

Fire Island National Seashore

**THREATENED & ENDANGERED SPECIES
MONITORING PROGRAM
2014 SUMMARY**



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Table of Contents

	<u>Page number</u>
1. Abstract.....	3
2. Introduction.....	3
3. Objective.....	4
4. Preseason Protocol.....	4
5. Monitoring.....	5
a. Piping plover monitoring.....	5
i. Preliminary monitoring	
ii. Incubation monitoring	
iii. Brood monitoring	
b. Colonial Waterbird Monitoring.....	6
c. Vegetation Monitoring.....	6
6. Results.....	7
a. Piping plovers (<i>Charadrius melodus</i>).....	7
i. Summary of nests	
b. Colonial waterbirds (<i>Sterna</i> spp).....	9
c. Vegetation (<i>Amaranthus pumilus</i> and <i>Polygonum glaucum</i>).....	9
7. Discussion.....	10
a. Disturbance issues in 2014.....	10
i. Anthropogenic disturbances.....	10
ii. Natural disturbances.....	10
8. Recommendations.....	11
9. Works cited.....	13

Appendix A: Figures and Tables

	<u>Page number</u>
Table 1: List of federal and state-listed threatened and endangered species at FIIS.....	14
Table 2: Historic Productivity of Piping Plovers at FIIS.....	15
Table 3: FIIS 2014 Overall Piping Plover Productivity.....	16
Table 4: Long Island Colonial Waterbird Surveys for the 2014 season.....	19
Figure 1: Piping Plover breeding pair productivity at FIIS (2003-2014).....	17
Figure 2: Pie graph displaying the outcome of all Piping Plover eggs at FIIS.....	17
Figure 3: Bar graph of brood outcome for 2014 Piping Plovers at FIIS	18
Figure 4: Chart displaying historical values for seabeach amaranth and seabeach knotweed on FIIS (2003-2014).....	18
Table 5: Piping Plover Banding information from Virginia Tech study.....	20

Appendix B: Maps

	<u>Page number</u>
Map 1: Map of Fire Island National Seashore.....	21
Map 2: Fire Island Lighthouse.....	22
Map 3: Fire Island Villages (Kismet to Point O'Woods).....	23
Map 4: Fire Island Sunken Forest.....	24
Map 5: Fire Island Pines (Cherry Grove to Davis Park).....	25
Map 6: Fire Island Wilderness.....	26
Map 7: Fire Island Wilderness (East of Old Inlet).....	27

*areas are based on New York State's Department of Environmental Conservation's Long Island Colonial Waterbird Sites.

Appendix C: GPS Locations

1. Piping Plover Nests
2. Seabeach Amaranth Individuals
3. Seabeach Knotweed Individuals

THREATENED & ENDANGERED SPECIES MONITORING PROGRAM 2014 SUMMARY

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 several federal and state-listed threatened and endangered (T&E) species were observed in 2014. Through daily monitoring and a collaborative park effort, a total of 8 piping plover (*Charadrius melodus*) nesting pairs were recorded within the park. With a total of 7 successful piping plover fledglings, nesting productivity reached an average of 0.88 piping plover chicks fledged per pair. Annual population surveys for waterbirds were conducted this season in areas specified by the New York State Department of Environmental Conservation's Long Island Colonial Waterbird surveys. Sixty-eight seabeach amaranth (*Amaranthus pumilus*) and 40 seabeach knotweed (*Polygonum glaucum*) plants were documented throughout FIIS. Some information on piping plover nests used in FIIS records was also obtained through contact with a group of researchers from Virginia Tech. Several natural and human-induced disturbances that occurred this year will be discussed. Educational and outreach efforts directed towards park visitors, island residents, cooperating agencies and essential services is critical for the continued success of this program.

2. INTRODUCTION

Fire Island National Seashore (FIIS) was established as a unit of the National Park Service on September 11, 1964 (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). 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.

Fire Island National Seashore provides suitable breeding/germination habitat for a number of federal- and state-listed threatened and endangered (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*). Most of these species around found nesting on Fire Island's oceanside beaches and bay islands.

Of the several 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. Due to limited resources the only threatened and endangered plant species monitored this year were 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.

Hurricane Sandy in October 2012 caused a breach in the Old Inlet area and this breach remains open and dynamic. Practically the entire area in OPWA East was overwashed from Hurricane Sandy, which can be seen in the aerial photography used to produce the maps in Appendix B.

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 2014 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 2014, 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 of habitat.

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 15th 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.

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 were 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.

5. MONITORING PROTOCOLS

5a. PIPING PLOVER 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. In accordance with USFWS guidelines, pre-season habitat fencing (symbolic fencing) is erected for the purpose of protecting nesting habitat and potential vegetative species habitat. Areas to be fenced on federal tracts were determined through the compilation of nest/plant data collected from previous years, early season plover observations, and through visual assessments of the beach.

Areas where birds are seen regularly are more intensely monitored and symbolic fencing is erected and adjusted accordingly. For example, the Wilderness area has in years past consistently yielded the highest piping plover productivity and is thus monitored closely beginning in early April. The west-end of the island is also monitored closely by FIIS staff due to high volume of visitation and beach driving. Off-road vehicles (ORV) may be utilized as a means of transportation to these areas. 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).

Upon discovery of a nest, an alphanumeric tag is used to identify each nesting pair and nest; a number and year are assigned chronologically, using an “A” for first nesting attempt, “B” for second, and so on (eg. 1A-14). Regardless of nest location along FIIS shore, all nests were protected within symbolic fencing borders creating a buffer zone of no less than 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. The majority of nests were exclosed as an additional protective force against predators. The decision to exclose a nest is made by the FIIS Wildlife Biologist, based on the nests location and visibility to the public and on the known predator population near the nest.

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.

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 week after hatching. Data collected for each brood consists of: number and behavior of adults, number of chicks observed, and location. 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 35 days after they have hatched or when a sustained flight of 15 meters is observed before then. When a nest is situated near a vehicle beach access route, a fledge date of 35 days is implemented and driving restrictions are extended to ensure the safety of the brood (USFWS 1996).

Additional information on nest or brood statuses was received from a group of Virginia Tech (VA Tech) researchers conducting a study on piping plovers. For the purposes of their own research, the VA Tech group banded each adult and chick to allow the identification of individual plovers. The information recorded for this project helped FIIS staff to confirm data on outcomes of plover nests and broods.

5b. COLONIAL WATERBIRD SURVEY

Population counts for colonial waterbirds were conducted twice during the 2014 season in June, once June 1-15, and once June 15-July 1. 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 are located on Fire Island's ocean and bay beaches between the Lighthouse Tract and Smith Point County Park. Several bay islands that fall within the boundaries of the park are also monitored for waterbirds, including: 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 motorboat, canoe or kayak, 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. These plants tend to grow in early successional beach/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 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 GPS unit is used to collect data points for the locations of amaranth and knotweed plants. All plants located outside of existing symbolic fencing are marked, enclosed within fencing, and recorded with a GPS. Other data collected include location, plant condition, size, reproductive status, cluster number, potential threats, weather conditions, and general observations in accordance with data sheets provided by the U.S. Fish and Wildlife Service and The Nature Conservancy. We continue conducting sweep counts for new amaranth and knotweed plants and monitor existing amaranth plants throughout August and early September until plant growth and reproduction ceases. Due to the increased rarity of amaranth plants, exclosures were added to all plants this year to prevent herbivory.

6. RESULTS

6a. PIPING PLOVERS (*Charadrius melodus*)

Monitoring for the 2014 piping plover breeding season on Fire Island began when the first piping plovers were observed in early April and continued through the end of August. In the months between May and July, piping plover nests were discovered and documented throughout FIIS.

