

Fire Island National Seashore

**THREATENED & ENDANGERED SPECIES
MONITORING PROGRAM
2015 SUMMARY**



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THREATENED & ENDANGERED SPECIES MONITORING PROGRAM 2015 SUMMARY

1. ABSTRACT

Fire Island National Seashore (FIIS) is a National Park Service 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 2015. Through daily monitoring and a collaborative park effort, a total of 3 piping plover (*Charadrius melodus*) nesting pairs were recorded within the park. With a total of 5 successful piping plover fledglings, nesting productivity reached an average of 1.67 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. Distance point count and callback surveys for secretive marsh birds were conducted utilizing Saltmarsh Habitat & Avian Research Program (SHARP) protocols. In addition, a bald eagle nest was discovered at the William Floyd Estate this year and was monitored; one eagle chick hatched and successfully fledged. FIIS continued to survey for certain T&E plant species as well in 2015. 107 seabeach amaranth (*Amaranthus pumilus*) and 28 seabeach knotweed (*Polygonum glaucum*) plants were documented throughout FIIS. Lastly, 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. R

Some information on piping plover nests used in FIIS records was also obtained through contact with researchers from the Virginia Polytechnic Institute and State University (Virginia Tech), who have been conducting research on piping plovers since the summer of 2013. Their study (from 2013-2015) is titled, "*The Response of Piping Plovers and their Invertebrate Prey to Habitats Created by Hurricane Sandy*" and their final reports can be found on NPS IRMA (in the References section). Most of their work in 2015 at FIIS was focused on areas around the breach, and in the OPWA East.

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 2015 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 2015, 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.

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. In past seasons, wire exclosures were erected and placed around the plover nest site in order to protect nests from avian and mammalian predators. However, in 2015 no nests were exclosed due to a high rate of nest abandonment observed in the 2014 season along with evidence that exclosures may contribute to adult piping plover mortality (Neuman et. al, 2004). This decision was made by the FIIS Wildlife Biologist based on observations from the researchers at Virginia Tech and based on recommendations from USFWS Biologist, Steve Papa.

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. This effort helps ensure 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 (VT) researchers conducting a multi-year study on piping plovers. For the purposes of their own research, the VT group banded each adult and chick in OPWA East 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 2015 season in June, once June 1-15, and once June 15-June 30. 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. MARSHBIRD MONITORING

Distance survey point counts and call back surveys for secretive marsh birds were conducted three times during the 2015 season: Survey 1 (May 1- May 31), Survey 2 (June 1 – June 25), and Survey 3 (June 26 – July 15). Three tidal marsh locations located at Watch Hill and OPWA were accessed by kayak and foot for surveys (Map 2 in Appendix). Surveys consisted of a 5-minute passive period point count noting all birds seen or heard utilizing the habitat. This was followed by a broadcast period where a series of seven secretive marsh bird calls were broadcast into the marsh. Each 30-second broadcast was followed by a 30-second window of silence to allow for observations of answering vocalizations. Surveys have been conducted since 2011 utilizing Saltmarsh Habitat & Avian Research Program (SHARP) protocols, which can be accessed on the network drive and at: <http://www.tidalmarshbirds.org/>

5d. 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 the 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. This year the survey windows were as follows: Survey window 1: 7/13 – 7/27, Survey window 2: 8/3 – 8/17, Survey window 3: 8/20 – 8/31. 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. Due to the increased rarity of amaranth plants and the browsing data from previous years, new protocol dictates all individual plants are to be exclosed to prevent herbivory until population growth makes this unfeasible. Other data collected include location, plant condition, evidence of browsing as well as percent browsed, maximum lateral spread, 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.

5e. BALD EAGLE MONITORING

On March 22nd a bald eagle nest was found by Mary Laura Lamont (NPS) at the William Floyd Estate, located on the edge of the estate near Home Creek Inlet (18T 684364, 4515556). This same tree had been used in previous years by nesting American Ospreys. The pair consisted of one adult and one sub-adult (lacking white head plumage). A buffer zone of 1380 m was placed around the nesting site and a small portion of the lower acreage was closed to prevent the public from disturbing the eagles. FIIS staff began consistently monitoring the nest on May 20th. Observations were taken via a spotting scope from across Home Creek Inlet at Osprey Park, where information such as nest attendance and feeding were recorded over the duration of 60 minutes.

6. RESULTS

6a. PIPING PLOVERS (*Charadrius melodus*)

Monitoring for the 2015 piping plover breeding season on Fire Island began when the first piping plovers were observed in early April and continued through the end of July. In the months between May and June, piping plover nests were discovered and documented throughout FIIS.

A total of 3 nesting pairs were documented, from which there came 5 nesting attempts throughout FIIS. Two nests hatched and five total fledglings were successfully produced. The other five nest attempts were lost due to predation or for unidentified reasons (Table 3).

A total of 19 eggs were laid and of these 6 total eggs hatched, with the remainder failing as a result of predation or other circumstances (Figure 2). Five chicks went on to fledge, yielding a productivity of 1.7 for 3 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

There was no evidence of plover nest activity on Fire Island west of the Otis Pike Fire Island High Dune Wilderness (OPWA).

The OPWA yielded 3 plover pairs and 5 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 was 1 nesting pair in OPWA West (3A). In the OPWA East there were 2 nesting pairs (1A, 1B, 2A, 2B). Below is a summary of each attempt:

Nest **1A-15**, located in section 8 of OPWA-East, was discovered with one egg on April 26th by VA Tech observers. On May 5th four eggs were observed in the nest. On May 28th VA Tech observed signs of hatching (i.e., pipping). On May 29th no chicks or eggs were present and VA Tech confirmed predation by red fox. Pair 1 was observed performing mating behaviors (i.e., scraping) together near the old nest site on the same day.

Nest **1B-15**, located in section 8 of OPWA-East ~50 meters east of the site of nest 1A-15, was discovered with one egg on June 7th by VA Tech observers. On June 12th three eggs were observed and no more observed afterwards. On July 5th two of the chicks had hatched and were banded by VA Tech. The third egg showed no signs of hatching. Two chicks were observed and stayed in the area until they successfully fledged.

Nest **2A-15**, was discovered on April 30th in section 9 of OPWA-East inland behind the primary dunes with four eggs in the nest. On May 14th VA Tech observed evidence of predation by red fox (i.e., urine and tracks).

Nest **2B-15**, was discovered on May 25th in section 9 of OPWA-West ~50 meters south of nest 2A-15 with three eggs in it. On May 26th four eggs were observed. On June 20th three chicks were observed and banded by VA researchers, and on June 21st the fourth chick had hatched and was banded. Four chicks were observed until June 6th when only three were observed from then on. The three chicks went on to fledge successfully.

Nest **3A-15** was discovered on June 16th with two eggs in section 3 of OPWA-West. On June 18th four eggs were observed. On July 10th no eggs were observed and only deer tracks were seen around the nest.

6b. COLONIAL WATERBIRDS (*Sterna* spp)

Long Island Colonial Waterbird Surveys were conducted on Fire Island and its surrounding 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). Despite various circumstances such as weather events, motorboat activity and remoteness of location almost all survey sites were visited during both survey windows. Sexton Island, East Fire Island and West Fire Island were only surveyed during the second window.

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 or BLSK colonies were observed in the survey area for 2015. Annual population surveys for LETE, COTE, and ROST species resulted in total maximum counts (the greatest number counted during a survey period for each site) of 0, 778, and 0 respectively. COTE and ROST populations are comparable to that of recent years, while LETE populations have been declining. Since 2012 nesting least tern populations have decreased from 101 to 16 individuals in 2012 and 2013 respectively, and none have been observed in the last two years.

For the first time since 2011 a single pair of COTE was present on Sexton Island. While Sexton Island previously sustained colonies (140 and 80 in 2010 and 2011, respectively), it has served as nesting habitat for the species since 2011. Unfortunately Sexton Island was one of three sites not surveyed during the first survey window. During the second survey window the COTE pair displayed territorial behavior towards GBBG and HEGU. Both HEGU and COTE have not colonized Sexton Island since 2011; however sightings of both species this year could indicate new attempts to recolonize the area.

6c. MARSHBIRDS

A total of 242 calls were heard throughout the three different SHARP marsh bird point count and callback survey sites on May 27th, June 25th, and July 8th. Of the total calls 174 or (72%) were recorded during the five minute point count period. During the callback period none of the species whose calls were broadcast were noted as answering the calls; however 64 calls were documented.

