 egg. It was exclosed with 4 eggs on May 11th. Adults stopped incubating the nest on June 4th, and it was officially considered abandoned on the 13th.

Nest **2B-09** was found 300 yards east of 2A on June 15th with a full clutch of 4 eggs and was exclosed the following day. Three chicks successfully hatched on July 17th and one unhatched egg remained. By July 20th only 2 chicks remained and both went on to fledge on August 6th.

Nest **3A-09** was discovered with 1 egg on May 6th just west of Bellport beach; it was exclosed on May 12th. It reached a full clutch of 4 eggs on May 14th. The nest was considered abandoned on May 24th when no birds were seen incubating and the eggs were missing/blown over. The cause of abandonment is unknown: there were fox tracks seen in the vicinity but the nest was very close to Bellport Beach and the abandonment occurred during Memorial Day weekend (ie, highly visited area).

Nest **4A-09** was found with 2 eggs on May 6th just west of Old Inlet. The nest was exclosed on May 8th with 3 eggs and a total of 4 eggs were confirmed on May 12th. The nest was considered abandoned on May 25th when eggs were blown over with sand but still present. A red fox had attempted to dig under the exclosure on May 12th and fox tracks were observed circling around the exclosure on May 25th.

Nest **4B-09** was discovered on May 30th with two eggs near the original nest. It was exclosed on June 1st with 3 eggs. On June 19th no plovers were observed incubating but the nest still contained 4 eggs. However, the next day FIIS staff noticed a tear at the top of the exclosure, debris that appeared to have been thrown into the exclosure, heavy fox digging around the exclosure and only one egg remained. A Criminal Incident Record 343A was filed describing the situation (Case Incident Report 09-00-120) and the issue was considered an 'unlawful take'. The pair remained in the area between 4B and 13A but never re-nested.

Nest **5A-09** was discovered by LandUse staff on May 6th in the western half of Davis Park with 3 eggs. The nest was exclosed the same day by FIIS staff. Three of the chicks hatched on June 4th and one unhatched egg remained. Only 2 chicks were observed by June 7th. However, the chicks from this brood did not survive; LandUse or FIIS staff did not observe these birds anytime after June 10th.

Nest **6A-09** was found on top of an artificial dune just east of the Casino cut in Davis Park on May 6th with 2 eggs. It was exclosed on May 9th with a full clutch of 4 eggs. All 4 chicks hatched on June 6th. Only 3 chicks were observed by June 15th and only 2 had survived by June 25th. This brood initially moved east near the Watch Hill cut but then moved back near to where their nest had been. Both of these chicks went on to fledge.

Nest **7A-09** was discovered just east of the Watch Hill dune crossing on May 8th by an East District Visitor & Resource Protection Ranger with 4 eggs; the nest was exclosed the following day. Four chicks hatched on June 4th. Only 3 chicks were seen on June 7th and only 2 chicks the following day. Both of the remaining chicks went on to fledge.

Nest **8A-09** was found on May 12th with three eggs in the west-end of the OPWA. It reached a full clutch of four eggs on May 14th. All 4 chicks hatched but only 1 chick survived within the first 24 hours on June 8th. The final chick was not seen on June 13th. The adults remained in the area and acted territorial; scrapes were even found but the pair never re-nested.

Nest **9A-09** was discovered with 4 eggs on May 19th at the Lighthouse and was exclosed the same day. All 4 eggs hatched but only 3 chicks were observed on June 13th. Only two chicks were observed by June 30th. Both chicks went on to fledge.

Nest **10A-09** was discovered with 1 egg in the east-end of the OPWA on May 19th. The nest was exclosed with 2 eggs on May 21st. All 4 eggs hatched but only 1 chick was observed on June 21st. The 1 chick went on to fledge.

Nest **11A-09** was found on May 20th with 1 egg in the east Overwash area. An exclosure was attempted the following day but pulled after the adult did not return to incubate after one hour had expired (USFWS 1996). The nest was successfully re-exclosed on May 30th with 4 eggs. All 4 chicks hatched but only 1 chick was observed on June 23rd. The 1 chick went on to fledge.

Nest **12A-09** was found in the west-end of the OPWA on May 30th with 3 eggs. It was exclosed the following day. Three chicks hatched on June 25th. Only 2 chicks were observed by June 29th and only 1 chick by July 4th. This last chick was assumed to be fledged on July 16th and witnessed flying on July 27th.

Nest **13A-09** was found near nest 4A, just west of Old Inlet with 4 eggs on May 31st. This nest was exclosed the same day. The nest was considered abandoned on June 14th after no birds were present but eggs remained within the exclosure. On June 19th biologists noticed a tear in the top of the exclosure. After investigating further, biologists saw that a 4x4 had been thrown inside, breaking the remaining eggs. A Criminal Incident Report has been filed describing the situation (Case Incident Report 09-00-120).

Nest **14A-09** was found in the Fire Island Pines on May 31st with 4 eggs. All 4 chicks hatched on June 25th. LandUse staff did not observe the brood during the entire week of June 29th; FIIS staff located the entire brood on the east-end of Sailors Haven on July 2nd. However, by July 4th only two chicks were observed and only one chick was observed on July 5th. The final chick was last seen on July 7th, approximately 100 yards east of the Sailor's Haven cut.

Nest **15A-09** was found in the west-end of the OPWA near the first blowout with 3 eggs on June 2nd. It was exclosed the following day with 4 eggs. Three chicks hatched on June 30th, however, only 1 chick was observed and one unhatched egg remained. The final egg was not present on July 1st but only 1 chick was still observed so the chick likely did not survive. The 1 chick went on to fledge.

Nest **16A-09** was found 100 yards west of Old Inlet with 2 eggs on June 2nd. It was exclosed on June 4th with a full clutch of 4 eggs. The nest was considered abandoned on June 15th after no birds were seen incubating the nest for several days.

The pair re-nested (**16B-09**) 10 yards west of their first nest; it was discovered on June 29th with 2 eggs. The nest was exclosed on July 2nd with a full clutch of 3 eggs. Only 2 of the eggs hatched on June 27th; one unhatched egg remained in the nest. However, only 1 chick was observed with its adults on June 27th. This chick survived and was considered fledged as of August 23rd, according to East District Visitor & Resource Protection Ranger's observations and the Hatch/Fledge date chart provided by the NYSDEC. However, this fledgling was discovered to have a broken wing on August 24th. USFWS Biologists were appropriately contacted but after several inquiries the USFWS advised the park that no zoo/aquarium was able to take in the injured fledgling; it was last sighted on August 28th.

Nest **17A-09** was found in the middle of the Overwash area with 4 eggs on June 15th and the nest was exclosed the following day. Only 3 eggs were observed in the nest by June 25th; it is unclear what happened to the 4th egg. One chick hatched on July 9th and the other 2 chicks hatched on July 10th although only 2 chicks were seen. These 2 chicks went on to fledge.

Nest **18A-09** was found in east-end of Davis Park (east of 6A) with 3 eggs on June 25th and was exclosed the same day. One chick hatched on July 19th and two eggs remained and never hatched. The 1 chick did not survive past July 21st.

Nest **19A-09** was found the east-end of the Overwash area with 1 egg on June 29th. It was exclosed on July 2nd with 2 eggs and ended up being a full clutch at 3 eggs. Biologists witnessed 2 chicks hatching on July 27th but one egg remained in the nest and never hatched. The estimated fledge date was August 21st but no brood was observed anytime after August 14th.

6b. COLONIAL WATERBIRDS (*Sterna* spp)

Efforts were made to conduct Long Island Colonial Waterbird Surveys on Fire Island and its smaller islands in the Great South Bay. Although all breeding bird species were identified by FIIS staff, the NYSDEC is most interested in breeding least terns (*Sterna antillarum*), common terns (*Sterna hirundo*) and black skimmers (*Rynchops niger*). Almost all areas were covered, but unfortunately some of them were not surveyed in both time windows due to various circumstances such as weather events, motorboat activity and remoteness of location. The first window was from June 1st through June 14th and the second window was from June 15th through June 30th. In total, 15 different areas were surveyed throughout the month-long effort (Table 3, *see page 24*) including East Fire Island which has not been surveyed by FIIS staff in the past several years. Common tern and/or least tern colonies were observed in the following areas: Sexton Island, Long Cove, East Fire Island, Davis Park beach, Fire Island Pines beach, Otis Pike High Dune Wilderness Area beach, Sailors Haven beach, and Lighthouse beach.

Annual population surveys for least tern, common tern, and roseate tern species resulted in total estimated counts (averages from each site for each survey period) of 181, 382, and 0 respectively.