A total of 8 nesting pairs were documented, from which there came 12 nesting attempts throughout FIIS. Four nests hatched and three of them successfully fledged at least one chick. The other eight nest attempts were lost due to overwash, predation, and nest abandonment for unidentified reasons (Table 3).

A total of 46 eggs were laid and of these 15 total eggs hatched, with the remainder failing as a result of predation or other circumstances (Figure 2). Seven chicks went on to fledge, yielding a productivity of 0.88 for 8 breeding pairs (Table 3).

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 1 day, those that lived past 2 weeks and those that went on to fledge (Figure 3). Maps of nest locations can be located in Appendix B.

i. Summary of piping plover nests

A summary of plover nest activity on Fire Island west of the Otis Pike Fire Island High Dune Wilderness (OPWA) is as follows: 1 pair at Lighthouse Beach (8A).

The OPWA yielded 7 plover pairs and 10 nesting attempts which were divided by location: OPWA West (Watch Hill to Old Inlet) and OPWA East (Old Inlet to the Wilderness Visitor Center). There were 4 nesting pairs in OPWA West (3A, 3B, 4A, 4B, 6A, 7A). In the OPWA East there were 3 nesting pairs (1A, 2A, 5A, 5B, 5C). Below is a summary of each attempt:

Nest **1A-14**, located in section 8 of OPWA-East, was discovered with three eggs on May 3rd by VA Tech observers. On May 6th, four eggs were seen in the nest. On May 18th no plovers were sighted near the nest and several days later the nest was determined to be abandoned.

Nest **2A-14** was discovered on May 9th by VA Tech observers in section 9 of OPWA-East with one egg in the nest. It was exclosed with three eggs on May 14th. On June 10th, three chicks were seen and the final egg was showing signs of hatching (i.e., pipping). Four chicks were then observed in the area until their fledge date.

Nest **3A-14** was located in section 2 of OPWA-West. It was discovered and exclosed on May 12th with three eggs. The nest was determined abandoned on May 30th. There were crow tracks and human shoeprints around the exclosure.

Nest **3B-14** was discovered on June 11th with three eggs just east of Bellport beach. VA Tech determined that the pair was the female from nest 3A-14, but a different male. Four eggs were observed on June 17th. Three eggs hatched July 7th and VA Tech observed a fourth chick on July 8th, however,

only three chicks were ever observed by FIIS staff. After July 23rd, only two chicks were seen. Those chicks went on to fledge successfully.

Nest **4A-14** was found on May 16th by VA Tech west of Bellport Beach with 1 egg. It was exclosed on May 21st with a full clutch (four eggs). On May 27th the nest was found with no adults nearby and appeared to be abandoned for 1 or 2 days. Red fox tracks were seen nearby, but not directly around the exclosure.

Nest **4B-14** was located about 100m east of 4A-14 and was first observed June 17th with two eggs. VA Tech observed four eggs on June 22nd, but the nest was found to be predated by red fox the next day.

Nest **5A-14** was located in section 8 of OPWA-East just east of 1A-14 and was discovered by VA Tech on May 18th with one egg. When it was exclosed on May 27th, three eggs were in the nest and a fourth had been pushed about 3m away from the nest. Both birds were observed originally, but only the female was observed incubating and defending the nest from June 2 – 6. By June 8 no plovers were observed on or near the nest and it was determined abandoned. Red fox tracks and digging around the exclosure were observed by VA Tech researchers on June 2nd and 6th.

Nest **5B-14** was discovered by VA Tech on June 14th with one egg. They determined that the pair was the female from 5A nesting with a new male. It was predated by a red fox at some point between June 21st and 22nd based on fox tracks observed near the vicinity of the nest.

Nest **5C-14**, located in OPWA-East section 8, was discovered by VA Tech with 2 eggs on June 26th. Three eggs were observed on June 27th, but a fourth egg was never laid. On July 23rd, two chicks were mobile and a third chick was observed in the nest. Three chicks were observed until August 1st, and then two chicks were observed until August 6th. On August 8th, only one chick was seen and no chicks were observed after that date.

Nest **6A-14** was located in OPWA-West in section 3. It was discovered on May 20th and exclosed on May 27th with four eggs. Three eggs hatched on June 19th and were predated by a red fox later that night or the next morning. The last egg hatched June 20th. The adults and chick moved east to the area around the section 4 marker where they were observed until well after the chick had fledged.

Nest **7A-14** was located towards the back of an overwash slightly east of the section 4 marker in OPWA-West. It was discovered with a full clutch on May 21st and exclosed the same day. On May 30th no adults were seen and fox and human tracks were found circling the exclosure.

Nest **8A-14** was located on Lighthouse beach west of the Kismet cut. It was discovered on June 9th and exclosed with four eggs on June 10th. The nest was found to be overwashed on July 5th due to high tides/waves caused by Hurricane Arthur the night before.

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*; LETE), common terns (*Sterna*

hirundo; COTE) and black skimmers (*Rynchops niger*; BLSK). 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 sites were surveyed throughout the month-long effort (Table 4) including 9 bay islands and 6 sections of Fire Island. COTE colonies were observed in the following areas: East Fire Island, Long Cove, and Ridge Island. No LETE colonies were observed in the survey area for 2014. Annual population surveys for LETE, COTE, and ROTE species resulted in total maximum counts (the greatest number counted during a survey period for each site) of 0, 760, and 0 respectively. The lack of ROTE is consistent with previous years; however, the absence of least tern colonies is not. COTE numbers decreased by 458 individuals compared to 2013, but were higher than the 2012 counts by 485 individuals.

On the nearby bay islands, major declines in COTE and LETE counts were observed in recent years. For the third year, no COTEs were observed on Sexton Island, which had sustained colonies prior to 2012 (140 and 80 in 2010 and 2011, respectively).

LETES were previously observed at the following sites: Fire Island Lighthouse, Fire Island Villages (specifically Point O'Woods), Fire Island Sunken Forest, Fire Island Pines (specifically western Water Island), Watch Hill Bay, and the Fire Island Wilderness. However, no nesting LETEs were observed on Fire Island proper in 2014. In mid-June a group LETEs were present at the Fire Island Lighthouse, but disappeared from the area before a nesting colony was established.

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

A total of 68 seabeach amaranth plants were found in several sweep counts on FIIS throughout July, August and September during 4 survey windows (Figure 5). Plants still alive in September were surveyed up until senescence. Sites from the LICWS were recognized and reported as such for seabeach amaranth: Fire Island Lighthouse (0 plants), Fire Island Villages (5 plants), Fire Island Sunken Forest (14 plants), Fire Island Pines (26 plants), and the Fire Island Wilderness (23 plants).

An enclosure was constructed around 54 out of 68 plants (~80%) to protect them from browsing by white-tailed deer (*Odocoileus virginianus*). Twenty plants already showed signs of herbivory before being enclosed, but during subsequent surveys they were noted to be recovering. A mixture of large and small plants was observed, with the average size of 13.4 cm ($\pm$ 7.1 cm) in diameter at the widest point. Thirty-six out of 68 plants showed signs of reproduction (53% of plants). All vegetation data is located in Appendix C.

Surveying for seabeach knotweed was concurrent with that for seabeach amaranth during the survey windows. A total of 40 knotweed plants were counted and marked throughout FIIS (Figure 5). Sites found with knotweed include Fire Island Lighthouse (0 plants), Fire Island Villages (24 plants), Fire Island Sunken Forest (6 plants), Fire Island Pines (5 plants) and Fire Island Wilderness (5 plants). Both federal and non-federal tracts of land were surveyed in 2014. Most of the plants were a mix of large and small sizes and all plants were reproductive (i.e., flowering).