In total, 22 individual species were identified during the survey and one additional unknown species. Survey site point 4 appeared to have the greatest frequency of calls with 14 different species accounting for 150 calls. Survey site point 1 had similar numbers, in terms of species richness (14 different species); however, there were only 52 recorded calls. Point 7 only accounted for 40 calls by 12 species however no data was logged for that site on June 25th. There was no significant difference in species richness or total calls between the three survey dates when the absence of data is taken into account.

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

A total of 107 seabeach amaranth plants were found in several sweep counts on FIIS throughout July, August and September during 3 survey windows (Seabeach amaranth individuals table in appendix C). 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 (1 plant), Fire Island Villages (0 plants), Fire Island Sunken Forest (14 plants), Fire Island Pines (54 plants), and the Fire Island Wilderness (39 plants).

An enclosure was constructed around 86 out of 107 plants (80%) to protect them from browsing by white-tailed deer (*Odocoileus virginianus*). Fifty-seven plants (53%) already showed signs of herbivory before being exclosed. During subsequent surveys only 16% of individuals experienced an increase in browsing while 18% revealed browsing but to a lesser degree than previously noted. A range of plant sizes were observed; the largest plant was 36.5 cm in diameter at the widest point and the smallest plant

was 0.5 cm. The average plant size for all 107 plants was 5.25 cm. Seventy-nine out of 107 plants showed signs of reproduction (74% 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 28 knotweed plants were counted and marked throughout FIIS (Appendix C). Sites found with knotweed include Fire Island Lighthouse (0 plants), Fire Island Villages (0 plants), Fire Island Sunken Forest (3 plants), Fire Island Pines (10 plants) and Fire Island Wilderness (15 plants). Both federal and non-federal tracts of land were surveyed in 2015. All plants were reproductive (i.e., flowering).

6e. BALD EAGLES

The bald eagle nest was monitored a total of 10 times over 42 days, from May 20th through July 1st. Hatching of the eagle chick occurred during the week of April 27th, although it was confirmed as hatched on May 5th. Average nest attendance by at least one parent was 18 minutes for an average observation time of 51 minutes. Food was observed being brought to the nest a total of two times; both times the item was a small mammal. The bald eagle chick was successfully fledged by July 1st. All recorded data related to the bald eagle nest/pair can be accessed on the network drive, under 'T&Especies2015'.

7. DISCUSSION

7a. DISTURBANCE ISSUES IN 2015

7ai. ANTHROPOGENIC DISTURBANCES

There were several anthropogenic and natural disturbances to T&E species in 2015. 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.

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 because plovers did not nest west of Watch Hill in 2015.

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.

FIIS staff has also noted an increase in spring/summer non-NPS beach driving in OPWA-East (when the beach is closed), ever since Hurricane Sandy. This has been directly observed or later through observations (tracks). This section of beach is clearly marked as closed to driving from March 15 through Labor Day, except for in an emergency situation. Further warnings and postage may be warranted in future years.

7a. 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. Evidence and sightings of red fox were 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 showed evidence of being predated by red fox before the eggs hatched (1A-15 and 2A-15) and tracks were observed near most other nests. No other predator was as prevalent as red fox on Fire Island in 2015.

In 2015 no nests were exclosed due to evidence that exclosures may contribute to adult piping plover mortality (Neuman et. al, 2004) and a high rate of nest abandonment observed in 2014. This decision was based on observations from FIIS staff, researchers at Virginia Tech and also from recommendations from USFWS Biologist, Steve Papa. Two piping plover nests were predated, but no piping plover nests were abandoned in 2015.

Significant browsing of seabeach amaranth individuals has been observed in past seasons, which led to the decision to exclose almost all plants in 2015. Some instances of slight browsing were observed after the exclosing of plants but this was likely due to foraging by insects and other small animals. 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. Virginia Tech has been funded through the Fire Island to Moriches Inlet (FIMI) interim project to research red foxes and their impacts on listed species (piping plovers) on Fire Island, from Democrat Point through Smith Point County Park. Their study is titled, “*Red Fox (Vulpes vulpes) Movements, Habitat Selection, and Demography, on Fire Island, New York*”. It began in the summer of 2015 and will continue through the summer/fall of 2017. Information on the project can be accessed at:

<http://vtshorebirds.fishwild.vt.edu/projects.html> and
<https://irma.nps.gov/rprs/Permit/Profile/42421>

- One nest showed evidence of possible predation by white-tailed deer (nest 3A-15). This is an unconventional notion; however there are documented instances of white-tailed deer predating songbirds and songbird chicks so this should be noted and taken into consideration (Pietz and Granfors, 2000).
- 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. In 2014 as soon as an amaranth individual was found RM staff exclosed it to protect it from browsing. RM staff continued this practice in 2015. It's recommended to continue this 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, which could possibly alleviate browsing pressure on this federally threatened plant.
- 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.
- All of this information will be used in an updated Threatened and Endangered Species Management Plan (EA). The previous EA is from 1998 and park management agrees that it needs to be updated. The Superintendent has approved the Wildlife Biologist to begin this process, which will begin sometime in the fall of FY17. In the interim 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. In addition, trend data (previously described) will also better inform the new EA.
- Bats have been experiencing precipitous declines during the past several years. White-Nose Syndrome (WNS) is an emerging disease that has killed more than 6 million bats since its discovery in 2007, reducing regional populations of some bat species by more than 90 percent. The northern long-eared bat (*Myotis septentrionalis*) was listed as federally threatened by the USFWS in April 2015. FIIS has worked with researchers on bat research/monitoring (Michael Fishmann in 2014, SUNY-ESF in 2015) and has detected a significant number of northern long-eared bats at the William Floyd Estate. The Wildlife Biologist suggests continued research but also incorporating bats – especially the northern long-eared bat – into the T&ES Monitoring Program effort and developing a long-term monitoring plan for this species.

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

<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
2015	3	5	2	6	2.0	5	1.0	1.7
Average	10.5	12.7	6.2	32.4	2.2	14.1	1.2	1.3

Table 1: Historic Productivity of Piping Plovers on FIIS

¹Data from previous nesting seasons are incomplete

Nest	Area	Status	Exclosed? (Yes/No)	# of eggs laid	Actual hatch date	# of eggs hatched	# of chicks fledged
1A	Wilderness East (section 8)	Failed - Predated	No	4	N/A	0	0
1B	Wilderness East (section 8)	FLEDGED	No	3	7/6	2	2
2A	Wilderness East (section 9)	Failed - Predated	No	4	N/A	0	0
2B	Wilderness East (section 9)	FLEDGED	No	4	6/20	4	3
3A	Wilderness West (section 3)	Failed - Predated	No	4	N/A	0	0
Totals				19		6	5
Productivity (chicks fledged per pair)= 1.7							
*Otis Pike Wilderness Area. Nest designated West/East depending on its location from the Old Inlet area							

