

Fire Island National Seashore

**THREATENED & ENDANGERED SPECIES
MONITORING PROGRAM
2012 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.....	6
a. Piping plovers (<i>Charadrius melodus</i>).....	6
i. Summary of nests	
b. Colonial waterbirds (<i>Sterna</i> spp).....	9
c. Vegetation (<i>Amaranthus pumilus</i> and <i>Polygonum glaucum</i>).....	10
7. Discussion.....	11
a. Disturbance issues in 2012.....	11
i. Anthropogenic disturbances.....	11
ii. Natural disturbances.....	12
8. Recommendations.....	13
9. Works cited.....	14

Appendix A: Figures and Tables

	<u>Page number</u>
Table 1: List of federal and state-listed threatened and endangered species at FIIS.....	15
Table 2: Historic Productivity of Piping Plovers at FIIS.....	16
Table 3: FIIS 2012 Overall Piping Plover Productivity.....	17
Table 4: Long Island Colonial Waterbird Surveys for the 2012 season.....	21
Figure 1: Piping Plover breeding pair productivity at FIIS.....	18
Figure 2: Pie graph displaying the outcome of all Piping Plover eggs at FIIS.....	18
Figure 3: Bar graph of brood outcome for 2012 Piping Plovers at FIIS	19
Figure 4: Chart displaying historical values for Piping Plover nests and fledglings on FIIS (2000-2012)	19
Figure 5: Chart displaying historical values for seabeach amaranth and seabeach knotweed on FIIS (2003-2012).....	20

Appendix B: Maps

	<u>Page number</u>
Map 1: Map of Fire Island National Seashore.....	22
Map 2: Fire Island Lighthouse.....	23
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).....	24
Map 6: Fire Island Wilderness.....	25

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

THREATENED & ENDANGERED SPECIES MONITORING PROGRAM 2012 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 2012. Through daily monitoring and a collaborative park effort, a total of 12 piping plover (*Charadrius melodus*) nesting pairs were recorded within the park. With a total of 15 successful piping plover fledglings, nesting productivity reached an average of 1.25 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. Twenty-six seabeach amaranth (*Amaranthus pumilus*) and 50 seabeach knotweed (*Polygonum glaucum*) plants were documented throughout FIIS. FIIS staff worked cooperatively with Land Use Ecological Services staff (LUES) to monitor federally threatened and endangered species throughout the Fire Island community beaches – notably, piping plovers and seabeach amaranth. 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.

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 2012 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 2012, 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 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.

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. In addition, using these similar techniques and abiding by conditions in the 2009 beach nourishment permit, the FIIS Wildlife Biologist assisted the USFWS Biologist and Land Use Ecological Services (LUES) staff with deciding which areas were suitable to fence in front of Fire Island communities.

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 and LUES 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).

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 was decided by the FIIS Wildlife Biologist, based on the nests location and visibility to the public and on the known predator population near the nest. 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-12).

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).

5b. COLONIAL WATERBIRD SURVEY

Population counts for colonial waterbirds were conducted twice during the 2012 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.

6. RESULTS

6a. PIPING PLOVERS (*Charadrius melodus*)

Monitoring for the 2012 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 April and July, piping plover nests were discovered and documented throughout FIIS.

A total of 12 nesting pairs were documented, from which there came 17 nesting attempts throughout the island. Eleven nests hatched and eight nests successfully fledged chicks. Nests were lost due to predation and nest abandonment for unidentified reasons (Table 3).

A total of 58 eggs were laid and 35 of these total eggs hatched, with the remainder failing as a result of predation or other circumstances (Figure 2). Fifteen chicks went on to fledge, yielding a productivity of 1.25 for 12 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. Only two chicks did not survive past day 1 (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 the western half of the island is as follows: 1 nesting pair at Lighthouse Beach (1A, 1B), 1 at Robbins Rest (3A), 1 at Point O'Woods (10A, 10B), and 1 at Water Island (12A).

The Otis Pike Fire Island High Dune Wilderness Area (OPWA) yielded 8 plover pairs and 11 nesting attempts which were divided by location: OPWA West (Watch Hill to Bellport Beach) and OPWA East (Bellport Beach to the Wilderness Visitor Center). There was 1 nesting pair in the OPWA West (11A). In the OPWA East there were 7 nesting pairs: 3 between Bellport and Old Inlet (5A, 8A, 8B, 9A) and 4 in the overwash (2A, 2B, 4A, 4B, 6A, 7A). Below is a summary of each attempt:

Nest **1A-12** was found with 4 eggs on April 12th on the eastern end of Lighthouse beach, ~130 meters west of Kismet driving cut. It was unexpectedly discovered while putting up symbolic fencing and was exclosed on the same day. On May 2nd, the plovers stopped incubating and abandoned the nest. One reason for the abandonment could have been from negative interactions with a nearby pair of nesting American oystercatchers.

Nest **1B-12** was discovered on June 22nd with 1 egg, located approximately ~5 meters east of nest 1A. The nest was exclosed on June 28th. The clutch was complete on June 26th with 3 eggs. On July 22nd, 2 of the eggs had hatched and 1 egg remained. Five days later one chick went missing due to unknown causes. FIIS staff noticed the adult birds often left the chick/s alone for extended periods of time and the chick/s would sometimes walk within 6 feet of the Polaris. Three days later the second chick went missing.