Two large common tern colonies were found while conducting colonial waterbird surveys. These colonies were located on islands in the Great South Bay: East Fire Island and Long Cove. The first survey of East Fire Island did not occur due to inclement weather; however, the second survey occurred after the designated survey period on July 14th and biologists estimated 300 breeding adults. Long Cove was first surveyed on June 13th and 250 adults were counted. The second survey was completed on June 29th and had a count of 400 (Table 3, *see page 24*).

Davis Park was the site where LandUse staff first observed least tern activity on May 12th and reported a final count of 27 chicks of which 21 went on to fledge. Davis Park had a height of 42 individuals on June 30th, and 20 individuals were counted at Watch Hill. The largest least tern colony on Fire Island was at Old Inlet/Overwash with 112 individuals at its height on June 24th. There were also very small colonies of least terns observed at Lighthouse beach, Sailors Haven and Fire Island Pines with only 1-4 breeding birds. However, the only productive colony on Fire Island itself was in Davis Park; no chicks or fledglings were observed at any other site.

6c. VEGETATION (*Amaranthus pumilus* and *Polygonum glaucum*)

A total of 78 seabeach amaranth plants were found in the several sweep counts on FIIS throughout July and August. A mixture of large and small plants was observed in all areas that plants occurred. Federal tracts of beach were separated and distinguished as Lighthouse beach, Robbins Rest, Carrington Tract, Sailors Haven, Talisman/Barrett beach, Blue Point beach, Watch Hill, OPWA west and OPWA east. The abundance of amaranth was greatest in two locations: Sailors Haven with 20 plants and Lighthouse beach with 34 plants.

Surveying for seabeach knotweed was concurrent with that for seabeach amaranth (July-August). A total of 132 knotweed plants were counted on FIIS. Sites found with knotweed include Lighthouse beach, Robbins Rest, Talisman/Barrett beach, Sailors Haven, Blue Point beach, OPWA west and OPWA east, with the most occurring in Sailors Haven with 58 plants. Most of the plants were located inside the symbolic fenced areas designated initially for piping plover and least terns. Hurricane Bill caused severe high tides on southern Long Island the weekend of August 21st through 23rd; this caused burial or sustained salt water inundation of amaranth and knotweed plants due to overwash at most sites on Fire Island which resulted in death of most plants.

6d. SEANET

A total of 24 beach walks occurred on Fire Island SEANET sites from April 18th through September 1st, 2009: 8 surveys at Lighthouse beach, 6 surveys at Sailors Haven, and 10 surveys at the OPWA. In this 4 ½ month time period a total of 13 beached birds were found on these beaches: 3 birds at Lighthouse beach (2 northern gannets, 1 red-throated loon), 3 birds at Sailors Haven (1 common loon, 1 shearwater spp, 1 unidentified gull) and 7 birds at OPWA (3 northern gannets, 2 common loons, 1 sooty shearwater, 1 great black backed gull) (Table 4, *see page 26*; Pic 1, *see page 31*).

7. DISCUSSION

7a. T&E SPECIES

The T&E species monitoring results are varied as far as trends from the past 10 years. In 2007, 25 piping plover pairs made 35 nesting attempts, 11 of which hatched and fledged 18 chicks, and yielded a breeding productivity of 0.7 fledglings per pair. In 2008, 15 pairs made 26 attempts, 8 of which hatched and fledged 20 chicks, yielding a productivity of 1.3. This was nearly double the productivity of the 2007 season with only 3/5 of the total number of pairs. In 2009 there were 4 more nesting pairs than in 2008 but only 24 nesting attempts, 15 of which hatched and fledged 13 chicks, yielding a productivity of 0.7. Large differences in the total numbers of pairs, nests and fledglings as well as the overall productivity have been observed just in the past 3 years; the population dynamics of species needs to be assessed over 10-20 years to effectively identify trends. However, there are a few anecdotal trends from the data gathered for piping plovers at FIIS.

Figure (*see page 28*) displays the trend in the number of fledglings and the number of nests throughout a span of 10 years on FIIS. It illustrates that the total number of nest attempts had been steadily increasing to 2007, but that the total number of fledglings had taken a sharp decline since 2005. This trend appeared reversed between the 2007 and 2008 seasons, as there were fewer nest attempts but more fledglings yielded in 2008. Chicks fledged per pair as well as chicks fledged per nest have been declining from 1997 to 2007. The total number of fledglings was much lower in 2009 relative to past years. FIIS hasn't observed less than 13 fledglings since 2001. However, other sites across Long Island observed lower than average productivity this season, possibly due to region-wide wet weather events during the early summer months. Whether the low productivity in 2009 at FIIS was related to regional or site-specific factors (or a combination of the two) remains unclear.

During the past 3 seasons the survival/mortality rate of eggs and chicks has been very different, making it difficult to predict patterns for management efforts to focus on. For example, although 20 and 13 chicks fledged in 2008 and 2009 respectively, approximately the same number of total eggs was laid. In 2008 only 40% of eggs went on to hatch relative to 60% in 2009. However, approximately 60% of the chicks went on to fledge in 2008 relative to only 25% in 2009. The majority of the chicks (53%) survived past 1 day, but did not survive before 2 weeks. This differs from what was observed in 2008 and appears to be more similar to what was observed in 2007 (50% of chicks that survived past one day were lost before two weeks).

The low productivity and distribution of least tern colonies on the island may have been a factor contributing to the lower number of chicks successfully fledging in 2009. The only productive least tern colony this year was at Davis Park. In 2008 the average fledge rate for pairs located in tern colonies was 3.0 chicks per pair; only three pairs that fledged chicks were not located within a tern colony, and the average fledge rate for these pairs was 1.7. Least terns are a highly defensive species, known to swoop and vocalize at potential attackers as they approach the colony. It is possible that these aggressive birds could have deterred predators and limited human disturbance from the colony, indirectly protecting nesting plovers and chicks. Established tern colonies could contribute to higher chick survival for piping plovers although this still remains unclear.

One interesting observation is the number of nesting pairs on non-federal tracts this year. This may have been caused by the increase in suitable habitat and symbolically fenced areas in front of the communities

due to the beach nourishment event in the spring of 2009. Of the 19 total nesting pairs, 5 nested on non-federal tracts this year in the following communities: Point O'Woods (1B), Ocean Bay Park (1C), Fire Island Pines (14A) and Davis Park (5A, 6A, 18A). However, only 1 of these nests fledged chicks, yielding a productivity of 0.4 for these 5 breeding pairs.

As for T&E plants, the majority of seabeach amaranth and seabeach knotweed individuals were located inside the symbolic fenced areas designated initially for piping plover and least terns. Several plants located before the survey day were found later dehydrated and likely dead. Hurricane Bill caused severe high tides on southern Long Island the weekend of August 21st through 23rd; this caused burial or sustained salt water inundation of amaranth and knotweed plants due to overwash at most sites on Fire Island which resulted in the death of a majority of plants.

7b. DISTURBANCE ISSUES

Numerous pairs chose to nest in areas with high seasonal visitation. Nests 1C, 3A, 5A, 6A, 7A, 9A and 14A were all located on beaches where visitor populations increased exponentially between the time the nesting territory was established and the time the eggs were laid. As in previous years, nests were subject to disturbance in these areas due to human activity. In the case of pair 14, the brood stayed in the Fire Island Pines for approximately a week but then moved westward approximately 1.5 miles to the less frequently visited Sailors Haven beach. This movement occurred just before the 4th of July weekend when Fire Island is at its peak in regards to visitation. In addition, human activity may have played a role in the abandonment of nest 3A, as this nest abutted the frequently visited Bellport Beach and was abandoned during Memorial Day weekend.

With the presence of humans comes the increased presence of predators. Dogs, cats, gulls, raccoons, red fox, ghost crabs, and other animals can pose a threat or disturbance to nesting piping plovers and their broods. Avian predators seen disturbing piping plover adults and broods include great black-backed gulls (*Larus marinus*), herring gulls (*Larus argentatus*), crows (*Corvus* spp.) and oystercatchers (*Haematopus palliatus*). Adults from several nests were seen defending territories and chicks from groups of great black-backed and herring gulls. Adults from 12A were seen defending their nest from a pair of American oystercatchers for a total of 20 minutes. Other avian species recorded as having a negative impact on piping plover breeding in years past (particularly in 2007) include willets (*Tringa semipalmata*) and terns (*Sterna* spp). However, the presence of least tern colonies was positively correlated with successful plover nests during the 2008 season.

Of the non-avian predators, red fox (*Vulpes vulpes*) and feral cat (*Felis catus Domesticus*) tracks were recorded inside the symbolic fencing and at times circling the exclosures. Evidence of red fox was especially prevalent in the OPWA, specifically the Overwash. Red fox tracks were often seen lacing the toe of the dune throughout the 7-mile stretch of wilderness. In addition, FIIS V&RP Rangers recorded a video of a red fox from a motion sensitive camera which was placed near 17A. The presence of these predators in the OPWA may be accountable for the high occurrences of assumed predation of chicks in this stretch of beach. No nests occurred at Talisman despite initial observations of plover activity. In addition, 1A and 1B nests at Sailors Haven and Point O'Woods were both predated by a mammalian predator before they could even be exclosed (tracks were indistinguishable for 1A, presumably red fox for 1B).