Table 2: FIIS 2015 Overall Piping Plover productivity

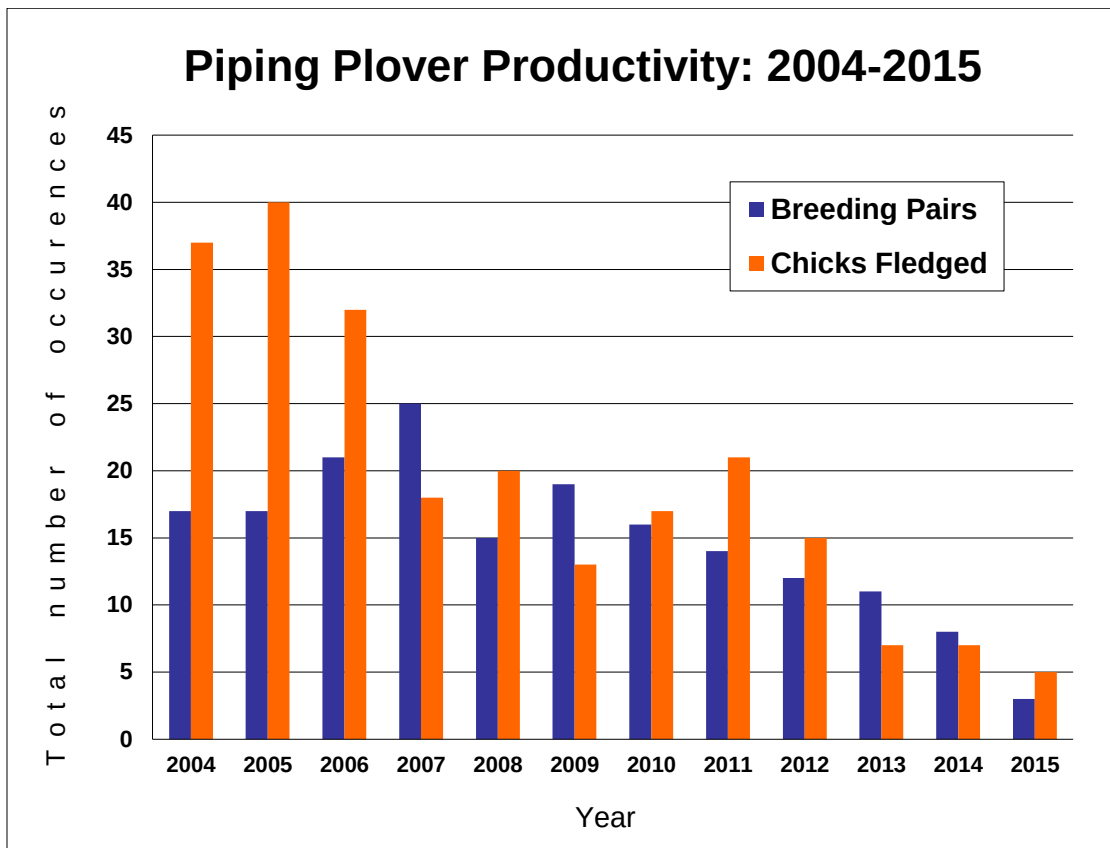


Figure 1: The number of Piping Plover breeding pairs and the number of chicks fledged at FIIS, 2003-2015

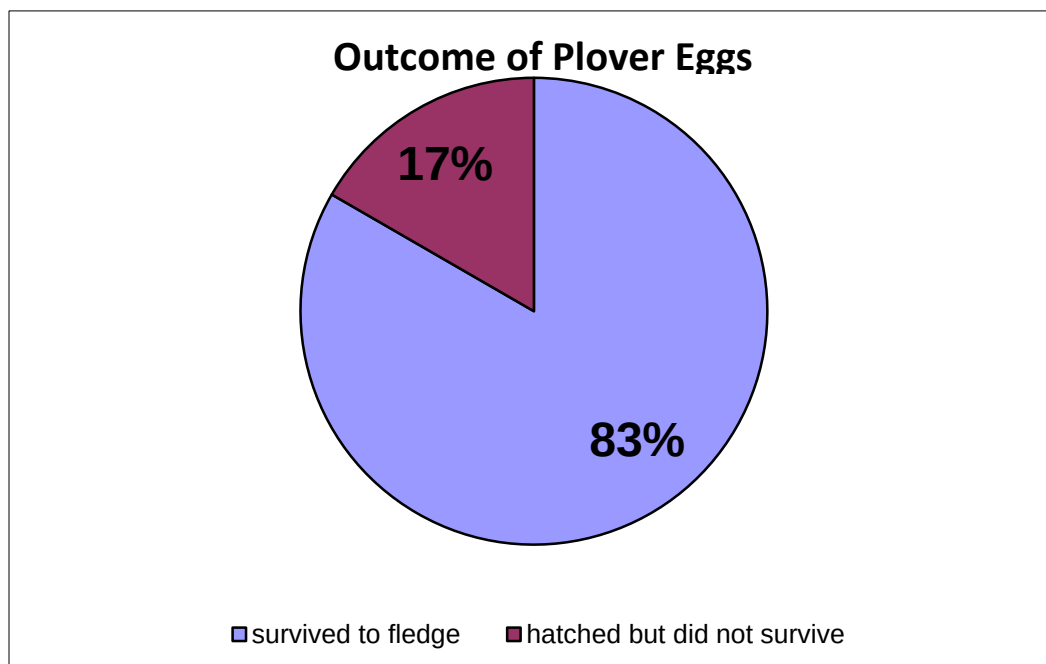


Figure 2: Pie graph displaying the outcome of all laid Piping Plover eggs at FIIS in 2015 (total = 19).

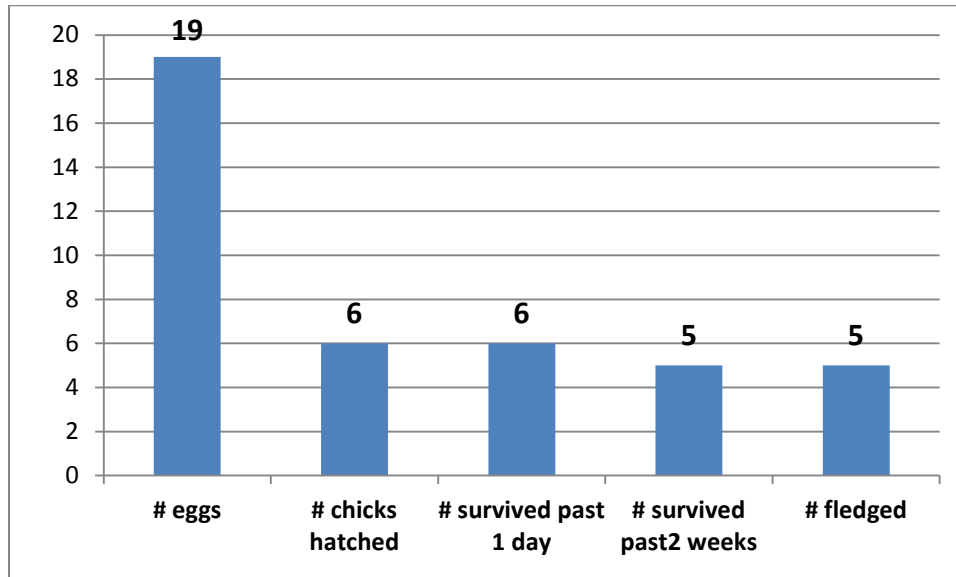


Figure 3: Bar graph of brood outcome for 2015 Piping Plovers at FIIS

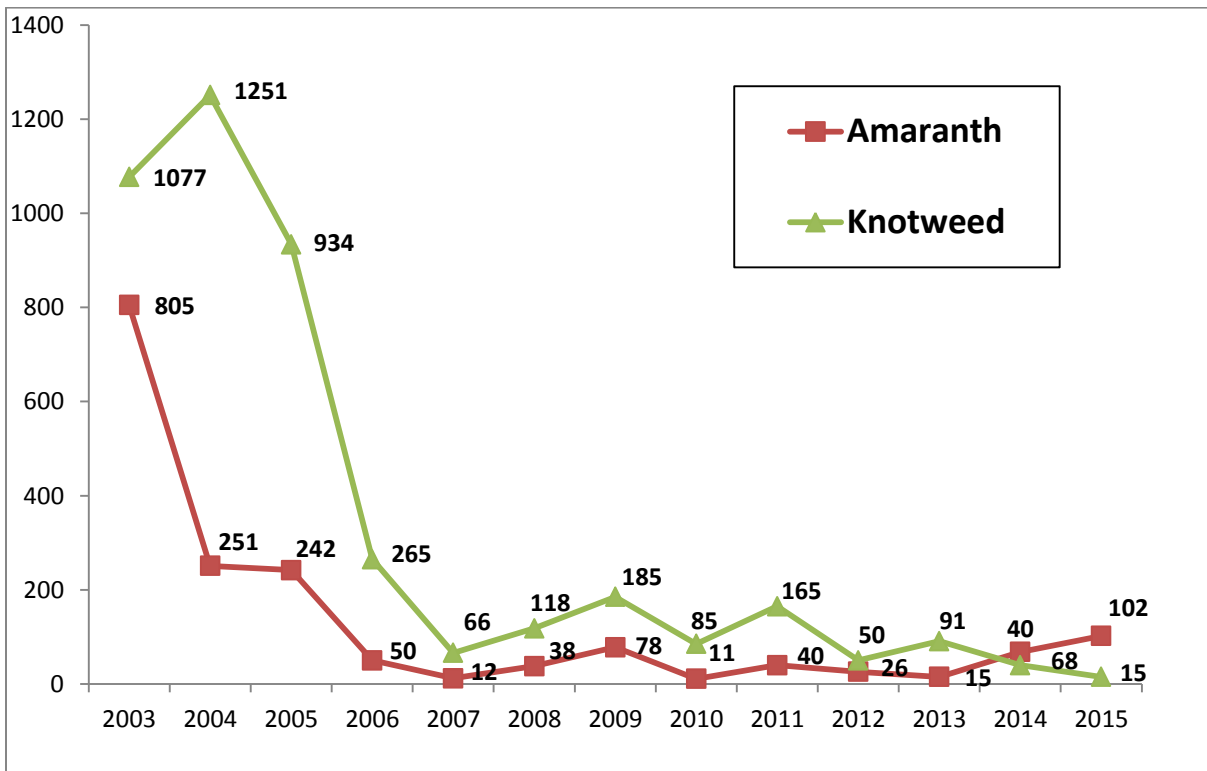


Figure 4: Chart displaying historical values for Seabeach Amaranth & Seabeach Knotweed on FIIS (2003-2015). The y-axis is the total number of plants counted that year.