Nest **2A-12** was discovered with 1 egg on April 19th in the eastern end of the overwash of OPWA East. On April 25th the nest was determined to be abandoned before a predator exclosure was erected. The plover pair stayed in the area and re-nested on May 3rd.

Nest **2B-12** was discovered on May 3rd with 1 egg in almost the exact location as 2A, just west of the path leading to the OPWA Visitor Center. The nest was exclosed on May 7th and reached a full clutch of 4 eggs on May 9th. Only 2 of the eggs hatched on June 5th and both chicks went missing on June 14th,

due to unknown causes. Fox were often spotted on the beach and far back in the overwash and tracks around the exclosures in this section of OPWA were always abundant. The plover pair stayed in the area and was observed acting territorial with an adjacent plover pair (6A). Scrapes were found in the area as late as August, but the pair never made a third nest attempt.

Nest **3A-12** was found with 3 eggs on May 5th, high on the primary dune in the federal tract west of Robbins Rest. The clutch was complete at 3 eggs. It was decided by the FIIS Wildlife Biologist not to exclose this nest because of low predator activity and the susceptibility to vandalism (nest in 2011 was vandalized in this same area). However, the nest was depredated by a red fox on May 16th. Fox and dog tracks were found around the nest site. The plovers remained in the area for a short time after and were observed acting territorial towards a third plover by FIIS staff; however, the plover pair did not re-nest.

Nest **4A-12** was discovered on May 7th with 3 eggs located in the OPWA East section, ~100 meters west of the Old Inlet path. The nest was exclosed the same day and a full clutch of 4 eggs was completed on May 9th. On May 14th, FIIS staff observed one adult plover chasing away two gulls. On May 17th an American osprey was observed perched on the exclosure eating a fish, causing the incubating plover to pop off the nest. When the nest was observed 4 days later only one adult plover was seen, alternating between incubating the nest and foraging at the water. By May 24th, the nest was no longer being incubated and it was determined to be abandoned. The pair re-nested on May 30th.

Nest **4B-12** was found on May 30th ~20 meters east of nest 4A, in the OPWA East section. The nest was exclosed as a full clutch of 4 eggs on June 5th. Digging attempts around the exclosure by red fox was observed a few times. Two of the eggs began to hatch on June 30th and the other 2 eggs never hatched. Both chicks went on to fledge.

Nest **5A-12** was discovered on May 7th with 2 eggs in section 7 of the OPWA. It was exclosed that same day. All 3 eggs hatched on June 5th and digging attempts around the exclosure by fox was observed. Two days later only 2 chicks were observed, and these chicks went on to fledge.

Nest **6A-12** was discovered on May 10th with 3 eggs in section 9 of the OPWA. The same day a fox was observed in the area (100 meters from nest). The nest was exclosed as a full clutch of 4 eggs the following day, May 11th. At least of the eggs had hatched on June 5th, and all 4 chicks were observed on June 7th. The following day only 2 chicks were seen, and as of June 21st only one chick had survived. This chick went on to fledge.

Nest **7A-12** was found on May 10th with 4 eggs in section 9 of the OPWA. The same day a fox was observed in the area (50 meters from nest). The nest was exclosed the following day, May 11th. Three of the 4 eggs hatched on June 2nd. The 4th egg hatched, but only 3 chicks were observed June 7th. The following date through to their fledge date only 2 chicks were observed.

Nest **8A-12** was found on May 14th with 4 eggs in section 7 of the OPWA. When going out to exclose on May 17th it was found to be depredated by red fox. The plover pair stayed in the area and re-nested on May 28th.

Nest **8B-12** was found on May 28th with 1 egg, ~100 meters west of nest 8A. On May 30th the nest was exclosed due to high predator activity. It still only had one egg and the adults were not observed in the

area while exclosing. The nest was confirmed abandoned on June 1st when the egg was found buried.

Nest **9A-12** was discovered on May 17th with 2 eggs, and was exclosed the same day in section 6 of the OPWA. The nest was confirmed as a full clutch of 4 eggs. Digging attempts by red foxes were observed around the predator exclosure. On June 21st all 4 eggs had hatched but only 3 chicks were observed. Only 2 chicks were observed as of July 14th onwards, and they both went on to fledge.

Nest **10A-12** was discovered on May 22nd with 4 eggs in the community of Point O' Woods. They had nested on top of the secondary dune. The nest was exclosed the following day, May 23rd. A beach driving closure date was difficult to predict since the nest was found as a full clutch, so FIIS staff monitored the nest everyday. Three of the chicks hatched only 6 days later, causing FIIS staff to close the area immediately to full-sized vehicles. Only 2 chicks were observed on May 31st, and only one chick was observed on June 1st and 2nd. One egg never hatched. Unfortunately the one chick was not sighted after June 2nd. The pair stayed in the area and re-nested on June 16th.

Nest **10B-12** was discovered on June 16th with 1 egg and was exclosed on June 20th. This nest was east of 10A and on the upper beach. On July 14th 2 chicks were observed, 2 eggs remained in the nest. On July 15th 3 chicks were observed and 1 egg remained in the nest. By June 17th only 1 chick was observed and all eggs had hatched. The one chick was observed regularly and went on to fledge.

Nest **11A-12** was found on May 28th with 1 egg in section 4 of the OPWA. It was exclosed on May 31st and was confirmed to have 4 eggs on June 2nd. Digging attempts by red foxes were observed around the exclosure. The nest hatched on June 29th. Four chicks were observed from July 4th – 12th, and only three chicks went on to fledge.