7. DISCUSSION

7a. DISTURBANCE ISSUES IN 2014

7ai. ANTHROPOGENIC DISTURBANCES

There were several anthropogenic and natural disturbances to T&E species in 2014. Anthropogenic disturbances refer to direct and indirect human interactions with T&E species. This includes foot traffic through fenced off areas and driving adjacent to suitable habitat areas. Natural disturbances refer to other wildlife interactions that negatively impact the species. This includes predation and competition for beach resources.

This season, only one pair (8A at Lighthouse Beach) chose to nest in an area with high seasonal visitation, where visitors 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 disturbances in these areas due to human activity.

FIIS staff follows USFWS (1996) guidelines: full-sized vehicles shall not be permitted on beaches where unfledged chicks are found, and that beach access points/dune crossings found within 1000 meters of a nest with chicks be closed to all traffic until those chicks are fledged (35 days after hatching for chicks near vehicle areas). The FIIS Wildlife Biologist continued the Plover Hotline (631-687-5030), first established in 2010, which was regularly updated with information on dune crossing/beach closures to vehicles. Adequate warning of closures (2-3 weeks) was given for established nests, when possible. However, no dune crossings were closed in 2014 due to the loss of 8A (Lighthouse Beach) to overwash before its hatch date.

Dogs were frequently seen off their leash, sometimes in areas where dogs were entirely prohibited. On numerous occasions, particularly at the peak of the summer season, there were several dogs observed both on and off their leash on the beach in the OPWA-east. Feral and domesticated cats living within the communities in previous years have posed a threat to plovers. Cats act as predators and will hunt and harass nesting birds and chicks. This season no cat tracks were observed near plover nests.

7aii. NATURAL DISTURBANCES

Gulls, raccoons, red foxes, ghost crabs, and a variety of avian wildlife in FIIS can pose a threat or disturbance to nesting piping plovers and their broods.

Based on field observations, the predominant predator for the nesting piping plover on Fire Island during the past several years has been the red fox (*Vulpes vulpes*). Red fox tracks were recorded inside the symbolic fencing and at times circling predator exclosures. Evidence and sightings of red fox was especially prevalent in the OPWA. Red fox tracks were often observed at the toe of the dune throughout the 7-mile stretch of wilderness. Two nests were predated by red fox before the eggs hatched (4B, 5B) and tracks were observed near most other nests. In addition, the presence of predators may be accountable for the occurrences of abandonments and assumed predation of chicks throughout Fire Island, most notably in the OPWA. However, other disturbance factors such as weather events are also affecting the productivity of T&E species and it's difficult to determine one cause for failure.

The majority of nests were exclosed as an additional protective force against predators. The decision to exclose a nest is made by the FIIS Wildlife Biologist, based on the nests location and visibility to the public and on the known predator population near the nest. However, in 2014 no nests were exclosed in the OPWA after June 10th due to evidence that exclosures may contribute to adult piping plover mortality (Neuman et. al, 2004). This decision was based on observations from the researchers at Virginia Tech and based on recommendations from USFWS Biologist, Steve Papa.

Another natural disturbance that prevents the success of piping plover productivity is the effect of storms and high tides sweeping over the nesting area. When a high tide encroaches on the nesting territory the nest can be covered by sand or washed away. This usually causes nest failure. One nest was overwashed in 2014 due to high waves caused by Hurricane Arthur on July 4th (8A- Lighthouse Beach).

Significant browsing of seabeach amaranth individuals has been observed in past seasons, which led to the decision to exclose all plants in 2014. Twenty plants already showed signs of herbivory before being exclosed in early August, but during subsequent surveys they were noted to be recovering. This observation supports having exclosure materials on hand in mid-July and exclosing plants as soon as they are found.

8. RECOMMENDATIONS

This section is provided to highlight specific suggestions and concerns pertaining to the T&E species monitoring effort.

- The observations from this season and previous ones implicate red fox as a major threat to piping plover breeding and productivity success. While tracks indicate that fox are present at predated nests, there is no direct observational evidence to prove they are the direct cause of the mortality or abandonments. A research project was completed in 2012 by Pace University (PI, Dr. Melissa Grigione) to look closer at red foxes through seasonal diet analysis and the graduate student (Maria Baglieri) just defended her thesis in August 2014.

It's suggested that a review be done to assess whether red fox pose a significant threat to threatened and endangered species through reviewing literature and statistically summarizing the park's monitoring data and analyzing existing data. If future studies are warranted they should be explained in this review.

- Observational data has shown white-tailed deer to be a possible threat to the survival and reproduction of seabeach amaranth. Several plants in 2008, and 2010-2013 showed signs of herbivory. This year as soon as an amaranth individual was found RM staff exclosed it to protect it from browsing. It's recommended that RM staff continue this practice next season, as staffing allows, and particularly until the implementation of the Deer Management plan/EIS which calls for a reduction of the deer herd on Fire Island in the winter of 2015/2016.
- During the 2014 field season, vehicle dune crossing routes and areas had to be closed due to the close proximity and home range of piping plover nests and chicks. This is 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 fewer complications. In the future, different communication methods and possibly more stringent enforcement measures should be considered.

- Annual reports have been written for T&E species in the past several years. However, trend data for each species needs to be evaluated. The FIIS Wildlife Biologist will collect, summarize and evaluate population data for all T&E species and species of special concern in a separate report. In addition, she will try and identify future management efforts to improve the success of T&E species on Fire Island.

Experience 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 of off-road vehicles and/or recreational activities. Nevertheless, they are highly effective and extremely rewarding.

WORKS CITED

Cairns, W. 1982. *Biology and Behavior of Breeding Piping Plovers*. Wilson Bulletin 94(4): 531-545.

DeRose-Wilson, Fraser, J., Catlin, D. & S. Karpanty. 2014. Virginia Tech Shorebird Project, Annual Report 2014 for the Response of Piping Plovers and their Invertebrate Prey to Habitats Created by Hurricane Sandy. Virginia Tech, Department of Fish and Wildlife Conservation. Unpublished Report.

National Park Service. 1994. Draft Environmental Assessment for Shoreside Species Breeding Habitat Management at FIIS. Fire Island, New York.

Neuman K.K., Page G.W., Stenzel L.E., Warriner J.C. & Warriner J.S. 2004. *Effect of mammalian predator management on snowy plover breeding success*. Waterbirds 27: 257-263

Steve Sinkevich, Senior Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, personal communication.

U.S. Fish and Wildlife Service. 1996. Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan. Technical/Agency Draft. Hadley, Massachusetts.

Appendix A: Tables and Figures

Scientific name	Common name	Park Status	Currently monitored? (Y/N)	Management Priority Details
<i>Amaranthus pumilus</i>	Seabeach amaranth	Present in park	Y	Global rank: G2 Federal: threatened NY State: endangered
<i>Polygonum glaucum</i>	Seaside knotweed	Present in park	Y	NY State: rare
<i>Kinosternon subrubrum</i>	Eastern mud turtle	Present in park	Y	Global rank: G5 NY State: endangered
<i>Charadrius melodus</i>	Piping plover	Present in park	Y	Federal: threatened NY State: endangered
<i>Sterna hirundo</i>	Common tern	Present in park	Y	NY State: threatened
<i>Rynchops niger</i>	Black skimmer	Not present	Y	NY State: special concern
<i>Sternula antillarum</i>	Least tern	Present in park	Y	NY State: threatened
<i>Sterna dougallii</i>	Roseate tern	Not present	Y	Global rank: G5 Federal: endangered NY State: endangered
<i>Cicindela dorsalis dorsalis</i>	Northeastern beach tiger beetle	Not present	N	Global rank: G4 Federal: threatened NY State: extirpated

Table 1: List of federal and state-listed threatened and endangered species at Fire Island National Seashore. Marine animals (sea turtles, marine mammals, fish) and other rare/protected plants are not included in this list.