Survey Window	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd		
Site / Species	COTE		LETE		AMOY		WILL		OSPR		GREG		GLIB		DCCO		GBBG		HEGU	
Sexton Island	-	2																		
East Fire Island	-	148																		
Long Cove	240	250																		
Ridge Island	400	380																		
Pelican Island					2				1											
John Boyle Island					3															
Inactive Sites: Fire Island Pines, Lighthouse, Fire Island Villages, Hospital Island, Sailors Haven (Sunken Forest), West Fire Island, OPWA*. Watch Hill Bay, Islip Spoil Island																				

Table 3: Long Island Colonial Waterbird Surveys for Terns and Black Skimmers the 2015 season at FIIS. Sites are listed from west to east, starting with the bay islands and finishing on Fire Island. *Species codes: COTE = Common Tern*, *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*, *HEGU = Herring Gull*, *GULL = unknown gull (either GBBG or HEGU) (* = Davis Park included in Wilderness survey)*

Nest	Latitude	Longitude	Date found	Other ID	Date init	Float	Eggs found	Eggs complete	Date Complete	Est hatch	Term date	Fate	Caged ?	Female	Male	Chick1	Chick2	Chick3	Chick4	Chick1 fate	Chick2 fate	Chick3 fate	Chick4 fate
PIPL01	40.72473	-72.891199	4/26/15	1A	4/26/15	0	1	4	5/4/15	5/30/15	5/29/15	Predated (fox)	N	GF(6UP)	GF(4EE)	-	-	-	-	-	-	-	-
PIPL03	40.727948	-72.884926	4/30/15	2A	4/24/15	3	4	4	4/30/15	5/26/15	5/15/15	Predated (fox)	N	GF(97)	GF(06)	-	-	-	-	-	-	-	-
PIPL16	40.726308	-72.884648	5/23/15	2B	5/21/15	0	2	4	5/29/15	6/24/15	6/20/15	Hatched	N	GF(97)	GF(06)	GF(23Y)	GF(862)	GF(PP4)	GF(273)	DIED	FLEDGED	FLEDGED	FLEDGED
PIPL25	40.72529	-72.889823	6/8/15	1B	6/7/15	0	1	3	6/11/15	7/7/15	7/5/15	Hatched	N	GF(6UP)	GF(4EE)	GF(LAE)	GF(19K)	-	-	FLEDGED	FLEDGED	-	-

Table 4: Piping Plover Banding Information for 2015 from Virginia Tech Study. GF = Green Flag, Y = Yellow. Please refer to Virginia Tech's Annual Report 2015 for more information (reference is in Works Cited section).

Survey Date	Alpha Code	Distance Band	Total Count	Min 1	Min 2	Min 3	Min 4	Min 5	BLRA	LEBI	SORA	VIRA	KIRA	CLRA	COMO	Outside
5/27/2015	BARS	0-50m	2	1	0	0	0	0	0	0	0	1	0	0	0	0
5/27/2015	GREG	50-100m	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	YWAR	50-100m	1	0	1	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	RWBB	>100m	2	0	0	2	0	0	0	0	0	0	0	0	0	0
5/27/2015	YWAR	>100m	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5/27/2015	SMSP	50-100m	4	0	0	0	1	0	0	0	3	0	0	0	0	0
5/27/2015	HERG	>100m	1	0	0	0	0	1	0	0	0	0	0	0	0	0
5/27/2015	BARS	50-100m	4	0	0	0	0	0	0	0	0	4	0	0	0	0
5/27/2015	WILL	50-100m	2	0	0	0	0	0	0	0	0	0	0	0	2	0
5/27/2015	COTE	50-100m	1	0	0	0	0	0	0	0	0	0	0	0	0	1
6/25/2015	SESP	50-100m	3	2	0	0	0	0	0	1	0	0	0	0	0	0
6/25/2015	WILL	50-100m	1	0	1	0	0	0	0	0	0	0	0	0	0	0
6/25/2015	GREG	>100m	1	0	0	0	0	1	0	0	0	0	0	0	0	0
6/25/2015	SESP	0-50m	2	0	0	0	0	0	2	0	0	0	0	0	0	0
6/25/2015	BASW	0-50m	1	0	0	0	0	0	0	0	0	0	1	0	0	0
6/25/2015	MALL	>100m	3	0	0	0	0	0	0	0	0	0	0	3	0	0
7/8/2015	TRSW	0-50m	3	3	0	0	0	0	0	0	0	0	0	0	0	0
7/8/2015	RWBB	>100m	2	0	0	2	0	0	0	0	0	0	0	0	0	0
7/8/2015	TRSW	>100m	5	0	0	0	0	5	0	0	0	0	0	0	0	0
7/8/2015	SMSP	50-100m	2	0	0	0	0	0	0	2	0	0	0	0	0	0
7/8/2015	YTWA	>100m	1	0	0	0	0	0	0	1	0	0	0	0	0	0
7/8/2015	SMSP	>100m	1	0	0	0	0	0	0	1	0	0	0	0	0	0
7/8/2015	BASW	50-100m	2	0	0	0	0	0	0	0	2	0	0	0	0	0
7/8/2015	GREG	>100m	2	0	0	0	0	0	0	0	1	1	0	0	0	0
7/8/2015	AMCR	50-100m	2	0	0	0	0	0	0	0	0	2	0	0	0	0
7/8/2015	SESP	0-50m	1	0	0	0	0	0	0	0	0	0	1	0	0	0
7/8/2015	GREG	50-100m	1	0	0	0	0	0	0	0	0	0	0	1	0	0

Table 5a: SHARP Marsh Bird Point Count and Callback Survey for 2015 for Survey Site Point 1.

Survey Date	Alpha Code	Distance Band	Total Count	Min 1	Min 2	Min 3	Min 4	Min 5	BLRA	LEBI	SORA	VIRA	KIRA	CLRA	COMO	Outside
5/27/2015	COTE	0-50m	2	2	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	COTE	50-100m	22	22	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	SESP	0-50m	2	0	2	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	GREG	0-50m	2	0	0	2	0	0	0	0	0	0	0	0	0	0
5/27/2015	WILL	0-50m	3	0	0	0	1	0	0	0	0	0	0	0	2	0
5/27/2015	HERG	50-100m	3	0	0	0	0	0	0	0	0	3	0	0	0	0
5/27/2015	SMSP	50-100m	3	0	0	0	0	0	0	0	0	0	3	0	0	0
5/27/2015	YTWA	>100m	1	0	0	0	0	0	0	0	0	0	0	1	0	0
5/27/2015	MUSW	50-100m	2	0	0	0	0	0	0	0	0	0	0	0	2	0
5/27/2015	SMSP	50-100m	1	0	0	0	0	0	0	0	0	0	0	0	0	1
6/25/2015	SESP	50-100m	1	1	0	0	0	0	0	0	0	0	0	0	0	0
6/25/2015	COTE	>100m	32	32	0	0	0	0	0	0	0	0	0	0	0	0
6/25/2015	RWBB	>100m	4	0	4	0	0	0	0	0	0	0	0	0	0	0
6/25/2015	WISN	50-100m	1	0	0	1	0	0	0	0	0	0	0	0	0	0
6/25/2015	GREG	50-100m	2	0	0	0	0	2	0	0	0	0	0	0	0	0
6/25/2015	LAGU	>100m	1	0	0	0	0	0	0	1	0	0	0	0	0	0
6/25/2015	SESP	>100m	2	0	0	0	0	0	0	2	0	0	0	0	0	0
6/25/2015	HEGU	>100m	2	0	0	0	0	0	0	0	0	0	2	0	0	0
6/25/2015	WILL	>100m	1	0	0	0	0	0	0	0	0	0	1	0	0	0
6/25/2015	SMSP	0-50m	1	0	0	0	0	0	0	0	0	0	0	1	0	0
7/8/2015	AMOY	0-50m	2	0	0	0	0	0	0	0	0	0	0	0	1	1
7/8/2015	GREG	>100m	2	2	0	0	0	0	0	0	0	0	0	0	0	0
7/8/2015	SESP	50-100m	4	0	4	0	0	0	0	0	0	0	0	0	0	0
7/8/2015	COTE	>100m	50	0	0	50	0	0	0	0	0	0	0	0	0	0
7/8/2015	SESP	50-100m	1	0	0	0	0	1	0	0	0	0	0	0	0	0
7/8/2015	GLIB	>100m	2	0	0	0	0	0	0	0	1	0	0	1	0	0
7/8/2015	SMSP	>100m	1	0	0	0	0	0	0	0	0	0	0	0	1	0