Many studies including one on piping plover productivity on Assateague Island (Patterson et al. 1991) and another on plover predator exclosure techniques on Cape Cod, Massachusetts (Melvin et al. 1992), document predation as being a major cause for nest failure. Among the common predators cited were red fox and raccoons. In another study, Loegering and Fraser (1995), found conflicting and inconclusive evidence on the role of the red fox in unsuccessful plover nesting. This study showed a high density of fox tracks in areas of beach where chick survival was highest as well as where survival was lowest. Although the connection between common non-avian piping plover predators and nest success/chick survival is unclear, it is vital to look at trends in disturbance and failed nests in future breeding seasons on Fire Island.

Dogs were frequently seen off their leash, sometimes in areas where dogs were entirely prohibited. Every day, particularly in the peak of the summer season, there were several dogs observed both on and off their leash on community beaches. This became a major regulation issue and a cause for concern, especially for broods in the communities.

7c. REGULATION ISSUES

Much time and effort was sequestered by issues involving regulation violations. Biologists and staff were required to travel across the island to fix and replace fencing that was damaged or moved by people on popular beaches and monitor for improper vehicle use and pet law violations. The most common area for damaged fencing and signs was in Ocean Bay Park (OBP). Symbolic fencing was placed for T&E species on the beach in front of OBP by LandUse as per the community's contract for the beach nourishment project that occurred in the winter/spring of 2009. However, FIIS biologists were repeatedly verbally harassed by seasonal residents/visitors on the weekends when monitoring this area. On May 23rd FIIS biologists repaired all of the fencing west of the OBP dune crossing; the string had been cut and the poles thrown on the beach. FIIS Law Enforcement was contacted and remained present while FIIS biologists repaired fencing due to the high density of beachgoers already established on the beach.

Another regulation issue involved driving and dune crossing closures. Several beach access points (dune crossings) were closed by FIIS and the Town of Brookhaven for part of the season due to piping plover nest locations and brood movements. Two Executive Orders by the Town of Brookhaven were issued in Ocean Bay Park and Davis Park to close dune crossings, in addition to several other protective measures. Based on USFWS (1996) guidelines, FIIS closed several dune crossings for the protection of plover broods this season. For example, the Kismet cut was closed from June 11th through July 18th, with the exception of emergency responses. Adequate warning of closures (2-3 weeks) was given to residents/contractors for established nests; however, the movement of pair 14 from Fire Island Pines to Sailors Haven caused an immediate dune crossing closure on the east-end of Sailors Haven (Cherry Grove cut). USFWS recovery guidelines for the piping plover explicitly state that full-sized vehicles shall not be permitted on beaches where unfledged chicks are found, and that beach access points/dune crossings found within 1000 feet of a nest with chicks be closed to all traffic until those chicks are fledged (1995). Nevertheless, full-sized vehicles were seen driving on closed beaches and using closed vehicle cuts, particularly at the OBP and west-end dune crossing at Fire Island Pines.

An "unlawful take" occurred at 2 nests near Old Inlet in the Wilderness Area, sometime between June 17th and 19th. A Criminal Incident Record 343A was filed describing the situation (Case Incident Report

09-00-120). The Endangered Species Act of 1973 defines “take” as, “to harass, harm, pursue, hunt, shoot, wounding, kill, capture, or collect, or to attempt to engage in any such conduct.” Although initial observations of possible vandalism were made by field biologists on Friday June 19th, the FIIS Wildlife Biologist and a FIIS Visitor and Resource Protection (V&RP) Ranger were not properly notified until Sunday June 21st. Unfortunately, this delayed the immediate securing of the scene. Only one of these nests was considered ‘active’ (4B); the second nest had been abandoned (13A) several days prior to the incident. FIIS V&RP Rangers placed a motion sensitive camera (camera trap) on a nearby active nest, 17A, which was estimated to hatch on July 9th. On July 4th V&RP Rangers observed human footprints circling the enclosure and the camera trap verified several children standing around the enclosure looking in. Both of these incidents may warrant us to have more of a presence on the beach, although transportation during chick season may be more difficult.

Dogs were frequently seen off their leash, sometimes in areas where dogs were entirely prohibited. Every day, particularly in the peak of the summer season, there were several dogs observed both on and off their leash on community beaches. This became a major regulation issue and a cause for concern, especially for broods within the communities. On June 28th field biologists quickly intervened to prevent 2 unleashed dogs from chasing down 4 unfledged chicks from 14A in Fire Island Pines. Unleashed dogs were most common at Ocean Bay Park near nest 1C.

7d. WEATHER ISSUES

The 2009 T&E monitoring season did not experience severe weather conditions which could greatly impact piping plover and least tern populations. In the 2008 season storm weather and overwash seemed to dominate the cause for lost nests and eggs in comparison to this season; overwash was not the cause for any failed nests in 2009. However, we did have an unusually wet spring/early summer with heavy rains, which could have negatively affected nesting success. Severe winds and high tides did not come until mid-August; at that time of the season all the park’s piping plover chicks and least terns had fledged. This weather was a direct result of Hurricane Bill (August 21-23) and the tropical storm aftermath. This caused burial and/or salt water inundation of seabeach amaranth and seabeach knotweed individuals via overwash. Long Island Colonial Waterbird Surveys were not completed at all sites due to the wet weather and wave action on the Great South Bay, in addition to time constraints.

8. RECOMMENDATIONS

This section is provided to highlight specific suggestions and concerns pertaining to the T&E species monitoring effort. Pre-season activities are the most critical time period for the program to establish an efficient and organized pre-season protocol. This sets the foundation for the upcoming year. One of these protocols is the construction of pre-season symbolic fencing.

The essential purpose of symbolic fencing is to preserve suitable habitat, as well as provide safe breeding/germination grounds, for all T&E species. In the non-federal tracts, symbolic was erected and maintained by LandUse Ecological Services. More coordination is suggested for following years in regards to the placement of fencing to allow for safe passage by vehicles. On numerous occasions FIIS staff found fencing run over and posts purposefully moved due to high scarps on the beach and the need for vehicles to pass by safely. In addition, with the approval of the FIIS Superintendent, LandUse removed the string from symbolic fencing and had stand alone posts for protection of seabeach amaranth

in early August in non-federal tracts. However, the stand alone posts can easily be moved without the string holding the posts together, either by washovers or by people simply picking them up and tossing them towards the foredune. This was observed several times on most sections and was not properly rectified. It's suggested that conversations occur before the T&E season begins about how fencing will be adjusted for seabeach amaranth protection in front of the communities.

Biodegradable string and flagging were used instead of traditional synthetic materials at Sailors Haven and throughout the OPWA in 2009. This was done as a conscious effort by the park to reduce the amount of waste produced by fencing lost in storm events. Sisal twine and flagging made from wood pulp were purchased from Home Depot and Forestry Suppliers, respectively. Though the benefits of biodegradable materials for the environment are plentiful, the drawbacks as far as maintenance and ease of use should be noted. The twine tended to sag as it aged, and became significantly weaker when it was wet. Repairs were common, almost daily at some points, and all of the string had to be replaced multiple times cyclically throughout the season. An alternative to sisal, such as hemp, is recommended for future seasons. If this kind of string cannot be found in large quantities it may be possible to use nylon string but place it out so it can easily be untangled and re-used the following year if still in good condition. Biodegradable flagging was damaged more quickly, especially when wet, than traditional plastic flagging, however this was not significant enough to dissuade staff from using it in the future.

Other issues associated with the T&E species program involve predators and other threats. The results of this and previous seasons implicate red fox as a major threat to piping plover breeding. Strong evidence of fox presence in nesting areas cannot prove fox predation of plover eggs, chicks or adults because no fox were ever directly seen in plover territory during nesting season. Ghost crabs and avian predators pose a similar threat, and although no direct predation was witnessed, several accounts from this year and years past document interactions between plovers and ghost crabs, gulls and oystercatchers. In addition to predators of water-and shorebirds, the 2008 season showed possible threats to seabeach amaranth from deer herbivory. In the future, it is suggested to utilize motion sensitive cameras for a more conclusive way to determine the exact occurrence of predator and disturbance activities near FIIS's protected species. In addition, a red fox monitoring or management effort could be put in place if it is concluded that they pose a significant threat to threatened and endangered species and their nests.