Nest **12A-12** was found on June 11th behind the primary dune in the community of Water Island with 1 egg. It was exclosed on June 14th with 3 eggs – a full clutch. A digging attempt by fox was observed around the exclosure on July 12th. The nest hatched on July 17th (later than estimated), and 3 chicks were observed. The following day only 2 chicks were observed, and they went on to fledge. The brood covered a lot of area – they initially moved east to Blue Point, then moved back to Water Island, then moved west to Talisman and ultimately near Fire Island Pines.

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 and/or LETE colonies were observed in the following areas: Sexton Island, East Fire Island, Long Cove, Ridge Island, Fire Island Villages and the Fire Island Wilderness beach. 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 118, 275, and 0 respectively. LETE and ROTE counts are comparable to past years; however, COTE counts dropped from 925 individuals in 2011.

As for bay islands, the park observed major declines in COTE and LETE counts in 2012. Ridge Island supported a colony in 2011, with 500 COTES observed during the first survey period. However, only 19 COTES were observed during the second survey period in 2012. In addition, Long Cove usually supports a large COTE colony. However, 171 and zero were observed during the first and second survey window in 2012, respectively. No COTES were observed on Sexton Island in 2012 (140 and 80 in 2010 and 2011, respectively) and East Fire Island has experienced fluctuating COTE numbers (Table 4).

As for sections on Fire Island, LETEs were 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. Although nesting occurred throughout Fire Island, only one fledged LETE chick was observed in Point O'Woods (Table 4). Human disturbance caused the failure of one known LETE nest in Davis Park on July 3rd. A beachgoer walked through a symbolically fenced area and stepped on the LETE pair's eggs.

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

A total of 26 seabeach amaranth plants were found in several sweep counts on FIIS throughout July, August and September (Figure 5). Staff surveyed for amaranth plants during 3 survey windows: 1) July 31 – August 10, 2) August 20 – 31, and 3) September 15 – 25. Sites from the LICWS were recognized and reported as such for seabeach amaranth: Fire Island Lighthouse (0 plants), Fire Island Villages (10 plants), Fire Island Sunken Forest (2 plants), Fire Island Pines (5 plants), and the Fire Island Wilderness (9 plants).

Twelve out of 26 amaranth plants showed signs of herbivory (46% of plants), presumably from white-tailed deer (*Odocoileus virginianus*): 6 plants in Fire Island Villages, 2 plants in Fire Island Sunken Forest, 2 plants in Fire Island Pines, and 2 plants in Fire Island Wilderness. A mixture of large and small plants was observed with the average size being 18.6 cm in diameter at the widest point. Eighteen out of 26 plants showed signs of reproduction (69% of plants). The majority of plants were located inside the symbolic fenced areas designated initially for piping plover and least terns. Only 9 plants were still alive during the third survey window. All vegetation data is located in Appendix C.

Surveying for seabeach knotweed was concurrent with that for seabeach amaranth during the first survey window. A total of 50 knotweed plants were counted and marked throughout FIIS (Figure 5). Sites found with knotweed include Fire Island Lighthouse (1 plant), Fire Island Villages (9 plants), Fire Island Sunken Forest (4 plants), Fire Island Pines (13 plants) and Fire Island Wilderness (23 plants). Both federal and non-federal tracts of land were surveyed in 2012. Most of the plants were a mix of large and small sizes and located inside the symbolically fenced areas designated initially for piping plover and least terns.

7. DISCUSSION

7a. DISTURBANCE ISSUES IN 2012

7ai. ANTHROPOGENIC DISTURBANCES

There were several anthropogenic and natural disturbances to T&E species in 2012. Anthropogenic disturbances refer to direct and indirect human interactions with T&E species. This includes heavy foot traffic, removal of symbolic fencing, driving in and adjacent to suitable habitat areas, and domesticated animal disturbances. Natural disturbances refer to other wildlife interactions that negatively impact the species. This includes predation and competition for beach resources.

Numerous pairs chose to nest in areas with high seasonal visitation, where seasonal residents/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. Disturbance caused by off-road vehicles (ORV) was minimized by closing certain beach access points (dune crossings) and sections of beach and providing signage for alternative routes through the interior of the island several days prior to the hatching of a piping plover nest.

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.

The following beach driving closures were implemented during the 2012 season:

- On May 28th the Ocean Bay Park/Point O'Woods driving cut and the Oakleyville driving cut were closed. 10A was approximately 425 meters and 1,000 meters away from these driving cuts, respectively. However, the 10A plover chicks did not survive; therefore, this area was re-opened on June 11th.
- On July 9th the area 1,000 meters east/west of Water Island's nest (12A) was closed to beach driving. No alternative/interior route could be provided so we gave ample notification to all parties and water transportation was strongly encouraged. The nest hatched on July 16th, and the area was re-opened to driving on August 20th.
- On July 13th the Ocean Bay Park/Point O'Woods driving cut and the Oakleyville driving cut were closed. 10B was approximately 485 meters and 940 meters away from these driving cuts, respectively. These two driving cuts remained closed until August 18th.
- The Kismet driving cut was closed July 20th; 1B was approximately 135 meters from the driving cut. The 1B plover chicks did not survive; therefore, the Kismet cut was re-opened on August 10th.