<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	1.2	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	0.5	0.7
2010	16	23	9	38	2.2	17	0.7	1.1
2011	14	16	10	38	2.7	21	1.3	1.9
2012	12	17	8	35	2.9	15	0.9	1.3
2013	11	13	3	35	3.2	7	0.5	0.6
2014	8	12	3	15	1.9	7	0.6	0.9
Average	10.8	13.1	6.4	34.1	2.2	14.5	1.2	1.3

Table 2: Historic Productivity of Piping Plovers on FIIS

¹Data from previous nesting seasons are incomplete

Nest	Area	Status	# of eggs laid	Est. (or actual) hatch date	# of eggs hatched	# of chicks fledged
1A	Wilderness East (section 8)	Failed - Abandoned	4	6/1		
2A	Wilderness East (section 9)	FLEDGED	4	6/11	4	4
3A	Wilderness West (section 2)	Failed - Abandoned	4	6/8		
3B	Wilderness West (section 6)	FLEDGED	4	7/8	4	2
4A	Wilderness West (section 5)	Failed - Abandoned	4	6/17		
4B	Wilderness West (section 6)	Failed - Predated	4	7/8		
5A	Wilderness East (section 8)	Failed - Abandoned	4	6/22		
5B	Wilderness East (section 8)	Failed - Predated	3			
5C	Wilderness East (section 8)	Hatched/Failed	3	7/23	3	0
6A	Wilderness West (section 2)	FLEDGED	4	6/19	4	1
7A	Wilderness West (section 3)	Failed - Abandoned	4	6/17 (or earlier)		
8A	Lighthouse Beach - East	Failed - Overwashed	4	7/8		
Totals			46		15	7
Productivity (chicks fledged per pair)= 0.88						
*Otis Pike Wilderness Area. Nest designated West/East depending on its location from the Old Inlet area						

Table 3: FIIS 2014 Overall Piping Plover productivity

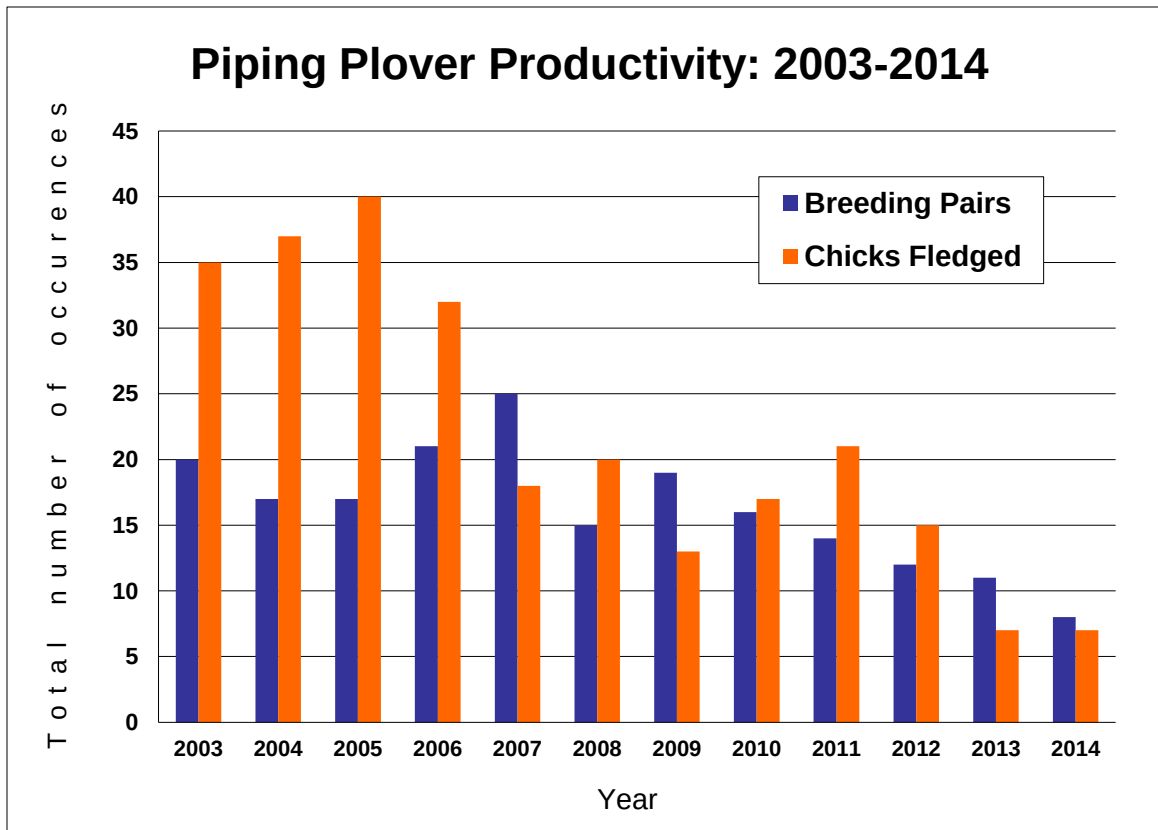


Figure 1: The number of Piping Plover breeding pairs and the number of chicks fledged at FIIS, 2003-2014

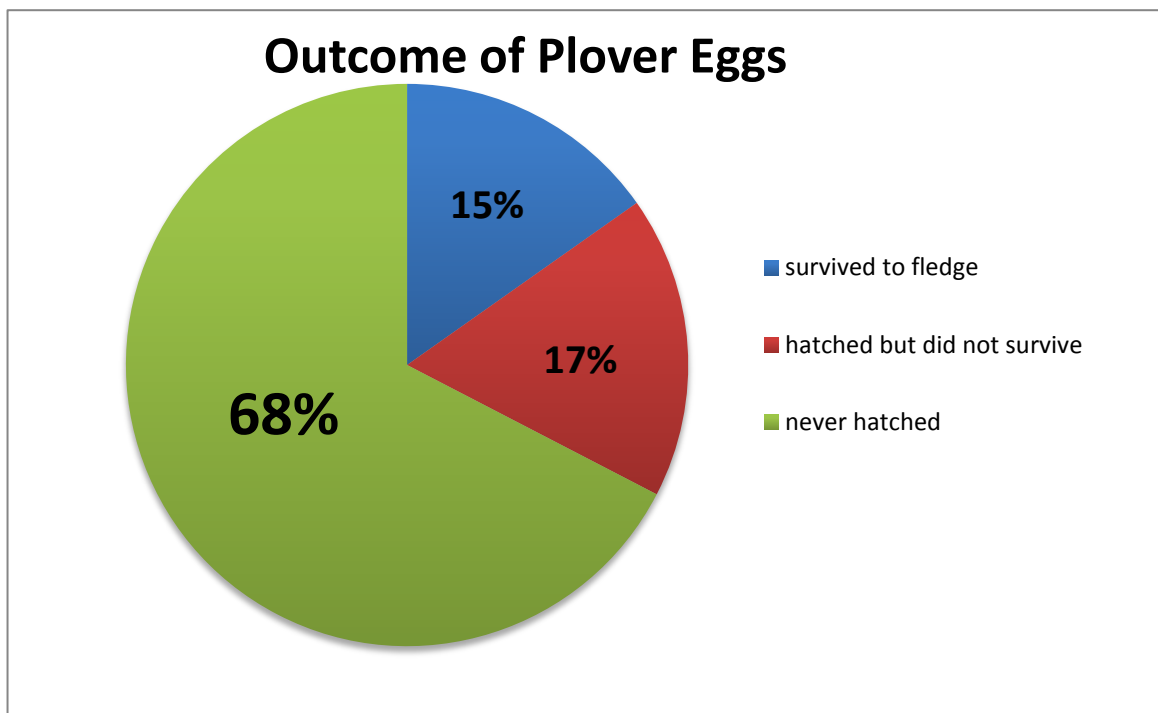


Figure 2: Pie graph displaying the outcome of all laid Piping Plover eggs at FIIS in 2014 (total = 46).