During the 2009 field season, vehicle dune crossing routes had to be closed due to the close proximity of piping plover nests and chicks. This is all in accordance with the USFWS recovery effort guidelines for managing recreational activities in piping plover breeding habitat. It will be beneficial to continue the effort to give prior warning to vehicle route closures so there is less confusion and complications. It will continue to be critical that early season efforts are made to warn island residents, essential service agencies, local police, and park staff of upcoming vehicle route closures. Although proper warning was given, enforcement of closures was still an issue this season. All driving regulations would need to follow USFWS guidelines for essential vehicles. Future enforcement measures should be considered.

Visitor & Resource Protection Rangers play a crucial role in educating and informing visitors, residents, and others about their responsibilities with regard to protection of threatened and endangered species. Because the OPWA is a secluded 7-mile stretch of beach, it is suggested, for the safety of the field biologists, that they conduct surveys in pairs. If driving should commence, it is suggested that vehicle types be reduced to only small ORVs (Polaris) and/or ATVs (quads), permits only be approved for NPS

and emergency vehicles, speed regulations be set at five miles per hour especially during chick season, and all staff be trained in identifying shorebirds. Since the most current FIIS management plan requires 2 people in an ORV when unfledged chicks are present, 1 biologist could travel with 1 V&RP Ranger during patrol of the OPWA. This would free up another V&RP Ranger to patrol/work in a different area and lead to possibly a greater presence in the OPWA during the summer season.

Cooperation with Concessions staff also plays a crucial role in informing the public of regulations. It is important for visitors to know about pet regulations before coming to Fire Island National Seashore and the Ferry concessions are often times the first contact with people and their pets.

Experience over the last ten years has shown that threatened and endangered species populations can increase dramatically in response to intensive protection efforts. These efforts are time-consuming, costly, and sometimes require temporary restrictions on off-road vehicles and/or recreational activities. Nevertheless, they are highly effective and extremely rewarding.

9. ACKNOWLEDGEMENTS

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Appendix A: Tables and Figures

<u>Year</u>	<u>Breeding Pairs</u>	<u>Nest Attempts</u>	<u>Productive Pairs</u>	<u>Eggs Hatched</u>	<u>Hatchlings per Breeding Pair</u>	<u>Chicks Fledged</u>	<u>Chicks Fledged per Nest Attempt</u>	<u>Chicks Fledged per Pair</u>
1993	7	7	0	0	0	0	0	0
1994	3	4	0	0	0	0	0	0
1995	9	2	1	N/A ¹	N/A	2	1	0.2
1996	2	1	1	N/A	N/A	1	1	0.5
1997	1	1	0	0	0	0	0	0
1998	1	1	1	N/A	N/A	1	1	1
1999	3	2	2	N/A	N/A	5	2.5	1.7
2000	3	3	3	N/A	N/A	9	3	3
2001	4	4	4	N/A	N/A	11	2.8	2.8
2002	10	11	9	33	3.3	28	2.6	2.8
2003	20	22	15	64	3.2	35	1.6	1.8
2004	17	18	15	57	3.4	37	2.1	2.2
2005	17	20	14	54	3.2	40	2	2.4
2006	21	26	15	46	2.2	32	1.23	1.5
2007	25	35	11	45	1.8	18	0.5	0.7
2008	15	26	8	32	2.1	20	0.8	1.3
2009	19	24	9	53	2.8	13	0.54	0.68
Average	10.4	12.2	6.4	34.9	2.00	14.8	1.3	1.3
2008 Avg.	9.9	11.4	6.2	N/A	N/A	14.9	1.4	1.4
2007 Avg.	9.5	10.5	6.1	N/A	N/A	14.6	1.4	1.4
2006 Avg.	8.4	8.7	5.7	N/A	N/A	14.4	1.5	1.4
2005 Avg.	7.5	7.5	5	N/A	N/A	13	1.5	1.4
2004 Avg.	6.7	6.3	4.3	N/A	N/A	10.8	1.5	1.3
2003 Avg.	5.7	5.3	3.3	N/A	N/A	8.4	1.4	1.2

¹Data from previous nesting seasons are incomplete

Table 1: Historic Productivity of Piping Plovers on FIIS

Nest #	Location	# Eggs Laid	# Chicks Hatched	# Chicks	Result
1A	Sailors Haven, West	4	0	0	Predated
1B	Point O' Woods	3	0	0	Predated
1C	Ocean Bay Park	4	4	0	Hatched/Predated
2A	OPWA* East (Old Inlet)	4	0	0	Abandoned
2B	OPWA* East (Overwash)	4	3	1	Fledged
3A	OPWA* West (Bellport)	4	0	0	Abandoned
4A	OPWA* East	4	0	0	Abandoned
4B	OPWA* East	4	0	0	Destroyed
5A	Davis Park, West	4	3	0	Hatched/Predated
6A	Davis Park, East	4	4	2	Fledged
7A	Watch Hill, West	4	4	2	Fledged
8A	OPWA* West	4	4	0	Hatched/Predated
9A	Lighthouse Beach, East	4	4	2	Fledged
10A	OPWA* East	4	4	1	Fledged
11A	OPWA* East	4	4	1	Fledged
12A	OPWA* West	3	3	1	Fledged
13A	OPWA* East (Old Inlet)	4	0	0	Abandoned
14A	Fire Island Pines	4	4	0	Hatched/Predated
15A	OPWA* West	4	4	1	Fledged
16A	OPWA* East (Old Inlet)	4	0	0	Abandoned/Destroyed
16B	OPWA* East (Old Inlet)	3	2	0	Hatched/Predated/Injured
17A	OPWA* East (Overwash)	3	3	2	Fledged
18A	Davis Park, East	3	1	0	Hatched/Predated
19A	OPWA* East (Overwash)	3	2	0	Predated
Totals		90	53	13	
Productivity (chicks fledged per pair)= 0.68					
*Otis Pike Wilderness Area. Nest designated West/East depending on its location from Bellport Beach.					

Table 2: FIIS 2009 Overall Piping Plover productivity

Survey 1 (6/1/09-6/14/09)

Site	Date	Species
Sexton Island	6/10/09	60 COTE, 120 LAGU, 2 AMOY
Long Cove	6/3/09	250 COTE
Davis Park	6/14/09	22 LETE
OPWA	6/14/09	22 LETE
Sailors Haven	6/14/09	3 LETE
Lighthouse	6/14/09	2 LETE
Fire Island Pines	6/10/09	-----
Fire Island Villages	6/2/09	-----
Watch Hill Bay	6/3/09	-----

Survey 2 (6/15/09- 6/30/09)

Site	Date	Species
East Fire Island *	7/14/09	75 LETE, 300 COTE, 4 WILL
Long Cove	6/16/09	400 COTE
Ridge Island	6/19/09	65 BLBA, 33 HEGU, 1 WILL
John Boyle	6/19/09	1 GREG, HEGU, BLBA
Pelican Island	6/19/09	2 OSPR
Hospital Island	6/19/09	1 AMOY 1 WILL
OPWA	6/30/09	112 LETE
Lighthouse	6/30/09	4 LETE
Sailors Haven	6/30/09	1 LETE
Davis Park	6/30/09	42 LETE
West Fire Island *	7/14/09	-----
Fire Island Villages	6/27/09	-----
Watch Hill Bay	6/16/09	-----
Fire Island Pines	6/26/09	2 LETE

Table 3: Long Island Colonial Waterbird Surveys for the 2009 season. Species codes: COTE = common tern, LAGU= laughing gull, OYST = American oystercatcher, LETE= least tern, WILL = willet, BLBA = black-backed gull, OSPR = osprey. (*West and East Fire Island were surveyed after the 2nd window due to weather and bay conditions).

Lighthouse beach	
Date	Species Found
04/18/09	Red throated loon
06/07/09	-----
06/21/09	-----
07/21/09	-----
07/30/09	Northern Gannet
08/04/09	-----
08/18/09	Northern Gannet
09/01/09	-----
Sailors Haven beach	
Date	Species Found
4/20/09	Common Loon
6/7/09	-----
6/21/09	Shearwater (<i>puffinus spp.</i>)
7/21/09	-----
8/18/09	Unidentified gull
9/1/09	-----
OPWA* beach	
Date	Species Found
5/7/09	Northern Gannet
5/19/09	Common loon
5/19/09	Common loon
5/19/09	Sooty Shearwater
6/7/09	-----
6/21/09	Great Black-Backed Gull
8/3/09	-----
8/19/09	Northern Gannet
8/20/09	Northern Gannet
9/1/09	-----

Table 4: Seabird Ecological Assessment Network (SEANET) data collected from April to September of 2009. These beaches were walked approximately every other week in search of beached birds to identify, assess and measure. (OPWA* = the beach directly adjacent to the Otis Pike High Dune Wilderness Area).