Although these driving cuts were closed by FIIS, the beach was not void of vehicles. Many full-sized vehicle tracks were observed and symbolic fencing to mark the closed driving cuts had been removed or discarded, as well as unauthorized vehicles driving on the beach near and through nesting sites. Park Rangers were notified during each witnessed incident and pictures were provided when necessary.

Dogs were frequently seen off their leash, sometimes in areas where dogs were entirely prohibited. Every day, particularly at 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 plover broods in the communities.

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.

7a.iii. NATURAL DISTURBANCES

Gulls, raccoons, red fox, ghost crabs, and a variety of avian wildlife in FIIS can pose a threat or disturbance to nesting piping plovers and their broods. In addition, nesting American oystercatchers (*Haematopus palliatus*) on Lighthouse beach acted territorial towards breeding piping plovers and may have prevented a pair from nesting. Although they regularly nest on the bay islands, this is the first known occurrence of nesting American oystercatchers on Fire Island's beaches. Other Long Island beaches, such as Breezy Point, have sighted negative American oystercatcher and piping plover interactions in recent years (Steve Sinkevich, personal communication).

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. Attempted digging around exclosures was observed at 5 nests (4B, 5A, 9A, 11A and 12A). Four of these nests were in the OPWA, whereas 12A was located in Water Island. Furthermore, two nests were predated by red fox before the eggs hatched (3A, 8A) and tracks were observed near most other nests. In addition, the presence of predators may be accountable for the occurrences of 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.

Another natural disturbance that faces 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 then be covered by sand or washed away. This is usually a cause of nest failure; however, no nests were overwashed in 2012.

Significant browsing of seabeach amaranth individuals was observed this season. Twelve out of 26 amaranth plants showed signs of herbivory (46% of plants), presumably from white-tailed deer (*Odocoileus virginianus*): 6 plants in Fire Island Villages, 2 plants in Fire Island Sunken Forest, 2 plants

in Fire Island Pines, and 2 plants in Fire Island Wilderness. The intensity of herbivory on individuals varied.

8. RECOMMENDATIONS

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

- During the 2012 field season, vehicle dune crossing routes had to be closed due to the close proximity 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. This year FIIS resource management staff observed countless acts of vandalism and/or theft to either the driving cut's fencing/signs or fencing around active plover habitat and persons driving through areas that were clearly closed to full-sized vehicles. Incidents were reported to NPS Rangers and tickets issued when possible.

It will be beneficial to continue the effort to give prior warning to vehicle route closures so there is less confusion and fewer complications. It will continue to be critical that efforts are made to forewarn island residents, essential service agencies, local police, and park staff of upcoming vehicle route closures. Although proper warning was given and signage was posted, enforcement of beach closures was not sufficient in eliminating beach driving as a threat to protected species. In the future, different communication methods and possibly more stringent enforcement measures should be considered.

- 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. In the future, it is suggested that motion sensitive cameras (*i.e.*, camera traps) are used for a more conclusive way to determine the exact occurrence of predator and disturbance activities near FIIS's protected species. A research project was started in 2011 by Pace University (PI, Dr. Melissa Grigione) to look closer at red foxes through seasonal diet analysis and statistically summarizing the park's monitoring data to assess whether red fox pose a significant threat to threatened and endangered species.
- Observational data has shown white-tailed deer to be a possible threat to the survival and reproduction of seabeach amaranth. Several plants in 2008, 2010, 2011 and 2012 showed signs of intense herbivory. The FIIS Wildlife Biologist has discussed amaranth exclosure options with Asseateague Island National Seashore, which implements this protective measure. FY14 funding has been awarded to the park for an amaranth study through the PMIS Block Grant program. However, piloting the exclosures next year would be desirable. In addition, the herbivory of amaranth has been brought to the attention of the park's Vegetation and White-tailed Deer Management planning team and is being considered in the plan/EIS.
- 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 oftentimes the first contact for people

with pets. The continued improvement of communication, including formal and informal efforts, is integral to the efficacy of this program.

- 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.

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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	N	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) 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	1.23	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
2010	16	23	9	38	2.2	17	0.74	1.06
2011	14	16	10	38	2.7	21	1.31	1.91
2012	12	17	8	35	2.9	15	0.88	1.25
Average	10.95	13.2	6.8	35.4	2.13	15.3	1.3	1.3

Table 2: Historic Productivity of Piping Plovers on FIIS

¹Data from previous nesting seasons are incomplete

Nest #	Location	Exclosed?	# Eggs Laid	# Chicks Hatched	# Chicks Fledged	Result
1A	Lighthouse (east)	Yes	4	0	0	Failed/Abandoned
1B	Lighthouse (east)	Yes	3	2	0	Hatched/Failed
2A	Wilderness (section 9)	No	1	0	0	Failed/Abandoned
2B	Wilderness (section 9)	Yes	4	2	0	Hatched/Failed
3A	NPS land (west of Robbins Rest)	No	3	0	0	Failed/Predated
4A	Wilderness (section 8)	Yes	4	0	0	Failed/Abandoned
4B	Wilderness (section 8)	Yes	4	2	2	FLEDGED
5A	Wilderness (section 7)	Yes	3	3	2	FLEDGED
6A	Wilderness (section 9)	Yes	4	4	1	FLEDGED
7A	Wilderness (section 9)	Yes	4	4	2	FLEDGED
8A	Wilderness (section 7)	No	4	0	0	Failed/Predated
8B	Wilderness (section 7)	Yes	1	0	0	Failed/Abandoned
9A	Wilderness (section 6)	Yes	4	4	2	FLEDGED
10A	Point O'Woods	Yes	4	3	0	Hatched/Failed
10B	Point O'Woods	Yes	4	4	1	FLEDGED
11A	Wilderness (section 4)	Yes	4	4	3	FLEDGED
12A	Water Island	Yes	3	3	2	FLEDGED
Totals			58	35	15	
	Productivity (chicks fledged per pair) = 1.25					