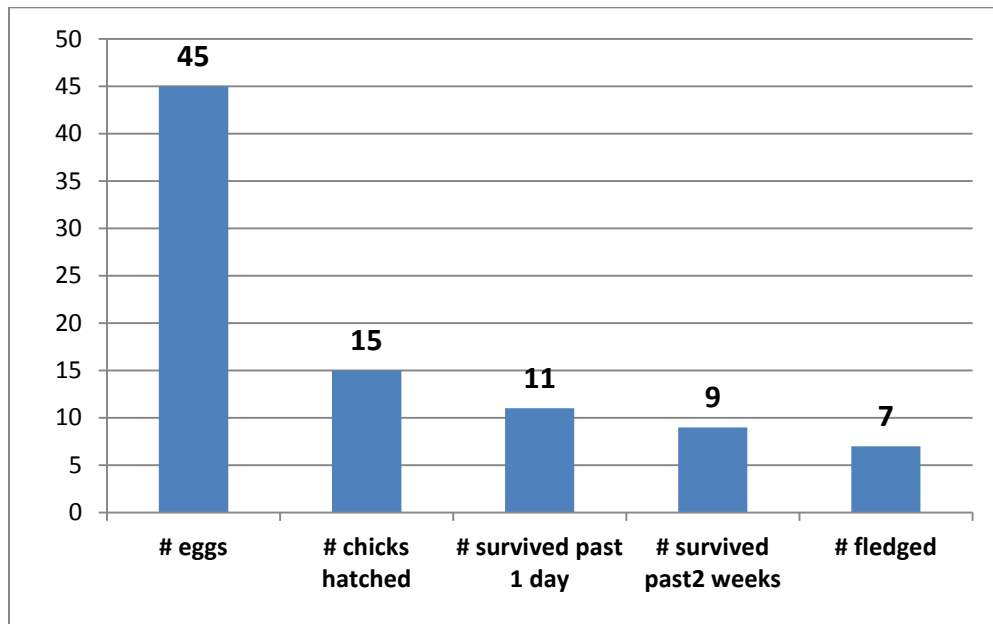


Figure 3: Bar graph of brood outcome for 2014 Piping Plovers at FIIS

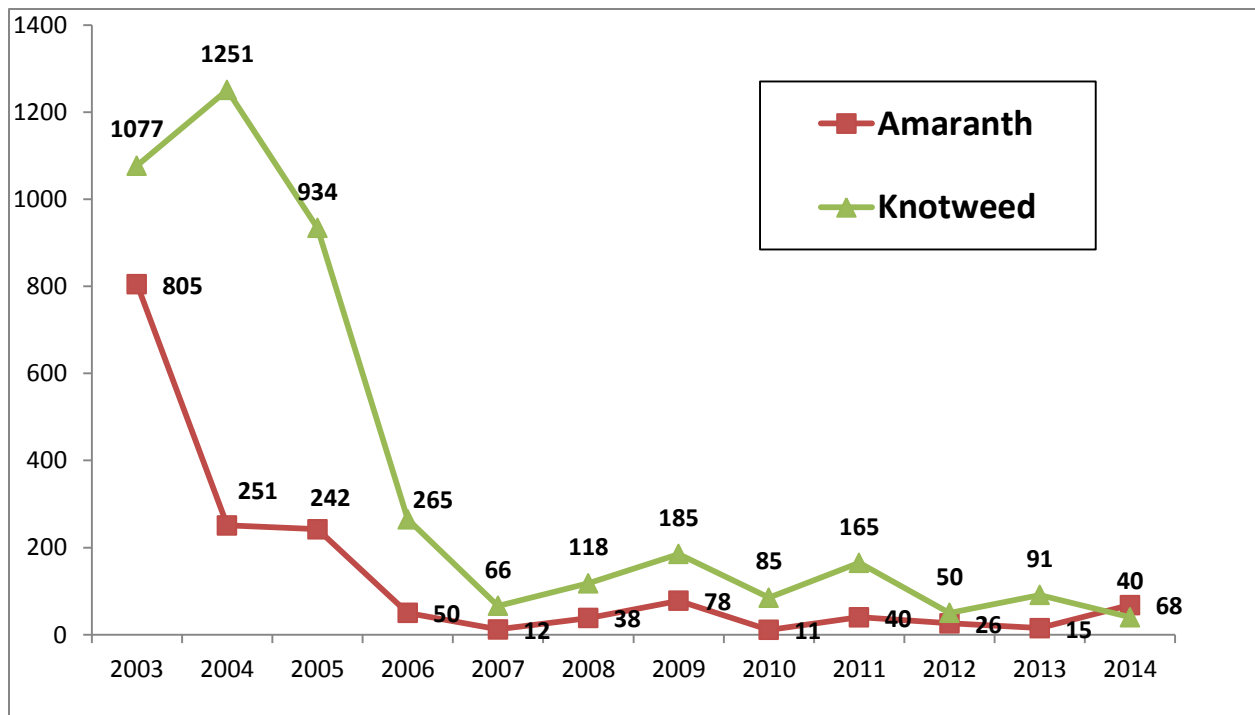


Figure 4: Chart displaying historical values for Seabeach Amaranth & Seabeach Knotweed on FIIS (2003-2014). The y-axis is the total number of plants counted that year.

Survey Window	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Additional Observations:		
Site / Species	COTE		LETE		AMOY		WILL		OSPR		GREG		GLIB		DCCO		GBBG		HEGU		
Islip Spoil Island						2						4		4				100		200	1st: not surveyed;
Sexton Island																					1st: not surveyed; 2nd: 10 DCCO
East Fire Island		110				2		6				1									1st: not surveyed ;
Long Cove	400	350																			1st: 50 GULL
Ridge Island		300				3												100			2nd: 22 GULL
Pelican Island									2	2											
John Boyle Island						4						10		10				50		100	1st: 5 BCNH, 13 SNEG, 2 LIBH; 2nd: 1 BCNH, 6 LIBH
Hospital Island																					1st: inactive
Watch Hill Bay							2	6													
Inactive Sites: West Fire Island, Sailors Haven, Fire Island Villages, OPWA, Lighthouse, Fire Island Pines																					

Table 4: Long Island Colonial Waterbird Surveys for Terns and Black Skimmers the 2014 season at FIIS. Sites are listed from west to east and separated by whether they are bay islands or on Fire Island. Species codes: COTE = Common Tern, LAGU= Laughing Gull, AMOY = American Oystercatcher, DCCO = Double Crested Cormorant, LETE= Least Tern, WILL = Willet, GBBG = Great Black-Backed Gull, OSPR = American Osprey, GLIB = Glossy Ibis, GREG = Great Egret, SNEG = Snowy Egret, HEGU = Herring Gull, MALL = Mallard, BCNH = Black Crowned Night Heron, LIBH = Little Blue Heron, GRBH = Great Blue Heron, MUSW = Mute Swan, GULL = unknown gull (either GBBG or HEGU), CAGO = Canadian Goose (* = Davis Park included in Wilderness survey)