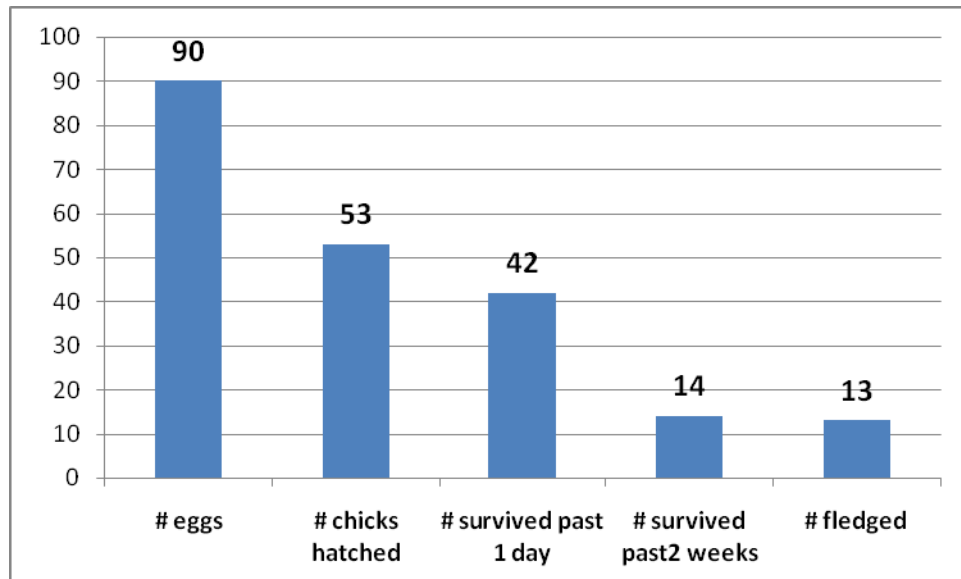


Figure 1: Bar graph of brood outcome for 2009 Piping Plovers at FIIS

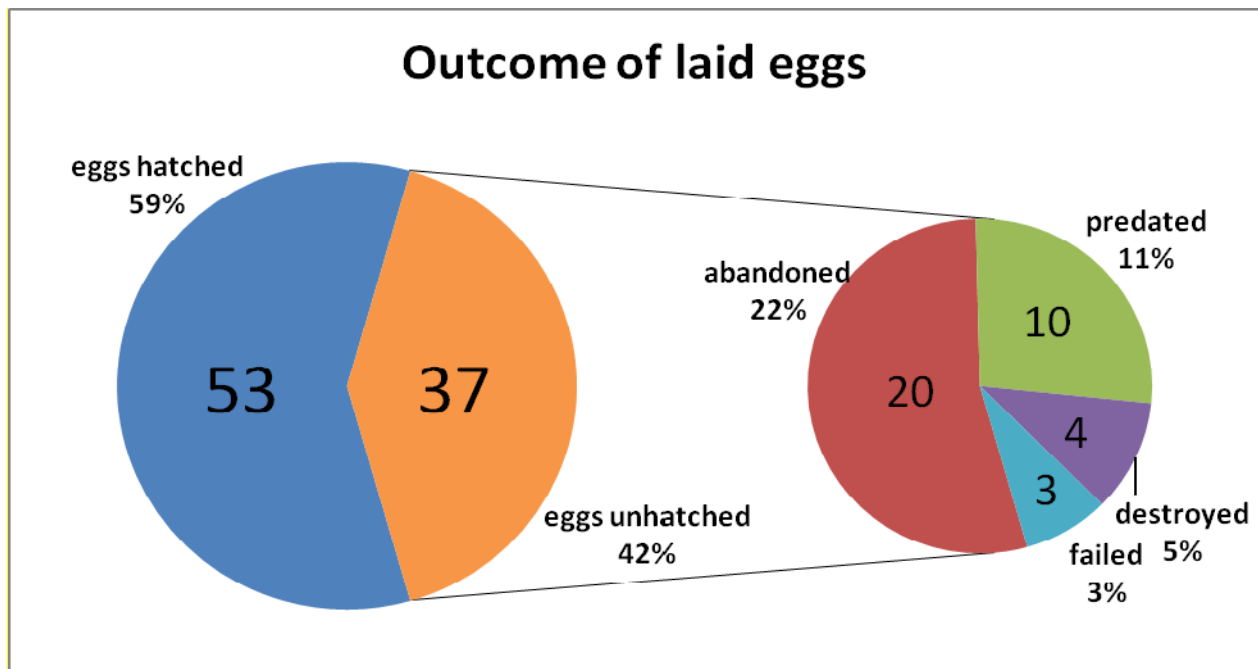


Figure 2: Pie graph displaying the outcome of all laid Piping Plover eggs at FIIS

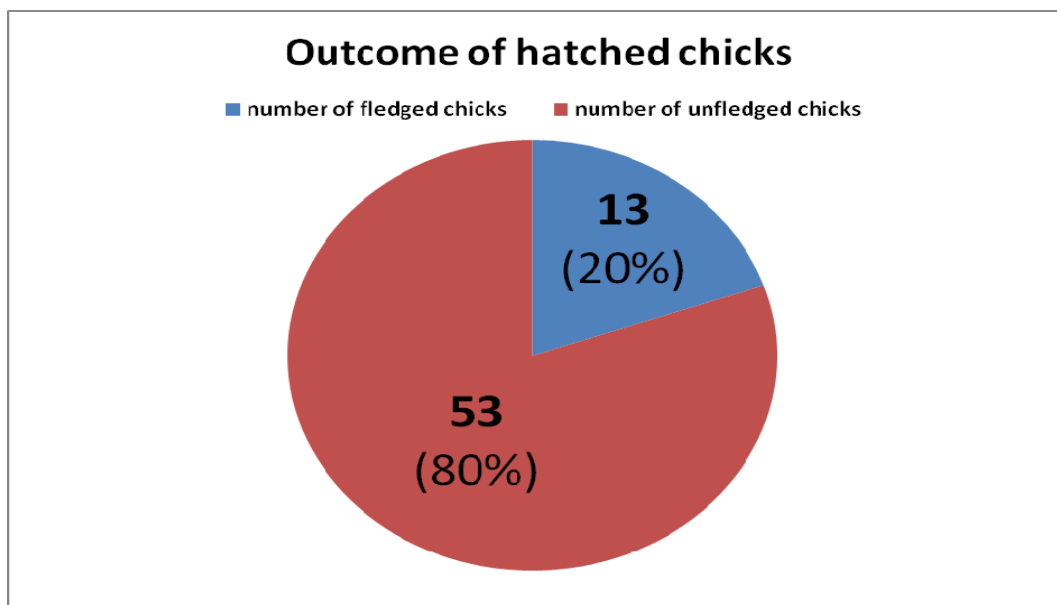


Figure 3: Pie graph displaying the outcome of all hatched Piping Plover chicks at FIIS

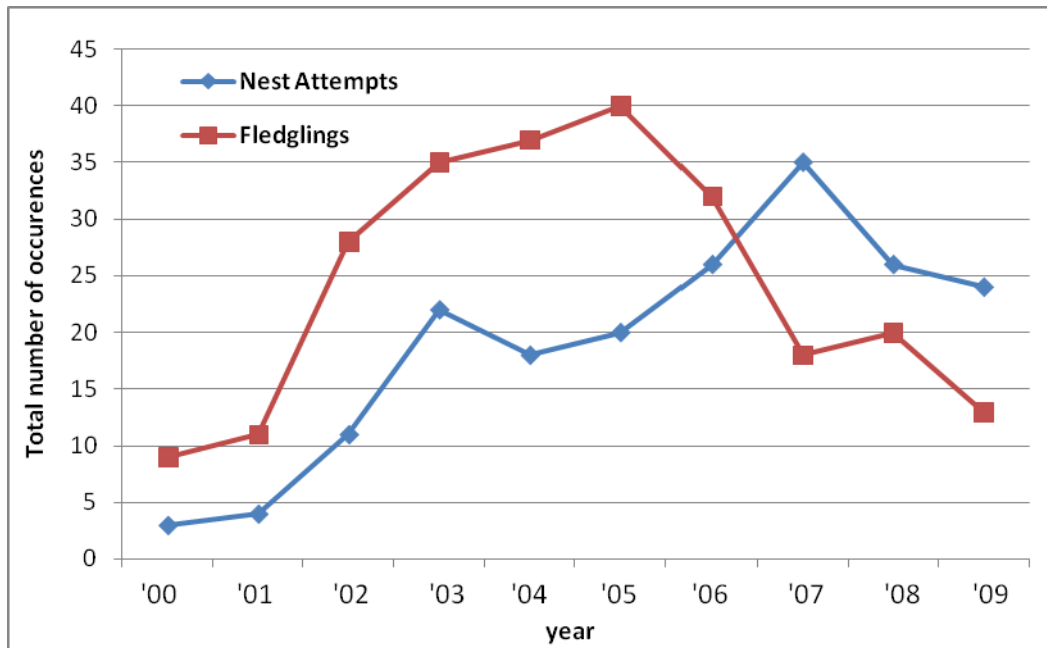


Figure 4: Chart displaying historical values for Piping Plover nests & fledglings on FIIS (2000-2009)