Table 3: FIIS 2012 Overall Piping Plover productivity

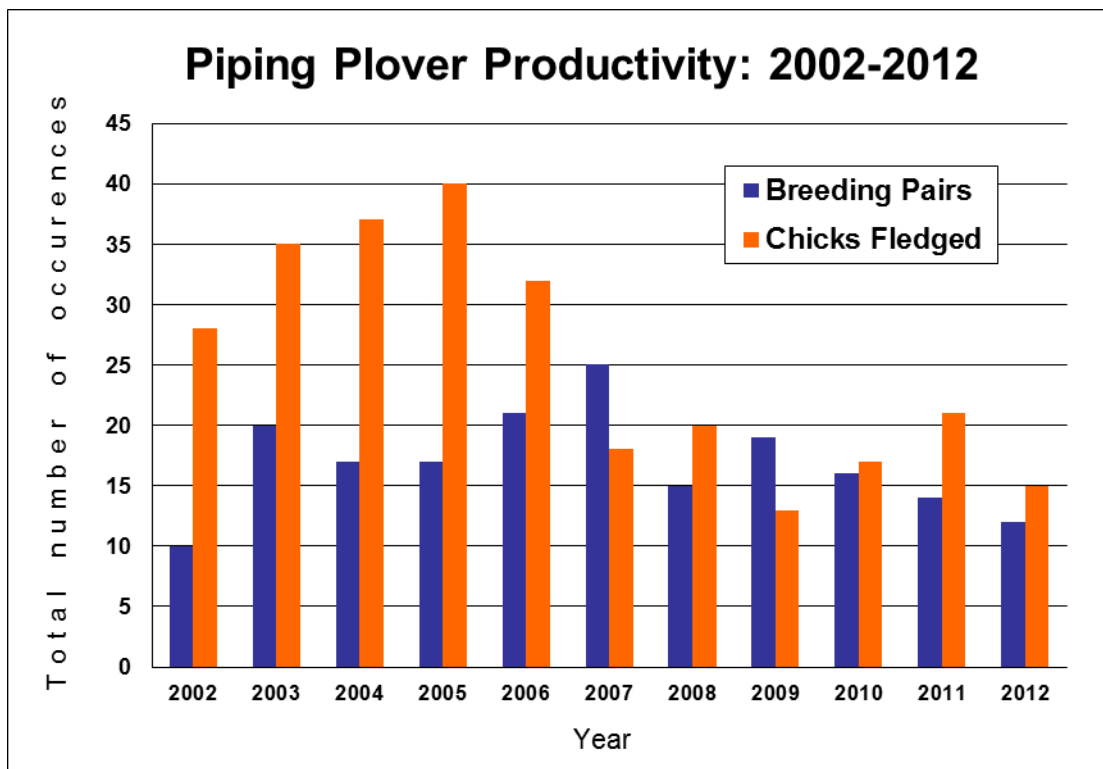


Figure 1: The number of Piping Plover breeding pairs and the number of chicks fledged at FIIS, 2002-2012

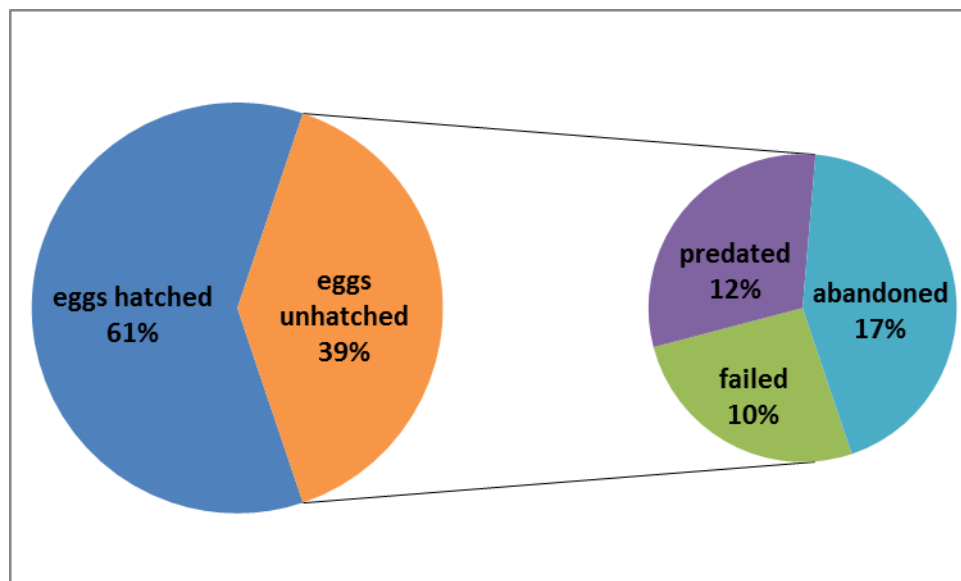


Figure 2: Pie graph displaying the outcome of all laid Piping Plover eggs at FIIS in 2012 (total = 58). Failed means the eggs remained in the nest and did not hatch.