Table 5b: SHARP Marsh Bird Point Count and Callback Survey for 2015 for Survey Site Point 4.

Survey Date	Alpha Code	Distance Band	Total Count	Min 1	Min 2	Min 3	Min 4	Min 5	BLRA	LEBI	SORA	VIRA	KIRA	CLRA	COMO	Outside
5/27/2015	AMGP	50-100m	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5/27/2015	COTE	0-50m	2	2	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	WILL	0-50m	2	2	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	WILL	50-100m	2	2	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2015	RWBB	50-100m	5	0	3	0	0	0	2	0	0	0	0	0	0	0
5/27/2015	COTE	50-100m	2	0	0	2	0	0	0	0	0	0	0	0	0	0
5/27/2015	UNKN	50-100m	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5/27/2015	YWAR	50-100m	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5/27/2015	SESP	50-100m	1	0	0	0	0	1	0	0	0	0	0	0	0	0
5/27/2015	BARS	0-50m	2	0	0	0	0	0	0	0	2	0	0	0	0	0
5/27/2015	SMSP	0-50m	1	0	0	0	0	0	0	0	0	0	0	0	1	0
7/8/2015	SESP	50-100m	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7/8/2015	BASW	0-50m	2	0	2	0	0	0	0	0	0	0	0	0	0	0
7/8/2015	TRSW	>100m	8	0	0	8	0	0	0	0	0	0	0	0	0	0
7/8/2015	YTWA	50-100m	1	0	0	0	0	1	0	0	0	0	0	0	0	0
7/8/2015	RWBB	50-100m	2	0	0	0	0	0	2	0	0	0	0	0	0	0
7/8/2015	WILL	>100m	2	0	0	0	0	0	0	2	0	0	0	0	0	0
7/8/2015	EATO	>100m	2	0	0	0	0	0	0	0	0	2	0	0	0	0
7/8/2015	COTE	0-50m	2	0	0	0	0	0	0	0	0	0	0	0	2	0

Table 5c: SHARP Marsh Bird Point Count and Callback Survey for 2015 for Survey Site Point 7.

Appendix B: Maps

Map 1: Map of Fire Island National Seashore



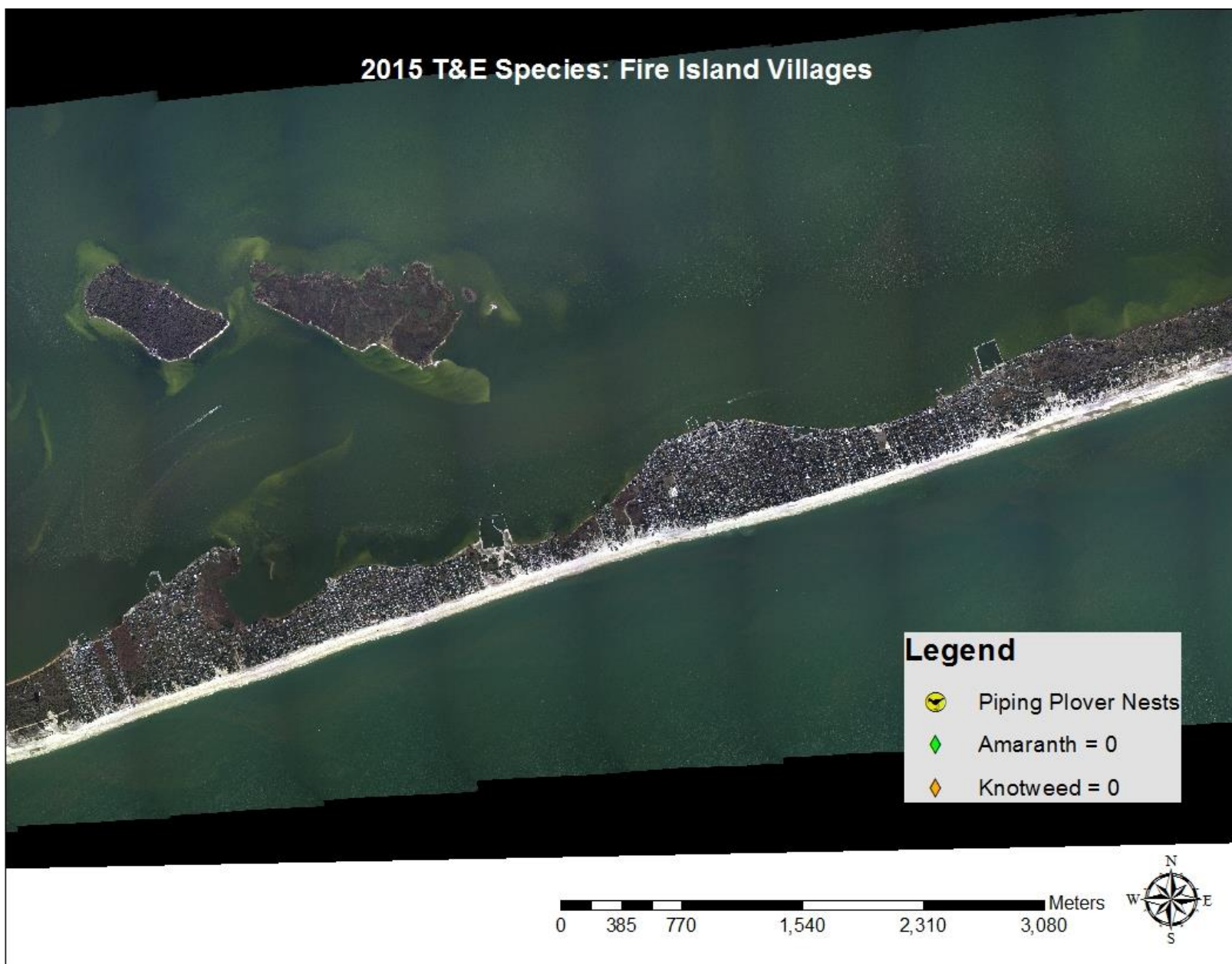
Map 2: Location of SHARP marsh bird and point count callback survey sites in 2015. All points are labeled with the hexagon location classification 56955 followed by the specific point (Point 1, Point 7, Point 4)



Map 3: Fire Island Lighthouse locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