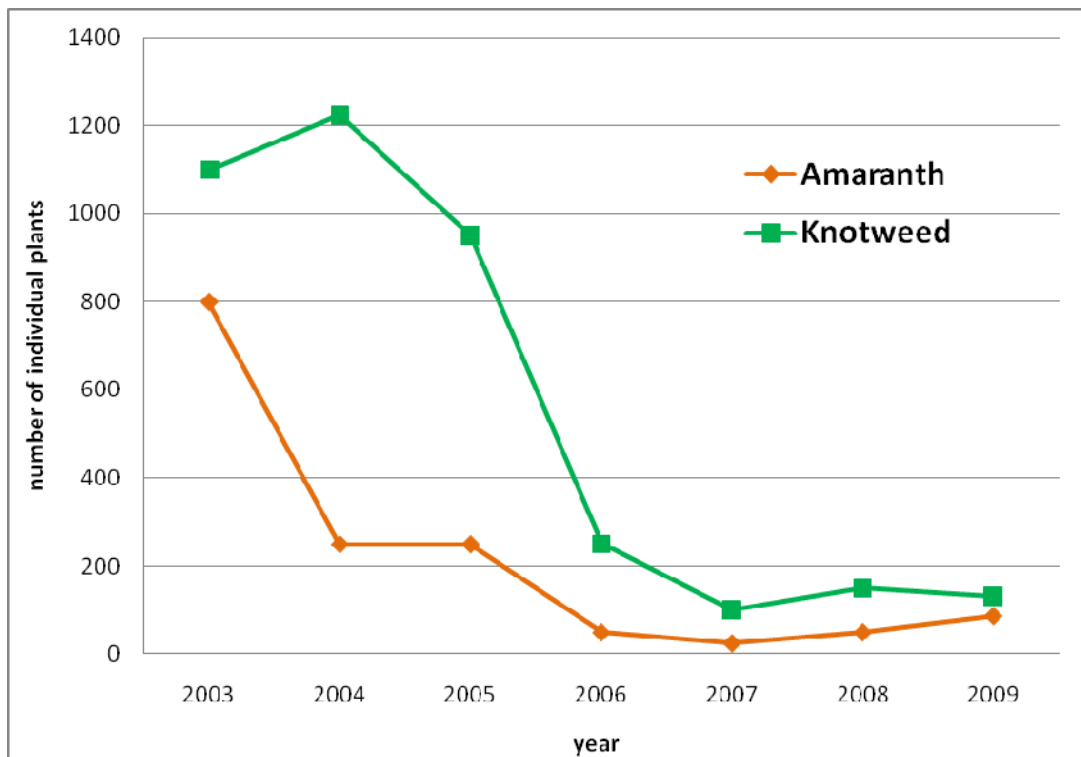


Figure 5: Chart displaying historical values for Seabeach Amaranth & Seabeach Knotweed on FIIS (2003-2009)

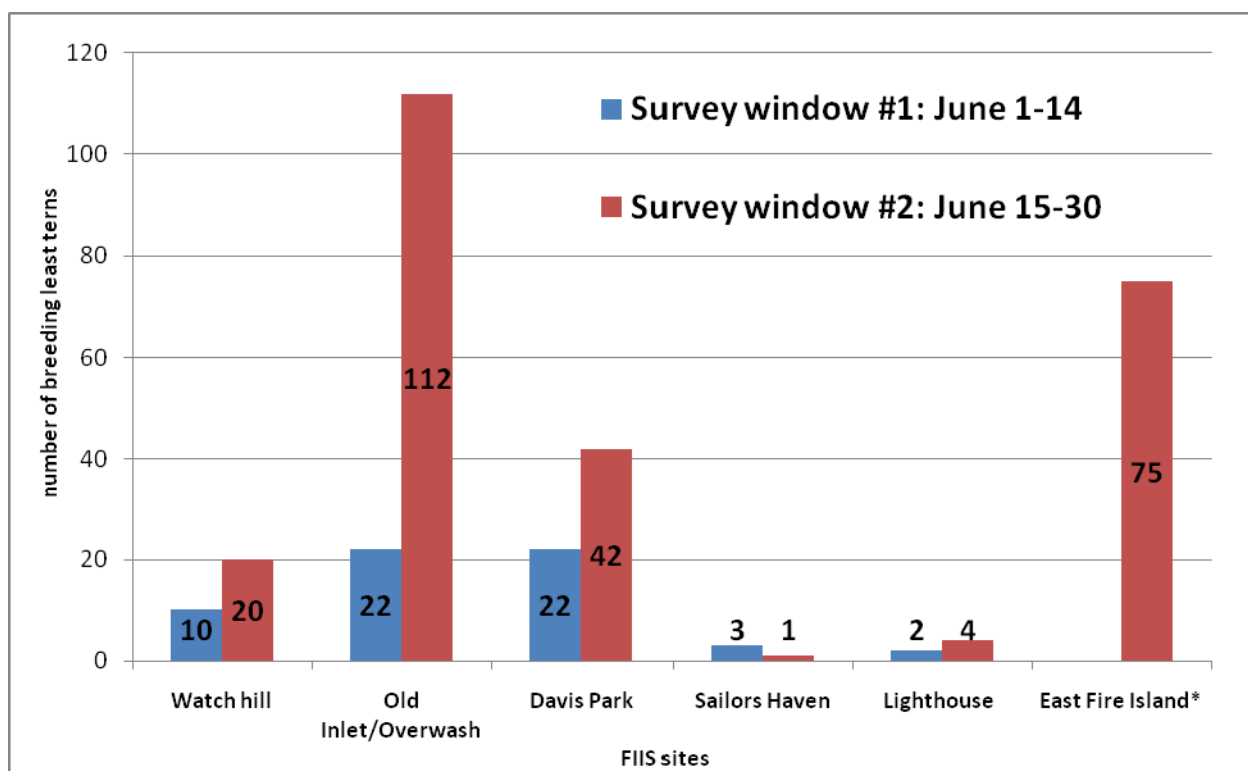
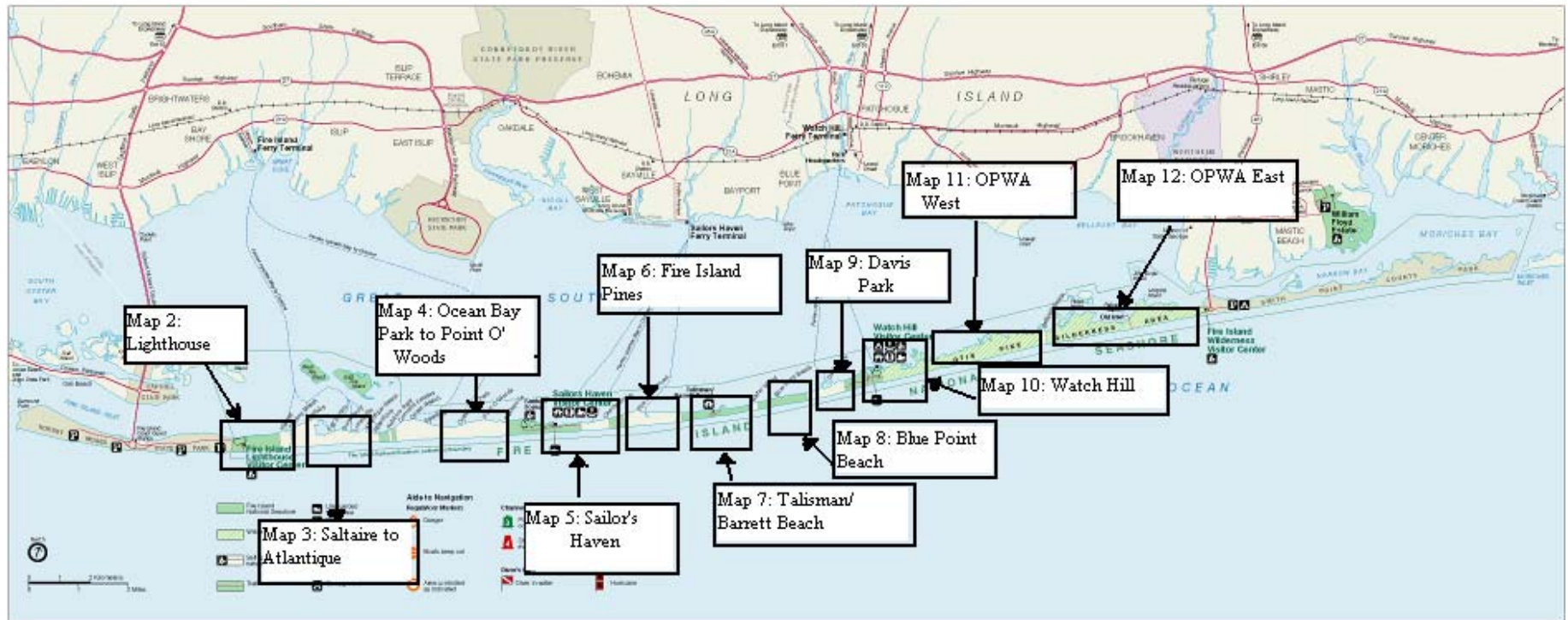