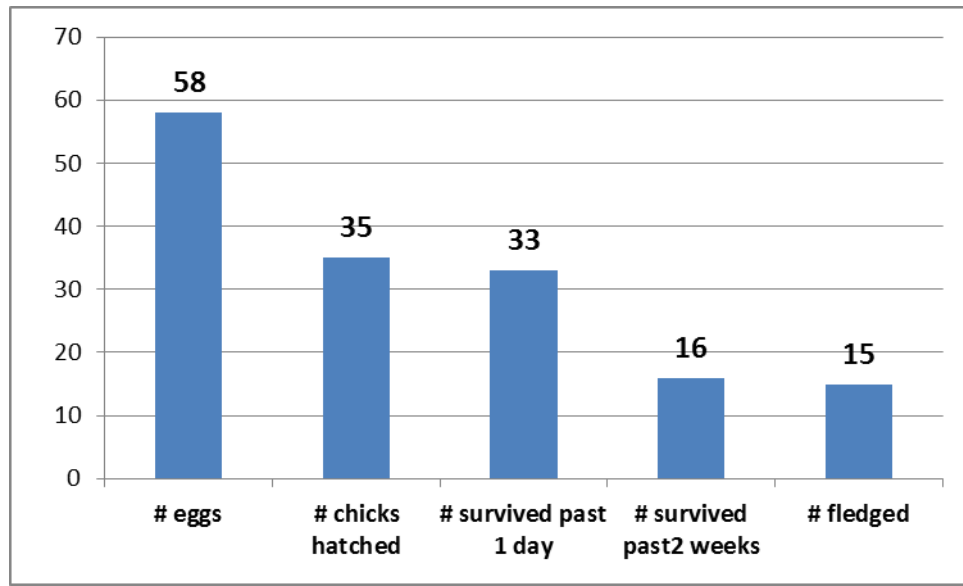


Figure 3: Bar graph of brood outcome for 2012 Piping Plovers at FIIS

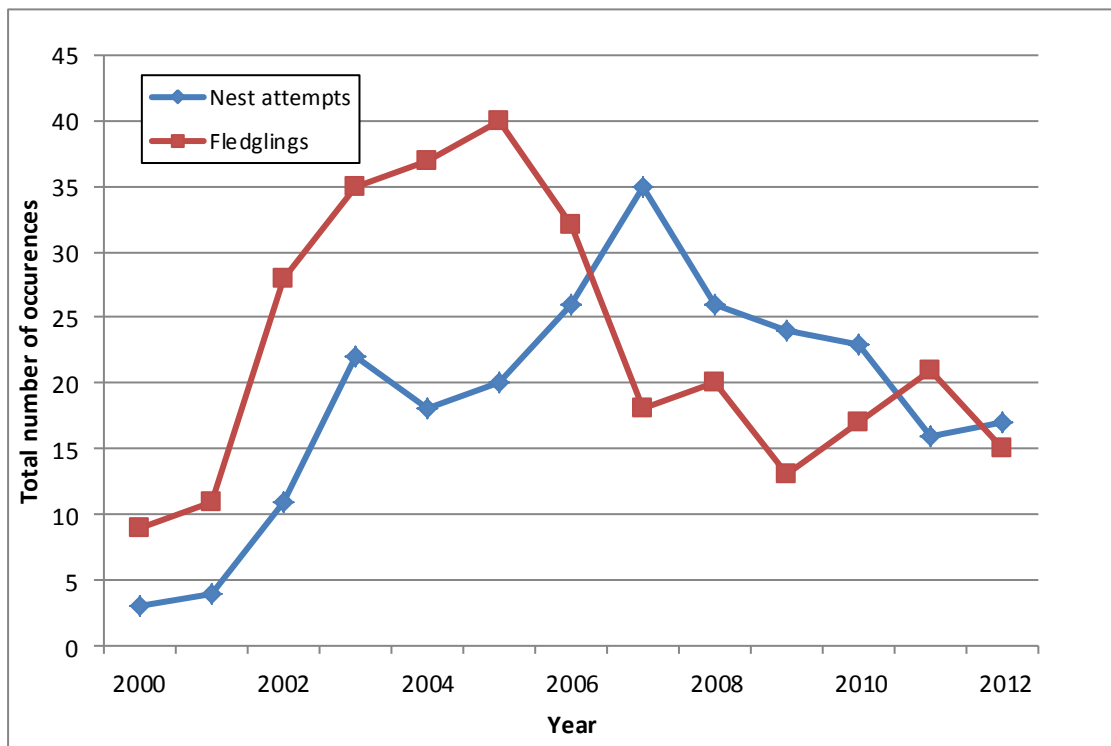


Figure 4: Chart displaying historical values for Piping Plover nests & fledglings on FIIS (2000-2012)