Sub-site	Date found	Nest	NPS nest #	Date init	Float	Eggs found	Eggs complete	Est hatch	Term date	Fate	Female	Male	Chick1	Chick2	Chick3	Chick4	Chick1 fate	Chick2 fate	Chick3 fate	Chick4 fate
East side of Old Inlet	5/3/2014	1	1A-14	4/30/2014	0	3	4	5/31/2014	5/23/2014	Abandoned	GF(28)	GF(82)	-	-	-	-	-	-	-	-
East side of Old Inlet	5/9/2014	3	2A-14	5/9/2014	0	1	4	6/12/2014	6/11/2014	Hatched	GF(08)	GF(06)	GF(1CK)	GF(561)	GF(7VP)	GF(CC2)	DIED	FLEDGED	FLEDGED	FLEDGED
Watch Hill	5/16/2014	6	4A-14	5/16/2014	0	1	4	6/18/2014	6/6/2014	Abandoned	UNBANDED_F	GF(88)	-	-	-	-	-	-	-	-
East side of Old Inlet	5/18/2014	8	5A-14	5/18/2014	0	1	3	6/21/2014	6/13/2014	Abandoned	GF(6UP)	GF(4AM)	-	-	-	-	-	-	-	-
Watch Hill	5/20/2014	11	3A-14	5/16/2014	0	3	4	6/8/2014	6/9/2014	Abandoned	GF(97)	UNBANDED_M	-	-	-	-	-	-	-	-
Watch Hill	5/20/2014	12	6A-14	5/17/2014	0	2	4	6/21/2014	6/19/2014	Hatched	UNBANDED_F	GF(Y80)	-	-	-	GF(KCE)	DIED	DIED	DIED	FLEDGED
Watch Hill	5/23/2014	15	7A-14	5/8/2014	9	4	4	6/13/2014	6/6/2014	Abandoned	GF(29)	YGAR	-	-	-	-	-	-	-	-
East of Bellport Beach	6/11/2014	22	3B-14	6/7/2014	0	3	4	7/8/2014	7/7/2014	Hatched	GF(97)	GF(24)	GF(2A2)	GF(C5L)	GF(JJP)	GF(P69)	FLEDGED	DIED	DIED	FLEDGED
East side of Old Inlet	6/14/2014	23	5B-14	6/14/2014	0	1		7/13/2014	6/19/2014	Predated	GF(6UP)	UNBANDED_M	-	-	-	-	-	-	-	-
Watch Hill	6/18/2014	24	4B-14	6/14/2014	0	1	4	7/7/2014	6/24/2014	Predated	UNBANDED_F	GF(88)	-	-	-	-	-	-	-	-
East side of Old Inlet	6/26/2014	25	5C-14	6/23/2014	0	2	3	7/23/2014	7/22/2014	Hatched	GF(6UP)	GF(ALX)	GF(2CK)	GF(N11)	GF(MY0)	-	DIED	DIED	DIED	-

Table 5: Piping Plover Banding Information for 2014 from Virginia Tech Study. GF = Green Flag, Y = Yellow. Please refer to Annual Report 2014 for more information (reference is in Works Cited section).

Appendix B: Maps



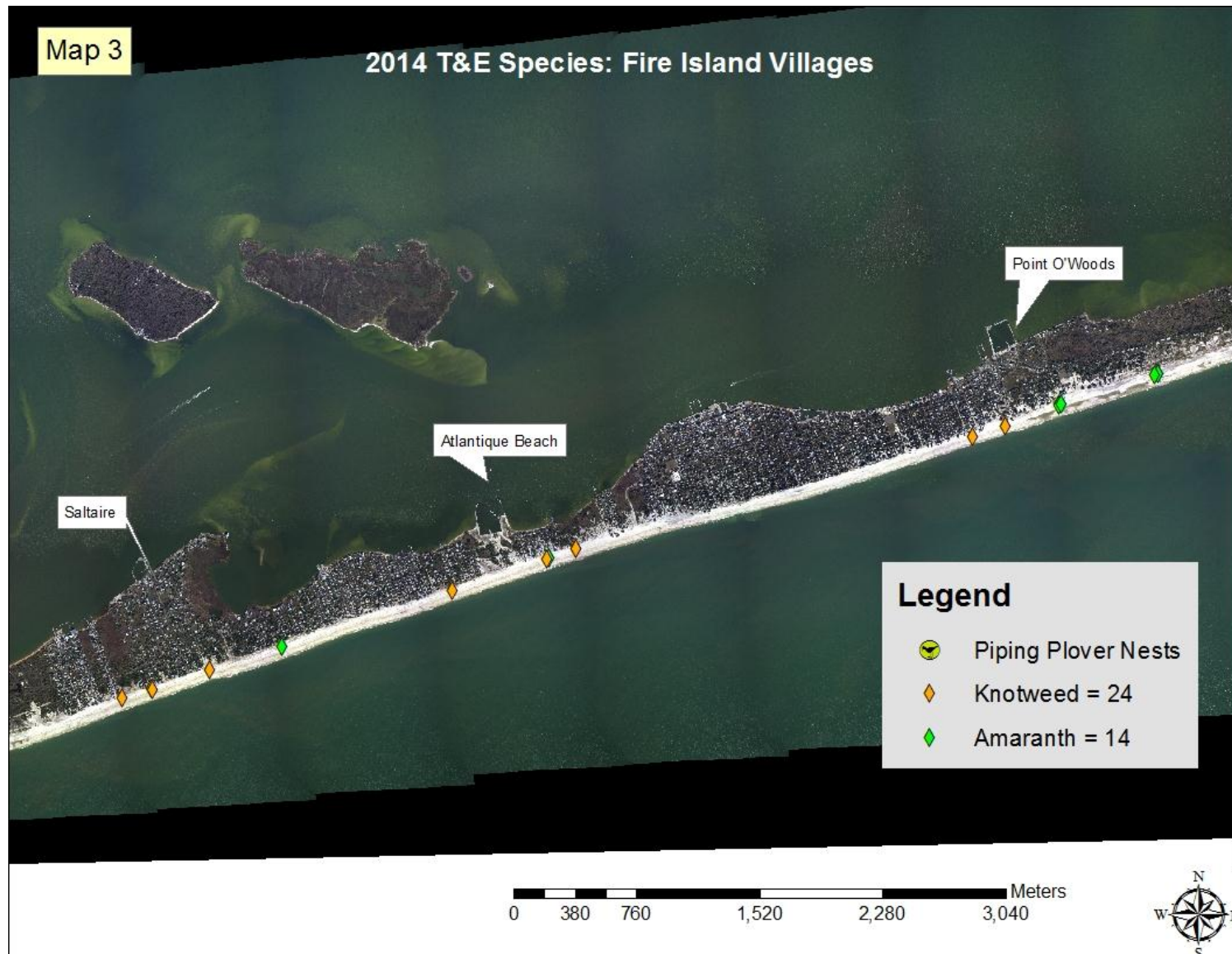
Map 1: Map of Fire Island National Seashore

Maps 2 - 7: Locations of threatened and endangered species in 2014. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals.