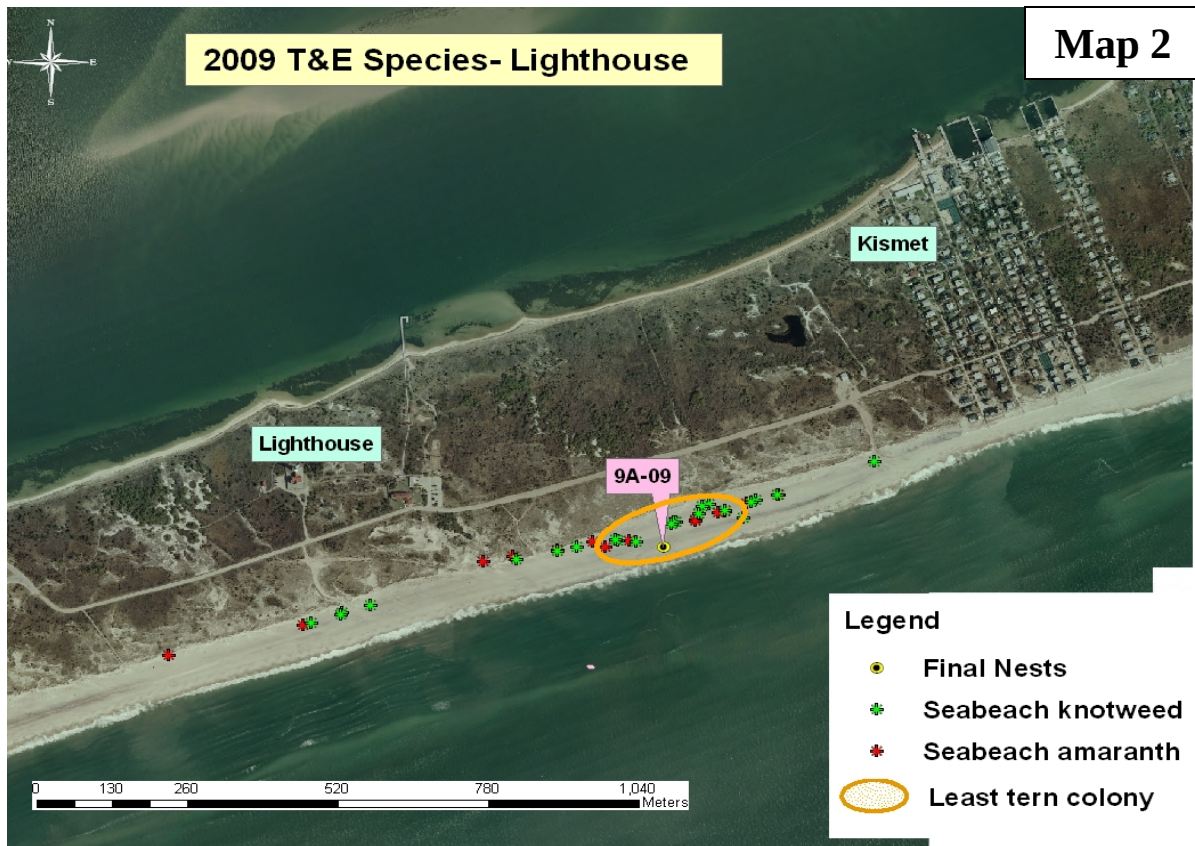
Figure 6: Approximate adult populations of least tern colonies occurring throughout FIIS, 2009
 (* = East Fire Island was surveyed on 7/14/09, 2 weeks beyond the survey window)



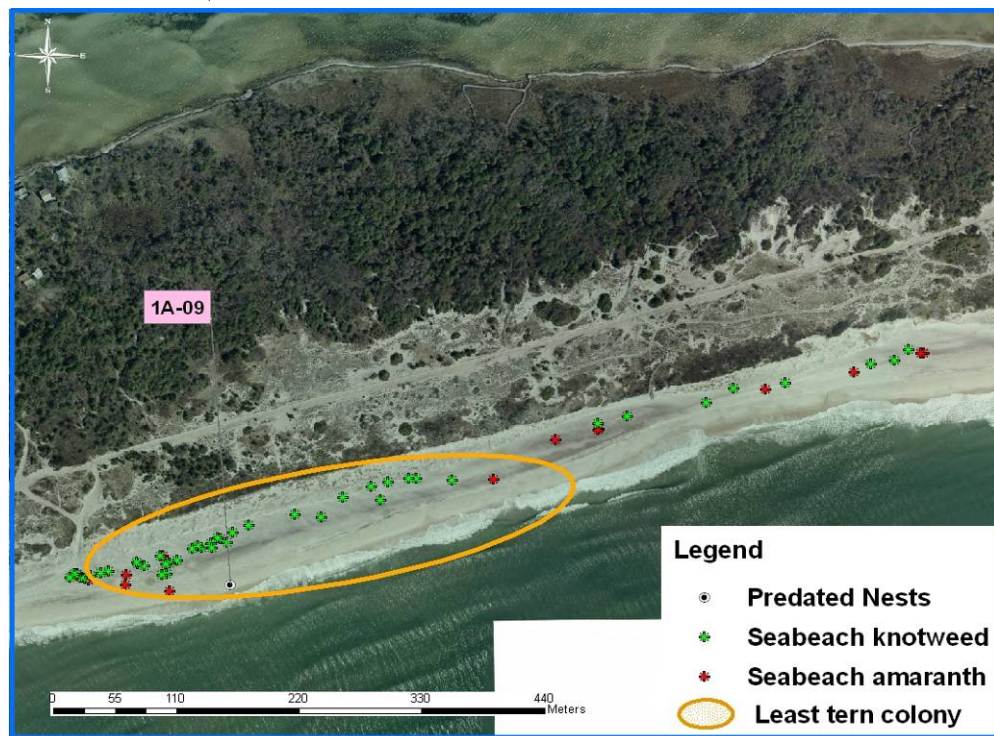
Picture 1: Northern Gannet (*Morus bassanus*) found on Lighthouse Beach during SEANET survey, 8/19/09.

Appendix B: Map 1:

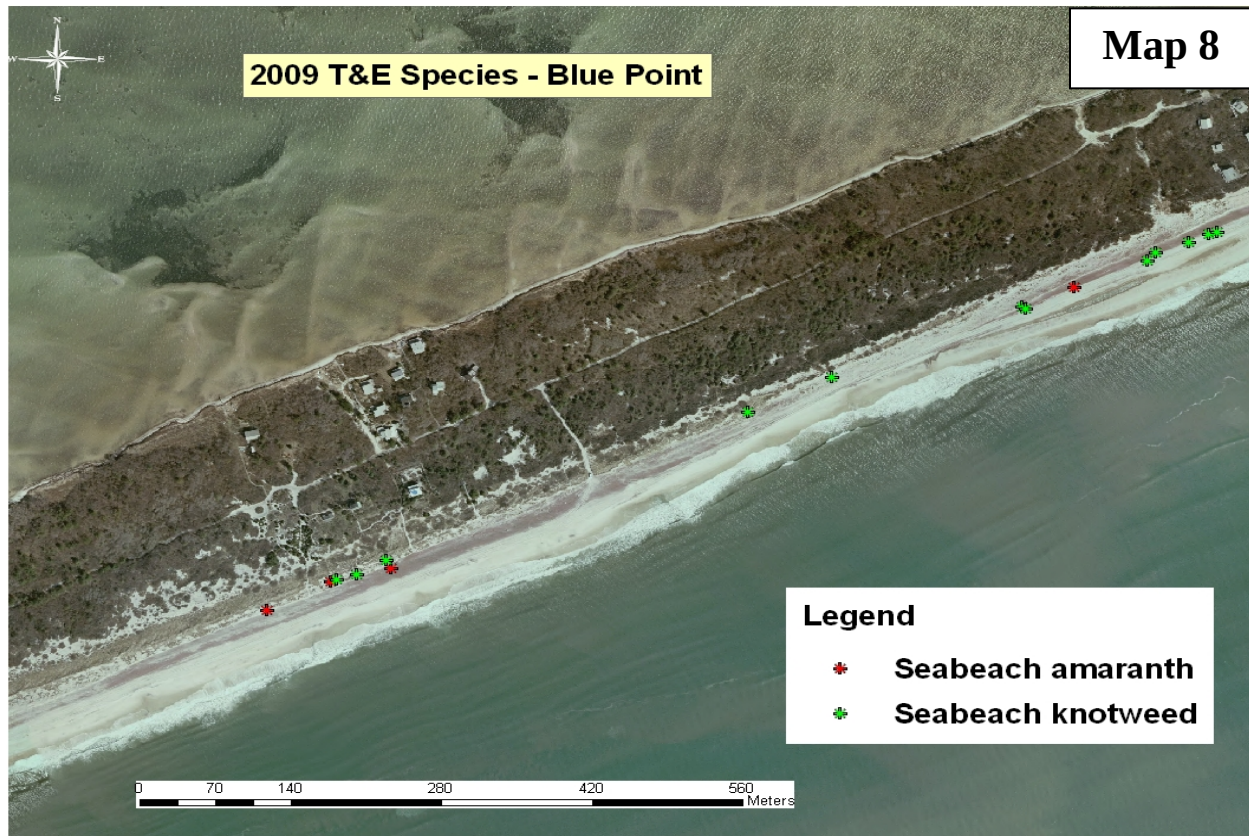


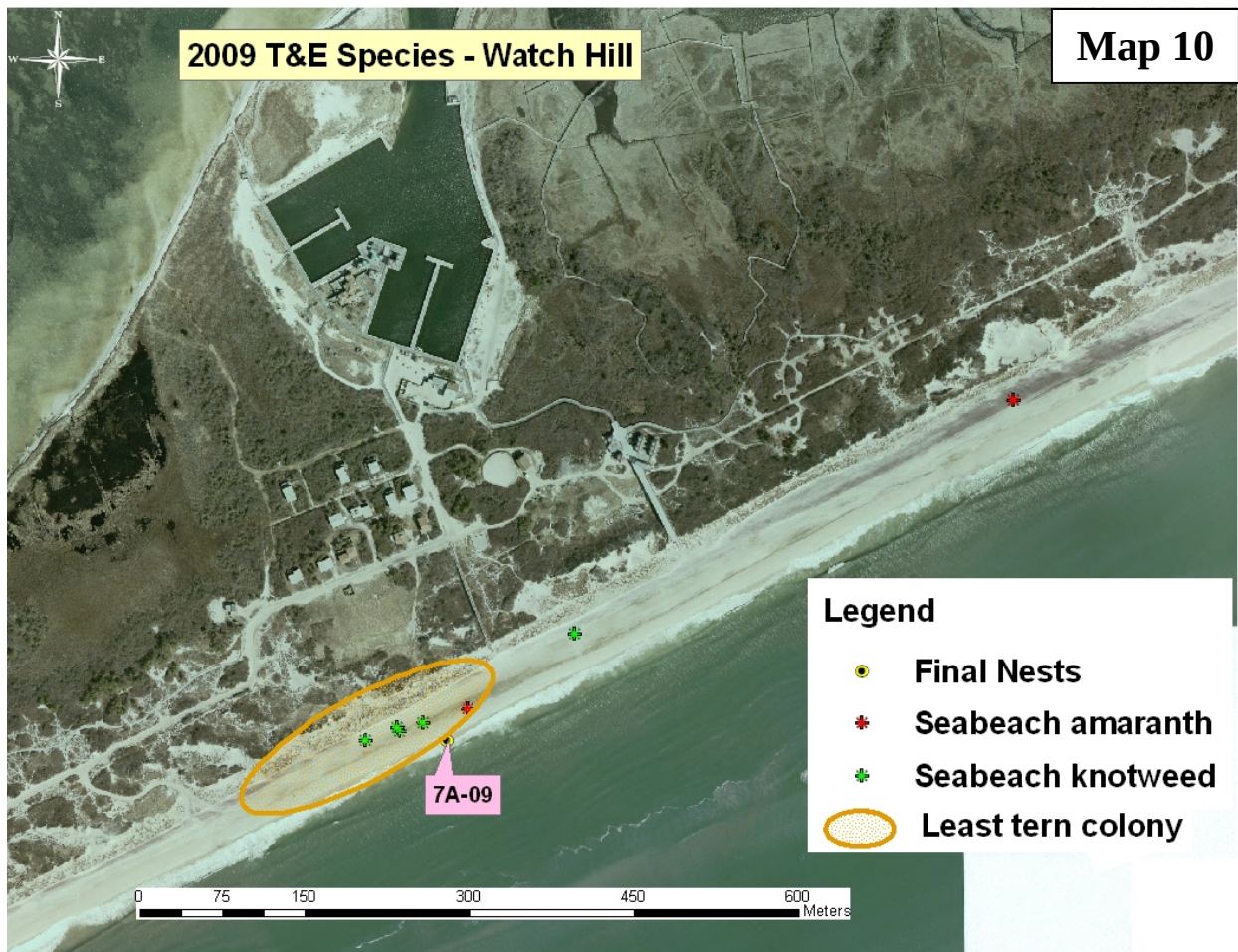








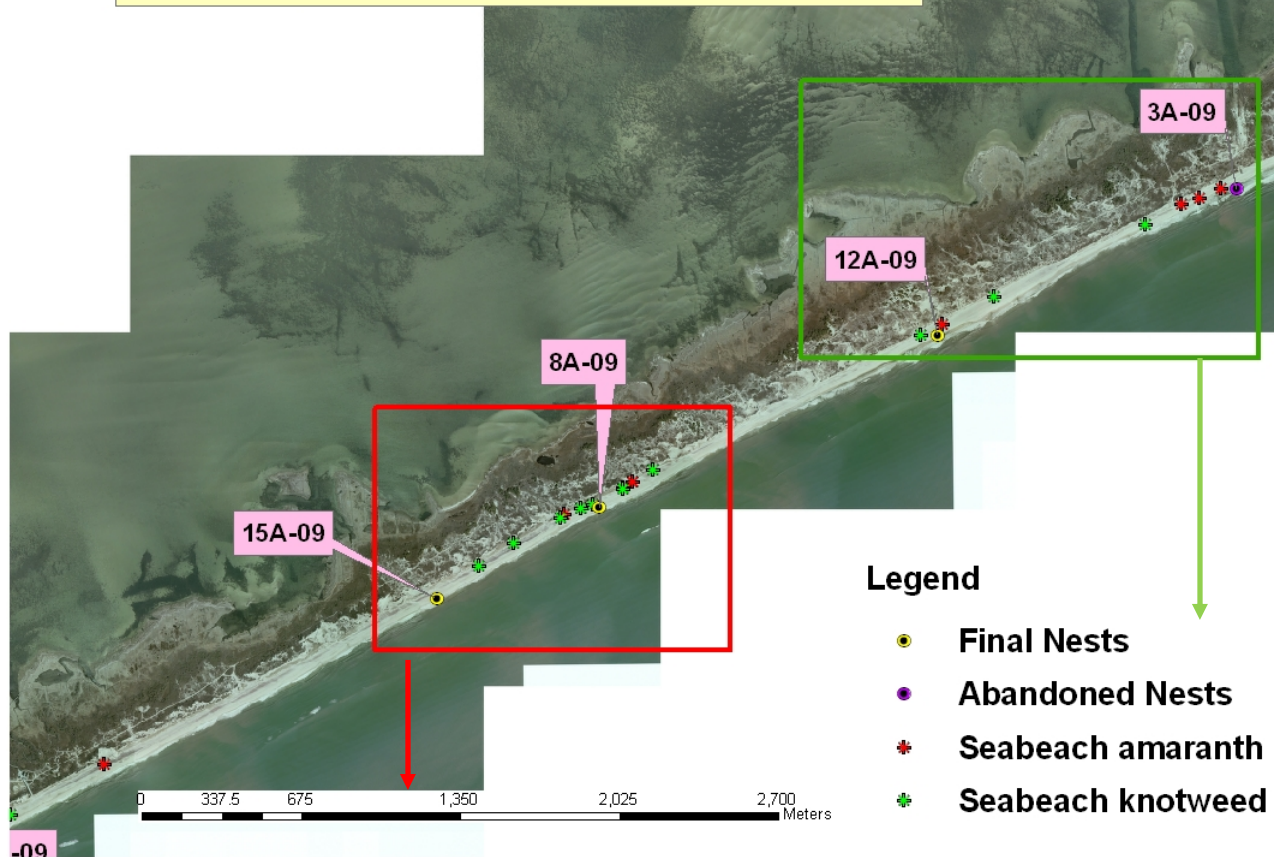




Map 11

2009 T&E Species - Otis Pike Wilderness Area, West

Bellport Beach





2009 T&E Species- Otis Pike Wilderness Area, East