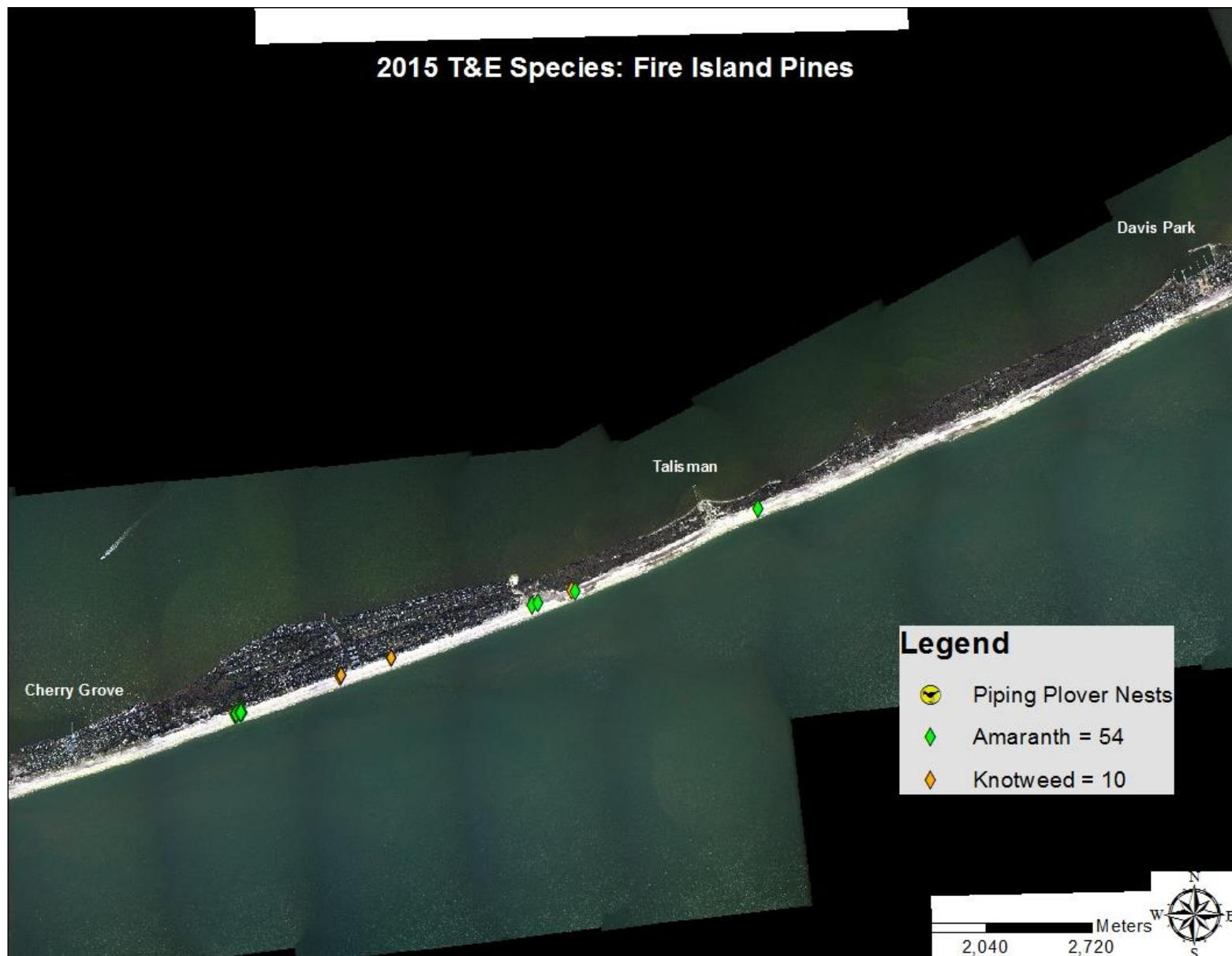
Map 4: Fire Island Villages locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



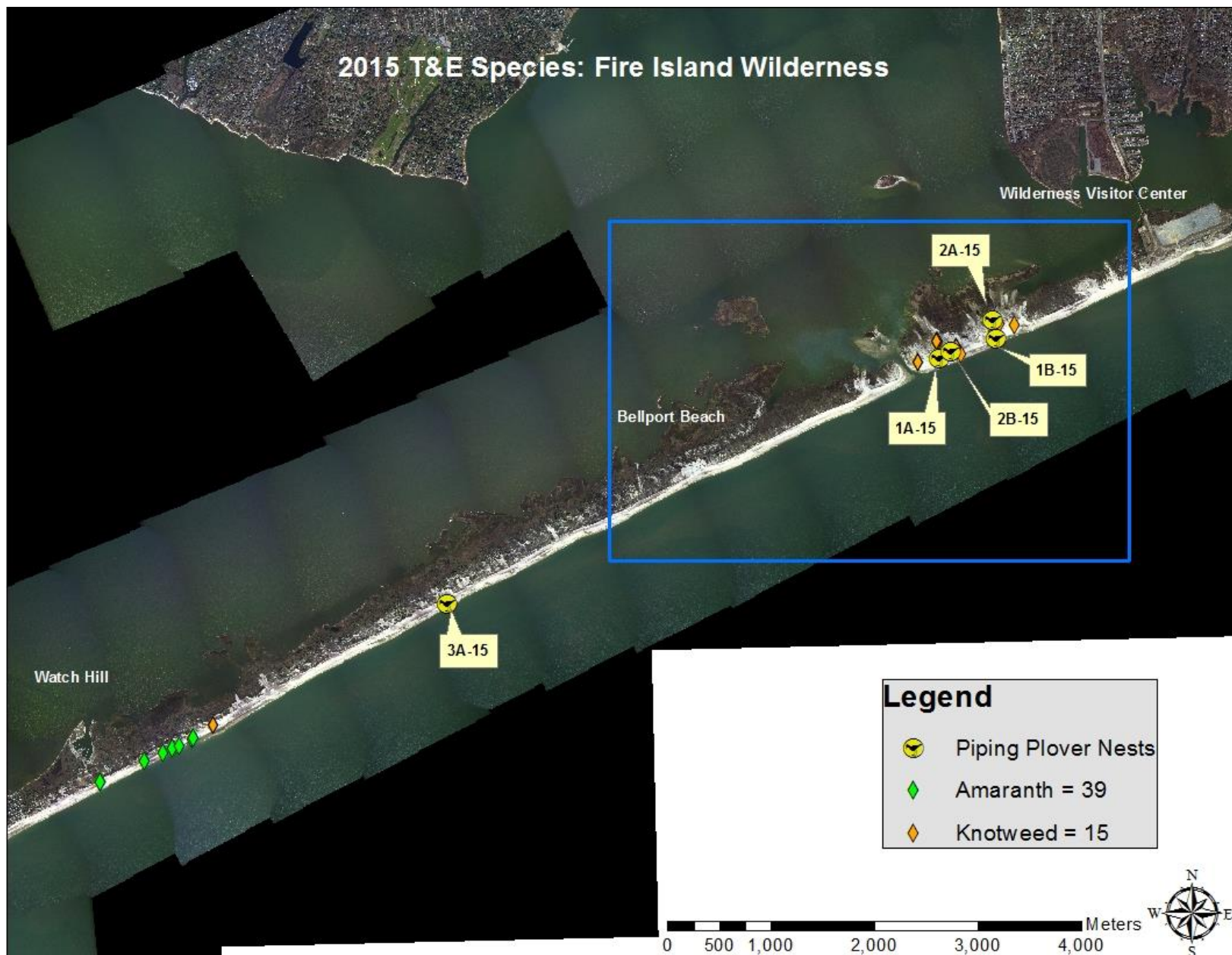
Map 5: Fire Island Sunken Forest locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



Map 6: Fire Island Pines locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



Map 7: Fire Island Wilderness locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



Map 8: Fire Island Wilderness (East of Old Inlet) locations of threatened and endangered species in 2015. Maps are organized by Long Island Colonial Waterbird Survey areas and include piping plover nests, seabeach amaranth and seabeach knotweed individuals for each area



Appendix C: GPS locations

Piping Plover Nests

Nest	Species	Site Name	Location Description	UTMx	UTMy	Exclosed?	HatchDate	Productivity
1A-15	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	678095	4510339	No	N/A	0
1B-15	Piping Plover	Fire Island Wilderness	Wilderness East (section 8)	678644	4510528	No	7/6/15	2
2A-15	Piping Plover	Fire Island Wilderness	Wilderness East (section 9)	678616	4510709	No	N/A	0
2B-15	Piping Plover	Fire Island Wilderness	Wilderness East (section 9)	678210	4510404	No	6/22/15	3
3A-15	Piping Plover	Fire Island Wilderness	Wilderness West (section 3)	673339	4507965	No	N/A	0