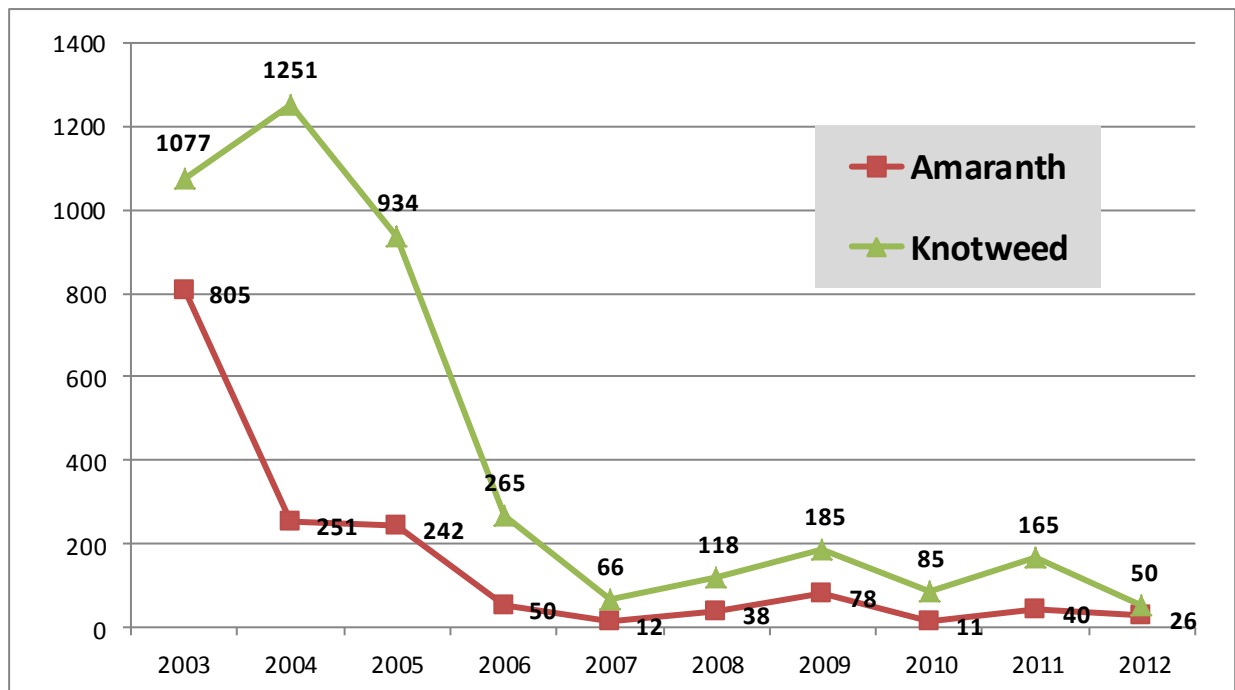


Figure 5: Chart displaying historical values for Seabeach Amaranth & Seabeach Knotweed on FIIS (2003-2012). The y-axis is the total number of plants counted that year.

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								2				50		400	1st: not surveyed; 2nd: 20 SNEG
Sexton Island						4														114	1st: not surveyed; 2nd: 360 LAGU
East Fire Island	55	85					3	3													
Sailors Haven			2	0																	
Long Cove	171	0																			
Ridge Island		19				3		5							15		100		120		1st: not surveyed
Pelican Island						2			2	2											
John Boyle Island					0	4			0	2	0	31	8	18			-	100	-	200	1st: 2 BCNH, 1 LIBH, 15 SNEG; 2nd: 7 SNEG, 2 BCNH, 3 LIBH
Hospital Island						2		4												2	1st: not surveyed
Fire Island Villages			34	2																	
Watch Hill Bay			0	2			0	2					0	2							1st: 11 MALL 2nd: 11 MALL
OPWA			26	7																	
Lighthouse			26	1																	
Fire Island Pines			20	28																	
Inactive Sites: West Fire Island																					

Table 4: Long Island Colonial Waterbird Surveys for the 2012 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 (* = Davis Park included in Wilderness survey)

Appendix B: Maps



Map 1: Map of Fire Island National Seashore

Maps 2 - 6: Locations of threatened and endangered species in 2012. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals.







Appendix C: GPS locations

1. Piping Plover Nests

Nest	LICWS Site Name	Location Description	UTMs (x)	UTMs (y)	productivity
1A-12	Fire Island Lighthouse	Lighthouse beach	651534	4499452	0
1B-12	Fire Island Lighthouse	Lighthouse beach	651539	4499451	0
2A-12	Fire Island Wilderness	Wilderness (section 9)	678686	4510545	0
2B-12	Fire Island Wilderness	Wilderness (section 9)	678673	4510528	0
3A-12	Fire Island Villages	NPS land (west of Robbins Rest)	655101	4500662	0
4A-12	Fire Island Wilderness	Wilderness (section 8)	677924	4510219	0
4B-12	Fire Island Wilderness	Wilderness (section 8)	678004	4510251	2
5A-12	Fire Island Wilderness	Wilderness (section 7)	677363	4509948	2
6A-12	Fire Island Wilderness	Wilderness (section 9)	678565	4510462	1
7A-12	Fire Island Wilderness	Wilderness (section 9)	678343	4510393	2
8A-12	Fire Island Wilderness	Wilderness (section 7)	677303	4509910	0
8B-12	Fire Island Wilderness	Wilderness (section 7)	676823	4509707	0
9A-12	Fire Island Wilderness	Wilderness (section 6)	676148	4509358	2
10A-12	Fire Island Villages	Point O'Woods	658034	4501545	0
10B-12	Fire Island Villages	Point O'Woods	658104	4501519	1
11A-12	Fire Island Wilderness	Wilderness (section 4)	673987	4508301	3