Map 3

2014 T&E Species: Fire Island Villages



Map 4

2014 T&E Species: Fire Island Sunken Forest



Map 5

2014 T&E Species: Fire Island Pines





Map 7

2014 T&E Species: Fire Island Wilderness (East of Old Inlet)



Appendix C: GPS locations

1. Piping Plover Nests

Nest	Species	SiteName	LocationDescription	UTMx	UTMy	Exclosed?	HatchDate	Productivity
1A-14	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	678009	4510305	yes	N/A	0
2A-14	Piping Plover	Fire Island Wilderness	Wilderness East (section 9)	678847	4510626	yes	6/11/2014	4
3A-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 2)	671307	4506955	yes	N/A	0
3B-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 6)	675687	4509237	no	7/8/2014	2
4A-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 5)	674520	4508589	yes	N/A	0
4B-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 6)	674645	4508660	no	N/A	0
5A-14	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	678172	4510370	yes	N/A	0
5B-14	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	677969	4510324	no	N/A	0
5C-14	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	678104	4510324	no	N/A	0
6A-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 2)	671631	4507101	yes	6/19/2014	1
7A-14	Piping Plover	Fire Island Wilderness	Wilderness West (section 3)	673475	4508141	yes	N/A	0
8A-14	Piping Plover	Lighthouse Beach	East end	651158	4499364	yes	N/A	0

2. Seabeach amaranth individuals

Amaranth ID	Site Name (LICWS)	Location Description	Date found	# of plants	max size (cm)	Evidence of Browsing (date(s)/none)	Reproductive (date(s)/none)	Dead/Gone date	Exclosed? (Y/N)	UTM (x)	UTM (y)
FIP-1	Fire Island Pines	Water Island	7/15/2014	1	12.5		7/30 - Flowering	9/4 - Gone	Yes- 7/30	665737	4504215
FIP-2	Fire Island Pines	Water Island	7/15/2014	1	11		7/30 - Flowering	9/4 - Gone	Yes- 7/30	665880	4504265
FIP-3	Fire Island Pines	Water Island	7/15/2014	1	11			7/30 - Gone	No	665900	4504276
FIP-4	Fire Island Pines	Water Island	7/15/2014	1	11	7/15 - 80% browsed, recovering		9/4 - Gone	Yes- 7/30	665916	4504284
FIP-5	Fire Island Pines	Water Island	7/15/2014	1	7.5			7/30 - Gone	No	665926	4504284
FIP-6	Fire Island Pines	Water Island	7/15/2014	1	13.5		7/30 - Flowering	9/4 - Gone	Yes- 7/30	665968	4504304
FIP-7	Fire Island Pines	Water Island	7/15/2014	1	14			7/30 - Gone	No	666101	4504353
FIP-8	Fire Island Pines	Water Island	7/15/2014	1	11	8/4 - 95% browsed, recovering		9/4 - Gone	Yes - 8/1	666104	4504353
FIP-9	Fire Island Pines	Water Island	7/15/2014	1	10			8/1 - Gone	No	666163	4504375
FIP-10	Fire Island Pines	Water Island	7/15/2014	1	7	8/4 - 40% browsed, recovering	8/4 - Flowering; 9/4 - Fruiting		Yes - 8/4	666168	4504374
FIP-11a	Fire Island Pines	Water Island	7/15/2014	1	3				Yes- 7/30	666212	4504391
FIP-11b	Fire Island Pines	Water Island	7/15/2014	1	2				Yes- 7/30	666212	4504391
FIP-12	Fire Island Pines	Tailsman	7/15/2014	1	20.5			8/19 - Gone	Yes- 7/30	665694	4504196
FIP-13	Fire Island Pines	The Pines	7/15/2014	1	14		7/15 - Flowering; 9/4 - Fruiting; 11/21 - Fruiting (old)	11/21 - Dead	Yes - 8/1	664512	4503681
FIP-14	Fire Island Pines	The Pines	7/15/2014	1	33	8/1 - 20% browsed	7/15 - Flowering; 9/4 - Fruiting	9/15 - Gone	Yes - 8/1	664463	4503652
FIP-15	Fire Island Pines	The Pines	7/15/2014	1	11.5	8/1 - 95% browsed, recovering		8/12 - Gone	Yes - 8/1	662567	4502967
FIP-16	Fire Island Pines	The Pines	7/15/2014	1	23	8/1 - 95% browsed, recovering	7/15 - Flowering; 9/4 - Fruiting	11/21 - Alive	Yes - 8/1	662545	4502957
FIP-17	Fire Island Pines	The Pines	7/15/2014	1	20	8/1 - 75% browsed, recovering	7/15 - Flowering; 9/3 - Fruiting	11/21 - Alive	Yes - 8/1	662540	4502953
FIP-18	Fire Island Pines	The Pines	7/15/2014	1	22		9/4 - Flowering/Fruiting		No	662536	4502956
FIP-19	Fire Island Pines	The Pines	7/15/2014	1	28	8/1 - 75% browsed, recovering	9/4 - Flowering/Fruiting	11/21 - Gone	Yes - 8/1	662537	4502952
FIP-20	Fire Island Pines	The Pines	7/15/2014	1	21	8/1 - 25% browsed, recovering	8/19 - Flowering; 9/4 - Fruiting	11/21 - Alive	Yes - 8/1	662516	4502944

FIP-21	Fire Island Pines	The Pines	7/15/2014	1	12	8/1 - 75% browsed, recovering	9/4 - Flowering/Fruiting; 11/21 - Fruiting (old)	11/21 - Dead	Yes - 8/1	662515	4502946
FIP-22	Fire Island Pines	The Pines	7/15/2014	1	10			8/4 - Gone	No	662641	4502984
FIP-23	Fire Island Pines	The Pines	8/4/2014	1	3		8/4 - Flowering	8/19 - Gone	Yes - 8/4	666075	4504346
FIP-24	Fire Island Pines	The Pines	8/4/2014	1	27.5	8/4 - browsed 20%, recovering		9/4 - Gone	Yes - 8/4	663284	4503207
FIP-25	Fire Island Pines	The Pines	8/4/2014	1	7				Yes - 8/4	662553	4502951
FIW-1	Fire Island Wilderness	Western Wilderness	7/21/2014	1	20		7/21 - Flowering	9/4 - Gone	Yes - 8/8	670872	4506660
FIW-2	Fire Island Wilderness	Western Wilderness	7/21/2014	1	22	8/8 - browsed 95%, recovering		9/4 - Gone	Yes - 8/8	671311	4506914
FIW-3	Fire Island Wilderness	Western Wilderness	7/21/2014	1	25	8/8 - browsed 85%, recovering		9/4 - Gone	Yes - 8/8	671966	4507265
FIW-4	Fire Island Wilderness	Western Wilderness	7/21/2014	1	20			9/4 - Gone	Yes - 8/8		
FIW-5	Fire Island Wilderness	Western Wilderness	7/21/2014	1	13.5			8/8 - Gone	No	672298	4507456
FIW-6	Fire Island Wilderness	Western Wilderness	7/21/2014	1	12			8/8 - Gone	No	672362	4507486
FIW-7	Fire Island Wilderness	Western Wilderness	7/21/2014	1	21	8/8 - browsed 25%, recovering;	7/21 - Flowering; 11/21 - Fruiting (old)	11/21 - Dead	Yes - 8/8	673679	4508170
FIW-8	Fire Island Wilderness	Western Wilderness	7/21/2014	1	14.5			11/21 - Gone	Yes - 8/8	673682	4508168
FIW-9	Fire Island Wilderness	Western Wilderness	7/21/2014	1	10		9/4 - Flowering/Fruiting	11/21 - Dead	Yes - 8/8	673709	4508172
FIW-10	Fire Island Wilderness	Western Wilderness	7/21/2014	1	9.5			11/21 - Dead	Yes - 8/8	673731	4508192
FIW-11	Fire Island Wilderness	Western Wilderness	7/21/2014	1	10			8/8 - Gone	No	674683	4508672
FIW-12	Fire Island Wilderness	Western Wilderness	7/21/2014	1	13		7/21 - Flowering	8/8 - Gone	No	673731	4508192
FIW-13	Fire Island Wilderness	Western Wilderness	7/21/2014	1	10				Yes - 8/8	674683	4508672
FIW-14	Fire Island Wilderness	Watch Hill	7/17/2014	1	18		8/8 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/8	669709	4506097
FIW-15	Fire Island Wilderness	Watch Hill	7/17/2014	1	14.5		8/8 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/8	669813	4506142
FIW-16	Fire Island Wilderness	Watch Hill	7/21/2014	1	20	8/8 - 25% browsed, recovering	9/4 - Flowering; 9/15 - Fruiting; 11/21 - Fruiting	11/21 - Alive	Yes - 8/8	669984	4506238
FIW-17	Fire Island Wilderness	Watch Hill	7/21/2014	1	20	8/8 - 95% browsed, recovering	7/21 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/8	670540	4506505
FIW-18	Fire Island Wilderness	Davis Park	7/17/2014	1	20		8/8 - Flowering	9/4 - Gone	Yes - 8/8	669339	4505894
FIW-19	Fire Island Wilderness	Western Wilderness	8/8/2014	1	4.5		8/21 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/8	670756	4506601
FIW-20	Fire Island Wilderness	Western Wilderness	8/8/2014	1	5		8/21 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/8	670752	4506604
FIW-21	Fire Island Wilderness	Western Wilderness	8/8/2014	1	15		9/4 - Flowering/Fruiting		Yes - 8/8	670881	4506670