Seabeach amaranth individuals

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)
FISF-1	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	28	7/14-10% browsed; 8/3-25% browsed; 9/4-100% browsed	8/3-fruiting	9/4-dead	Y	659241	4501922
FISF-2	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	8.5		8/3-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	659312	4501939
FISF-3	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	36.5		8/3-flowering and fruiting; 9/4-fruiting and seeds; 10/12-flowering and fruiting		Y	659555	4502030
FISF-4	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	15		8/3-fruiting ; 9/4-fruiting ; 10-12-fruiting		Y	659461	4501987
FISF-5	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	9.5	8/3-25% browsed; 9/4-5% browsed	8/3-flowering and fruiting; 9/4-fruiting; 10/12-flowering and fruiting		Y	660267	4502228
FISF-6	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	10		8/3-flowering and fruiting; 9/4-fruiting; 10/12-flowering and fruiting		Y	660269	4502230
FISF-7	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	5.5	7/14-50% browsed; 8/3-25% browsed; 9/4-0% browsed	8/3-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	660269	4502230
FISF-8	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	7	9/4-5% browsed	8/3-fruiting; 9/4-flowering and fruiting	10/12-gone	Y	660272	4502229
FISF-9	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	1			8/3-gone	Y	660272	4502229
FISF-10	Fire Island Sunken Forest	Sailors Haven	7/14/2015	1	16	7/14-5% browsed; 8/3-10% browsed	8/3-fruiting; 9/4-flowering and fruiting; 10/12-fruiting		Y	660969	4502453
FISF-11	Fire Island Sunken Forest	Sailors Haven	8/3/2015	1	7		9/4-fruiting		Y	659234	4501920
FISF-12	Fire Island Sunken Forest	Sailors Haven	8/3/2015	1	18.5		8/3-flowering; 9/4-fruiting; 10/12-flowering		Y	659306	4501936
FISF-13	Fire Island Sunken Forest	Sailors Haven	8/3/2015	1	24		9/4-flowering and fruiting		Y	660333	4502256
FISF-14	Fire Island Sunken Forest	Sailors Haven	8/3/2015	1	35		9/4-flowering and fruiting		Y	660334	4502256
FIP-1	Fire Island Pines	Carrington Tract	7/20/2015	1	12.5	7/20-10% browsed		8/20-dead	Y	662518	4502943

FIP-2	Fire Island Pines	Carrington Tract	7/20/2015	1	5.5	7/20-5% browsed; 8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting and seeds; 10/12-flowering and fruiting		Y	662514	4502941
FIP-3	Fire Island Pines	Carrington Tract	7/20/2015	1	1			9/4-gone	Y	662514	4502941
FIP-4	Fire Island Pines	Carrington Tract	7/20/2015	1	1.5	8/20-25% browsed; 9/4-25% browsed	9/4-flowering		Y	662516	4502943
FIP-5	Fire Island Pines	Carrington Tract	7/20/2015	1	2			8/20-gone	Y	662518	4502945
FIP-6	Fire Island Pines	Carrington Tract	7/20/2015	1	3.5			8/20-gone	Y	662549	4502953
FIP-8	Fire Island Pines	Carrington Tract	7/20/2015	1	5.5	8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-fruiting; 10/12-flowering and fruiting		Y	662546	4502957
FIP-9	Fire Island Pines	Carrington Tract	7/20/2015	1	2.5	8/20-25% browsed; 9/4-25% browsed	8/20-fruiting; 9/4-flowering and fruiting		Y	662547	4502957
FIP-10	Fire Island Pines	Carrington Tract	7/20/2015	1	2.5	7/20-5% browsed; 9/4-25% browsed	8/20-fruiting; 9/4-flowering and fruiting		Y	662547	4502956
FIP-11	Fire Island Pines	Carrington Tract	7/20/2015	1	1.5	9/4-50% browsed	8/20-fruiting; 9/4-fruiting		Y	662547	4502956
FIP-12	Fire Island Pines	Carrington Tract	7/20/2015	1	1	8/20-50% browsed; 9/4-50% browsed	8/20-fruiting; 9/4-fruiting		Y	662547	4502955
FIP-13	Fire Island Pines	Carrington Tract	7/20/2015	1	1.5	8/20-50% browsed		9/4-gone	Y	662546	4502955
FIP-14	Fire Island Pines	Carrington Tract	7/20/2015	1	3	8/20-25% browsed; 9/4-5% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662545	4502955
FIP-15	Fire Island Pines	Carrington Tract	7/20/2015	1	2	8/20-25% browsed; 9/4-50% browsed	8/20-fruiting; 9/4-flowering and fruiting		Y	662545	4502955
FIP-16	Fire Island Pines	Carrington Tract	7/20/2015	1	3	8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting		Y	662545	4502955
FIP-17	Fire Island Pines	Carrington Tract	7/20/2015	1	1.5		8/20-flowering and fruiting; 9/4-fruiting		Y	662545	4502955
FIP-18	Fire Island Pines	Carrington Tract	7/20/2015	1	3	8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 10/12-flowering and fruiting	9/4-gone	Y	662546	4502955
FIP-19	Fire Island Pines	Carrington Tract	7/20/2015	1	2		8/20-flowering and fruiting; 9/4-flowering and fruiting		Y	662546	4502955
FIP-20	Fire Island Pines	Carrington Tract	7/20/2015	1	2.5	9/4-25% browsed	9/4-flowering and fruiting		Y	662546	4502955
FIP-21	Fire Island	Carrington	7/20/2015	1	1	8/20-50% browsed		9/4-gone	Y	662546	4502955

	Pines	Tract									
FIP-22	Fire Island Pines	Carrington Tract	7/20/2015	1	2		8/20-flowering and fruiting; 9/4-flowering and fruiting		Y	662545	4502955
FIP-23	Fire Island Pines	Carrington Tract	7/20/2015	1	1	8/20-75% browsed	9/4-flowering and fruiting		Y	662545	4502955
FIP-24	Fire Island Pines	Carrington Tract	7/20/2015	1	1		8/20-flowering and fruiting; 9/4-flowering and fruiting		Y	662545	4502954
FIP-25	Fire Island Pines	Carrington Tract	7/20/2015	1	1		8/20-flowering; 9/4-flowering and fruiting		Y	662545	4502954
FIP-26	Fire Island Pines	Carrington Tract	7/20/2015	1	1	8/20-25% browsed	9/4-flowering and fruiting		Y	662545	4502954
FIP-27	Fire Island Pines	Carrington Tract	7/20/2015	1	1	8/20-25% browsed	9/4-flowering and fruiting		Y	662546	4502954
FIP-28	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502954
FIP-29	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502954
FIP-30	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502955
FIP-31	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502955
FIP-32	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502955
FIP-33	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502958
FIP-34	Fire Island Pines	Carrington Tract	7/20/2015	1	1		9/4-flowering and fruiting		Y	662546	4502955
FIP-35	Fire Island Pines	Carrington Tract	7/20/2015	1	3	8/20-25% browsed	8/20-flowering and fruiting; 9/4-fruiting		Y	662546	4502955
FIP-36	Fire Island Pines	Carrington Tract	7/20/2015	1	4	8/20-25% browsed; 9/4-5% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting ; 10/12-flowering and fruiting		Y	662546	4502955
FIP-37	Fire Island Pines	Carrington Tract	7/20/2015	1	3	8/20-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662545	4502955
FIP-38	Fire Island Pines	Carrington Tract	7/20/2015	1	7		7/20-fruiting	8/20-gone	Y	662544	4502952
FIP-39	Fire Island Pines	Carrington Tract	7/20/2015	1	2	7/20-5% browsed; 8/20-25% browsed	8/20-flowering and fruiting; 10/12-flowering and fruiting	9/4-gone	Y	662546	4502956
FIP-40	Fire Island Pines	Carrington Tract	7/20/2015	1	8	7/20-30% browsed; 8/20-25% browsed;	8/20-flowering and fruiting; 9/4-flowering and		Y	662549	4502955