2. Seabeach amaranth individuals

LICWS Site Name	Date	UTMs (x)	UTMs (y)	# of plants	max size (cm)	Evidence of Browsing (dates/none)	Reproduction (date/s)
Fire Island Pines	8/4/2012	667868	4505129	1	11		
Fire Island Pines	8/23/2012	667373	4504900	1	15	9/19	8/23, 9/19
Fire Island Pines	8/1/2012	664723	4503799	1	10.5		
Fire Island Pines	8/1/2012	665490	4504131	1	7.5		8/26
Fire Island Pines	8/26/2012	665876	4504253	1	18.5	8/26	8/26
Fire Island Sunken Forest	8/1/2012	660733	4502392	1	14	9/20	8/31, 9/20
Fire Island Sunken Forest	8/31/2012	660508	4502285	1	15	8/31	8/31
Fire Island Villages	8/20/2012	NR	NR	1	6.0		
Fire Island Villages	8/7/2012	658080	4501527	1	36	8/7, 8/26	8/26, 9/20
Fire Island Villages	8/7/2012	658156	4501542	1	21.5	8/26, 9/20	8/26, 9/20
Fire Island Villages	8/7/2012	658369	4501649	1	17.5	8/26	8/26, 9/20
Fire Island Villages	8/7/2012	658659	4501710	1	21		
Fire Island Villages	8/7/2012	658872	4501786	1	14.5	8/7	8/26, 9/20
Fire Island Villages	8/16/2012	658497	4501684	1	NR		
Fire Island Villages	8/3/2012	655082	4500634	1	5	9/20	9/20
Fire Island Villages	8/3/2012	655085	4500633	1	18	8/3	9/20
Fire Island Villages	8/7/2012	652870	4499926	1	NR		9/10
Fire Island Wilderness	8/2/2012	679607	4510934	1	38.5	8/22	8/22
Fire Island Wilderness	8/2/2012	675489	4509016	1	15		
Fire Island Wilderness	8/2/2012	675694	4509170	1	36	8/22	8/2
Fire Island Wilderness	8/2/2012	676794	4509681	1	20.5		8/2
Fire Island Wilderness	8/2/2012	671039	4506766	1	29		8/2
Fire Island Wilderness	8/2/2012	671270	4506868	1	27		8/2
Fire Island Wilderness	8/2/2012	672881	4507789	1	12.5		
Fire Island Wilderness	8/28/2012	672996	4507787	1	8.5		
Fire Island Wilderness	8/2/2012	674160	4508428	1	7		8/2

3. Seabeach knotweed individuals

LICWS Site Name	Date	UTMs (x)	UTMs (y)	# of plants
Fire Island Lighthouse	7/31/2012	650194	4499066	1
Fire Island Villages	8/3/2012	652266	4499710	1
Fire Island Villages	8/3/2012	654918	4500574	1
Fire Island Villages	8/3/2012	655098	4500637	1
Fire Island Villages	8/3/2012	655359	4500722	2
Fire Island Villages	8/7/2012	658120	4501556	1
Fire Island Villages	8/7/2012	658130	4501561	1
Fire Island Villages	8/7/2012	658142	4501558	1
Fire Island Villages	8/7/2012	658170	4501562	1
Fire Island Sunken Forest	8/1/2012	659363	4501959	1
Fire Island Sunken Forest	8/1/2012	659641	4502045	1
Fire Island Sunken Forest	8/1/2012	660194	4502200	1
Fire Island Sunken Forest	8/1/2012	660596	4502322	1
Fire Island Pines	8/1/2012	665960	4504316	1
Fire Island Pines	8/4/2012	666068	4504354	1
Fire Island Pines	8/4/2012	667284	4504836	1
Fire Island Pines	8/4/2012	668116	4505265	3
Fire Island Pines	8/4/2012	668116	4505269	3
Fire Island Pines	8/4/2012	668123	4505272	4
Fire Island Wilderness	8/10/2012	668755	4505593	1
Fire Island Wilderness	8/8/2012	669478	4505966	1
Fire Island Wilderness	8/2/2012	670902	4506678	1
Fire Island Wilderness	8/2/2012	671000	4506737	1
Fire Island Wilderness	8/2/2012	671043	4506771	1
Fire Island Wilderness	8/2/2012	671053	4506778	1
Fire Island Wilderness	8/2/2012	671080	4506772	1
Fire Island Wilderness	8/2/2012	671081	4506781	1
Fire Island Wilderness	8/2/2012	671078	4506784	1
Fire Island Wilderness	8/2/2012	671087	4506771	1
Fire Island Wilderness	8/2/2012	671190	4506836	1
Fire Island Wilderness	8/2/2012	671262	4506861	1
Fire Island Wilderness	8/2/2012	671263	4506889	1
Fire Island Wilderness	8/2/2012	671262	4506909	2
Fire Island Wilderness	8/2/2012	671313	4506951	1
Fire Island Wilderness	8/2/2012	672350	4507477	1
Fire Island Wilderness	8/2/2012	672670	4507633	1
Fire Island Wilderness	8/2/2012	672751	4507688	1
Fire Island Wilderness	8/2/2012	672898	4507751	1
Fire Island Wilderness	8/2/2012	675696	4509161	1
Fire Island Wilderness	8/2/2012	675700	4509174	1
Fire Island Wilderness	8/2/2012	677795	4509561	1