FIW-22	Fire Island Wilderness	Western Wilderness	8/8/2014	1	14		8/8 - Flowering		Yes - 8/8	672211	4507406
FIW-23	Fire Island Wilderness	Western Wilderness	8/21/2014	1	5.5		8/21 - Flowering; 9/4 - Fruiting	11/21 - Gone	Yes - 8/12	670754	4506609
FIV-1	Fire Island Villages	Saltaire	8/12/2014	1	7		8/12 - Flowering	9/15 - Gone	Yes - 8/12	653145	4500010
FIV-2	Fire Island Villages	Seaview	8/12/2014	1	17.5			8/25 - Gone	Yes - 8/12	654796	4500552
FIV-3	Fire Island Villages	Kismet	7/22/2014	1	9.5			8/12 - Gone	No		
FIV-4	Fire Island Villages	Atlantique	7/22/2014	1	12			8/12 - Gone	No		
FIV-5	Fire Island Villages	Robbins Rest	7/22/2014	1	3			8/12 - Gone	No		
FISF-6	Fire Island Villages	Point O' Woods	7/22/2014	1	20	8/12 - 75% browsed, recovering			Yes - 8/12		
FISF-7a	Fire Island Villages	Point O' Woods	8/12/2014	1	5.5			9/3 - Gone	Yes - 8/12	657946	4501502
FISF-7b	Fire Island Villages	Point O' Woods	8/12/2014	1	3.5			9/3 - Gone	Yes - 8/12	657946	4501502
FISF-8	Fire Island Villages	Point O' Woods	8/12/2014	1	2		9/15 - Fruiting	11/21 - Gone	Yes - 8/12	657946	4501500
FISF-9a	Fire Island Villages	Point O' Woods	8/12/2014	1	6		8/22 - Flowering	11/21 - Gone	Yes - 8/12	657956	4501508
FISF-9b	Fire Island Villages	Point O' Woods	8/12/2014	1	2		8/22 - Flowering	11/21 - Gone	Yes - 8/12	657956	4501508
FISF-9c	Fire Island Villages	Point O' Woods	8/12/2014	1	2		8/22 - Flowering	11/21 - Gone	Yes - 8/12	657956	4501508
FISF-10	Fire Island Villages	Point O' Woods	8/12/2014	1	14		8/22 - Flowering	11/21 - Alive	Yes - 8/12	658534	4501686
FISF-11	Fire Island Villages	Point O' Woods	8/12/2014	1	18	8/12 - 75% browsed, recovering			Yes - 8/12		
FISF-1	Fire Island Sunken Forest	Sailors Haven	7/22/2014	1	20	7/22 - 60% browsed	9/3 - Flowering	11/21 - Dead	Yes - 8/12	660279	4502231
FISF-2	Fire Island Sunken Forest	Sailors Haven	7/22/2014	1	8.5		8/22 - Flowering; 11/21 - Fruiting	11/21 - Alive	Yes - 8/12	659894	4502114
FISF-3	Fire Island Sunken Forest	Sailors Haven	7/22/2014	1	16		8/22 - Flowering; 11/21 - Fruiting (old)	11/21 - Dead	Yes - 8/12	659313	4501939
FISF-4	Fire Island Sunken Forest	Sailors Haven	7/22/2014	1	17			8/12 - Gone	No	660422	4502274
FISF-5	Fire Island Sunken Forest	Sailors Haven	7/22/2014	1	22	7/22 - 75% browsed		9/3 - Gone	Yes - 8/12		

3. Seabeach knotweed individuals

Knotweed ID (FID)	Site Name (LICWS)	Location Description	Date	UTMs (x)	UTMs (y)	# of plants	Reproductive (date(s)/none)
FIW-1	Fire Island Wilderness	Western Wilderness	7/21/2014	670621	4506439	1	7/21 - Flowering
FIW-2	Fire Island Wilderness	Davis Park	7/21/2014			1	7/21 - Flowering
FIW-3	Fire Island Wilderness	Western Wilderness	8/8/2014			1	8/8 - Flowering
FIW-4	Fire Island Wilderness	Western Wilderness	8/8/2014			1	8/8 - Flowering
FIW-5	Fire Island Wilderness	Western Wilderness	8/21/2014	670805	4506630	1	8/21 - Flowering
FIV-1	Fire Island Villages	Kismet	7/22/2014	652338	4499746	1	7/21 - Flowering
FIV-2	Fire Island Villages	Kismet	7/22/2014	652696	4499862	1	7/21 - Flowering
FIV-3	Fire Island Villages	Atlantique	7/22/2014	654961	4500610	1	7/21 - Flowering
FIV-4	Fire Island Villages	Ocean Beach	7/22/2014	657410	4501310	1	7/21 - Flowering
FIV-5	Fire Island Villages	Ocean Beach	7/22/2014	657602	4501361	1	7/21 - Flowering
FIV-6	Fire Island Villages	Kismet	8/12/2014			3	8/12 - Flowering
FIV-7	Fire Island Villages	Kismet	8/12/2014			2	8/12 - Flowering
FIV-8	Fire Island Villages	Kismet	8/12/2014			1	8/12 - Flowering
FIV-9	Fire Island Villages	Kismet	8/12/2014	652127	4499696	9	8/12 - Flowering
FIV-10	Fire Island Villages	Saltaire	8/12/2014	652375	4499739	1	8/12 - Flowering
FIV-11	Fire Island Villages	Robbins Rest	8/12/2014	654185	4500367	1	8/12 - Flowering
FIV-12	Fire Island Villages	Seaview	8/12/2014	655250	4500396	1	8/12 - Flowering
FIV-13	Fire Island Villages	Ocean Bay	8/12/2014	654962	4500615	1	8/12 - Flowering
FISF-1	Fire Island Sunken Forest	Sailors Haven	7/21/2014	659378	4501962	5	7/21 - Flowering
FISF-2	Fire Island Sunken Forest	Sailors Haven	7/21/2014	660645	4502367	1	8/22 - Flowering
FIP-1	Fire Island Pines	Water Island	8/4/2014	667120	4504804	1	8/4 - Flowering
FIP-2	Fire Island Pines	Water Island	8/4/2014	666742	4504635	1	8/4 - Flowering
FIP-3	Fire Island Pines	Water Island	8/4/2014	666130	4504370	1	8/4 - Flowering
FIP-4	Fire Island Pines	The Pines	8/4/2014	661252	4502529	1	8/4 - Flowering
FIP-5	Fire Island Pines	Cherry Grove	8/4/2014	664651	4503720	1	8/4 - Flowering