						9/4-25% browsed	fruiting; 10/12-flowering and fruiting				
FIP-41	Fire Island Pines	Carrington Tract	7/20/2015	1	15	7/20-5% browsed; 8/20-25% browsed; 9/4-5% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662547	4502955
FIP-42	Fire Island Pines	Carrington Tract	7/20/2015	1	6	7/20-5% browsed; 8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-fruiting; 10/12-flowering and fruiting		Y	662543	4502956
FIP-43	Fire Island Pines	Carrington Tract	7/20/2015	1	12	7/20-3% browsed; 8/20-25% browsed; 9/4-25% browsed	7/20-fruiting ; 8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662543	4502958
FIP-44	Fire Island Pines	Carrington Tract	7/20/2015	1	11	8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662551	4502955
FIP-45	Fire Island Pines	Carrington Tract	7/20/2015	1	13.5	7/20-50% browsed; 8/20-25% browsed; 9/4-50% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662552	4502957
FIP-46	Fire Island Pines	Carrington Tract	7/20/2015	1	7.5	8/20-25% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662552	4502952
FIP-47	Fire Island Pines	Carrington Tract	7/20/2015	1	13.5	7/20-50% browsed; 8/20-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	662555	4502957
FIP-48	Fire Island Pines	Carrington Tract	7/20/2015	1	3.5	8/20-25% browsed	7/20-fruiting; 8/20-fruiting; 9/4-flowering and fruiting; 10/12-fruiting		Y	662554	4502957
FIP-49	Fire Island Pines	Carrington Tract	7/20/2015	1	3.5	8/20-25% browsed	7/20-fruiting ; 8/20-fruiting; 9/4-flowering and fruiting; 10/12-fruiting		Y	662554	4502958
FIP-50	Fire Island Pines	Carrington Tract	7/20/2015	1	2		9/4-flowering		Y	662553	4502957
FIP-51	Fire Island Pines	Talisman	7/20/2015	1	2.5			8/20-gone	Y	664424	4503643
FIP-52	Fire Island Pines	Talisman	7/20/2015	1	3.5	7/20-5% browsed		8/20-gone	Y	664466	4503655
FIP-53	Fire Island Pines	Talisman	7/20/2015	1	5	8/20-25% browsed	9/4-flowering and fruiting		Y	664701	4503736
FIP-54	Fire Island Pines	Talisman	7/20/2015	1	5.5	8/20-75% browsed; 9/4-50% browsed	8/20-fruiting; 9/4-flowering and fruiting		Y	665876	4504265

FIP-55	Fire Island Pines	Talisman	7/20/2015	1	24	8/20-50% browsed; 9/4-25% browsed	8/20-flowering and fruiting; 9/4-flowering and fruiting; 10/12-flowering and fruiting		Y	665877	4504265
FIW-1	Fire Island Wilderness	Watch Hill	7/16/2015	1	4	8/6-75% browsed; 9/3-25% browsed	8/6-fruiting; 9/3-flowering and fruiting; 10/12-fruiting		Y	669984	4506240
FIW-2	Fire Island Wilderness	Watch Hill	7/16/2015	1	1	8/6-75% browsed			Y	669984	4506239
FIW-3	Fire Island Wilderness	Watch Hill	7/16/2015	1	1	8/6-75% browsed			Y	669983	4506238
FIW-4	Fire Island Wilderness	Watch Hill	7/16/2015	1	1.5	8/6-25% browsed			Y	669983	4506238
FIW-5	Fire Island Wilderness	Watch Hill	7/16/2015	1	1.5	8/6-100% browsed; 9/3-100% browsed			Y	669984	4506238
FIW-6	Fire Island Wilderness	Watch Hill	7/16/2015	1	8.5			8/6-gone	Y	669985	4506240
FIW-7	Fire Island Wilderness	Watch Hill	7/16/2015	1	4	8/6-50% browsed; 9/3-25% browsed	9/3-flowering and fruiting		Y	669986	4506237
FIW-8	Fire Island Wilderness	Watch Hill	7/16/2015	1	3.5				Y	670413	4506440
FIW-9	Fire Island Wilderness	Watch Hill	7/16/2015	1	4		8/6-flowering and fruiting; 9/3-flowering and fruiting		Y	670419	4506448
FIW-10	Fire Island Wilderness	Watch Hill	7/16/2015	1	2.5			8/6-gone	Y	670594	4506519
FIW-11	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3.5		8/6-fruiting	9/3-gone	Y	670688	4506565
FIW-12	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3.5		8/6-flowering and fruiting; 9/3-fruiting		Y	670688	4506566
FIW-13	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering and fruiting; 9/3-seeds		Y	670688	4506567
FIW-14	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3		8/6-flowering and fruiting; 9/3-seeds		Y	670689	4506567
FIW-15	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3.5	9/3-25% browsed	8/6-flowering and fruiting; 9/3-seeds; 10/12-flowering and fruiting		Y	670688	4506567
FIW-16	Fire Island Wilderness	Western Wilderness	7/16/2015	1	5			8/6-gone	Y	670747	4506590
FIW-17	Fire Island Wilderness	Western Wilderness	7/16/2015	1	17	7/16-10% browsed; 8/6-25% browsed; 9/3-25% browsed	8/6-flowering and fruiting; 9/3-fruiting; 10/12-flowering and fruiting		Y	670872	4506653
FIW-18	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering; 9/3-seeds; 10/12-flowering	9/3-dead	N	670884	4506673
FIW-19	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering; 9/3-seeds; 10/12-flowering	9/3-dead	N	670884	4506673
FIW-20	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering and fruiting; 9/3-seeds; 10/12-	9/3-dead	N	670884	4506673

							flowering and fruiting				
FIW-21	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering and fruiting; 9/3-seeds; 10/12-flowering and fruiting	9/3-dead	N	670884	4506673
FIW-22	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2		8/6-flowering and fruiting; 9/3-seeds; 10/12-flowering and fruiting	9/3-dead	N	670884	4506673
FIW-23	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3	9/3-25% browsed	8/6-flowering	9/3-dead	N	670884	4506673
FIW-24	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2			9/3-dead	N	670884	4506673
FIW-25	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-26	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-27	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-28	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-29	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-30	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1			9/3-dead	N	670884	4506673
FIW-31	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1.5		8/6-fruiting		N	670884	4506673
FIW-32	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3		8/6-flowering and fruiting; 9/3-seeds		N	670884	4506673
FIW-33	Fire Island Wilderness	Western Wilderness	7/16/2015	1	3		8/6-flowering and fruiting; 9/3-seeds		N	670884	4506673
FIW-34	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1.5	8/6-25% browsed		9/3-gone	N	670884	4506673
FIW-35	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1.5	8/6-25% browsed	8/6-flowering and fruiting	9/3-gone	N	670884	4506673
FIW-36	Fire Island Wilderness	Western Wilderness	7/16/2015	1	2	8/6-25% browsed	8/6-flowering and fruiting	9/3-gone	N	670884	4506673
FIW-37	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1.5	8/6-25% browsed		9/3-gone	N	670884	4506673
FIW-38	Fire Island Wilderness	Western Wilderness	7/16/2015	1	1.5	9/3-25% browsed			N	670884	4506673
FIW-39	Fire Island Wilderness	Watch Hill	8/6/2015	1	5	8/6-25% browsed; 9/3-5% browsed	8/6-flowering and fruiting; 9/3-flowering and fruiting; 10/12-flowering and fruiting		Y	669993	4506241

Seabeach knotweed individuals

Knotweed ID (FID)	Site Name (LICWS)	Location Description	Date	UTMs (x)	UTMs (y)	# of plants	Reproductive status
FIP-1	Fire Island Pines	Fire Island Pines	7/21/2015	663192	4503190	5	Flowering
FIP-2	Fire Island Pines	Talisman	7/21/2015	664680	4503745	1	Flowering
FIP-3	Fire Island Pines	Fire Island Pines	8/20/2015	663519	4503305	2	Flowering
FIP-4	Fire Island Pines	Fire Island Pines	8/20/2015	663193	4503191	2	Flowering
FISF-1	Fire Island Sunken Forest	Sailors Haven	7/15/2015	660535	4502336	3	Flowering
FIW-1	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678826	4510662	1	Flowering
FIW-2	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678630	4510591	1	Flowering
FIW-3	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678311	4510385	1	Flowering
FIW-4	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678311	4510385	1	Flowering
FIW-5	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678311	4510385	1	Flowering
FIW-6	Fire Island Wilderness	Eastern Wilderness	7/22/2105	678681	4510672	1	Flowering
FIW-7	Fire Island Wilderness	Western Wilderness	8/6/2105	671076	4506793	1	Flowering
FIW-8	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678082	4510497	1	Flowering
FIW-9	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678085	4510477	1	Flowering
FIW-10	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678081	4510500	1	Flowering
FIW-11	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678080	4510503	1	Flowering
FIW-12	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678079	4510506	1	Flowering
FIW-13	Fire Island Wilderness	Eastern Wilderness	8/13/2015	678268	4510452	1	Flowering
FIW-14	Fire Island Wilderness	Eastern Wilderness	8/13/2015	677892	4510296	1	Flowering
FIW-15	Fire Island Wilderness	Eastern Wilderness	8/13/2015			1	Flowering