

# **2014 Summary of Piping Plover Breeding Season on Long Island**

**Prepared by the 2014 Plover Monitors: Sarah Lehner and Andrew Harry on August 14, 2014**

## **Introduction**

Piping plovers (*Charadrius melodus*) are diminutive migratory shorebirds that overwinter on Atlantic and Gulf coast beaches, as well as some Caribbean islands. This species of plover travels north to nest in three geographically distinct areas: the Atlantic coast, Great Plains, and along the Great Lakes. The Great Lakes group is the smallest subpopulation, and is a federally endangered species, as well as a state endangered species in Wisconsin. (WIDNR) Piping plovers nest on Long Island, part of the Apostle Island National Lakeshore in Lake Superior. Long Island has been connected to Chequamegon Point since 1976 is no longer a true island (Matteson 2008). Plovers prefer to breed on wide sandy beaches with small stone cobble present (USFWS). This affinity for beaches puts them at odds with humans who also love beaches, and can lead to conflicts and nest disturbance. This breeding population has been closely monitored since 2007, (WIDNR) and is managed under a multi-agency partnership. The Bad River Band of Lake Superior Chippewa, National Parks Service, Wisconsin Department of Natural Resources, US Fish and Wildlife, and the Nature Conservancy have embarked upon a cooperative effort to improve this species' chance of survival. Two monitors, Andrew Harry and Sarah Lehner, stayed on Long Island for the duration of the breeding season. The monitors each camped for four nights at a time on the island, trading off on the fifth day. A Bad River warden provided transportation. This allowed for continuous data collection, with gaps only occurring during hazardous weather. Monitors walked the beach transect twice daily, recording their observations in detailed field notes complete with dates, times, weather conditions, birds sighted, plover behavior, visitor numbers, predator sign, and other species observed.

Plover monitoring began on May 30, 2014 and ended on August 5, 2014 when all the chicks had fledged. The 2014 breeding season resulted in four breeding pairs that fledged eleven chicks. Three chicks were lost to predation, prompting predator control measures to be taken in July. After trapping no more chicks were lost. Three unpaired males were also residents of the beach for the majority of the breeding season.

## **Methods**

Plover monitors began the season by locating and identifying individual birds by their unique color band combinations. These birds were observed to determine if they were involved in courtship

activities or if they had a nest. When a nest was found, the monitor on duty put a wire “mini” predator exclosure over the nest, which allowed the plovers to come and go freely but excluded larger animals. Psychological fencing of twine, flagging tape, and signs were erected to keep human visitors a safe distance from the nest and provide some basic information about the birds. During and after the placement of exclosure and fencing, the birds were observed closely to be sure they returned to the nest. A GPS coordinate was recorded for each nest. Data regarding habitat characteristics, presence of stone cobble and driftwood abundance was also logged in field notes. In the following weeks, monitors went to the nesting area to observe plover behavior, count eggs, look for predator sign, and interact with visitors to provide information regarding piping plover phenology, life history, and behavior. Monitors were tasked to be friendly and informative while explaining beach access restrictions and dog leash laws to visitors. In addition to these duties, monitors kept track of other species found on the island, as well as any instances of avian mortality or predation. Detailed field notes on weather, lake conditions, visitor numbers, and plover behavior were compiled to provide a comprehensive view of the 2014 breeding season on Long Island. A week by week summary of the 2014 breeding season follows. These summaries are adapted from field notes taken by Andrew Harry and Sarah Lehner between 5/30/2014 and 8/6/14, beginning with Andrew’s narrative, then alternating.

## **Week by Week Summary**

### **5/30-6/2**

Male [Of,L/Ob:X,B] was seen on the last evening. The female [X,-:O,B/O/B] and male [X,Y:Of,bb] were the only birds with a nest as of 6/2. There were three copulations from three separate pairs this week.

On 5/30 [X,O/G:O,-] copulated with [O,b:X,-]. These two birds eventually had a nest. The copulation occurred very quickly, [O/G] goose stepped and suddenly hopped on the female and copulated. There were also scrapes throughout this area, where the beach narrows and bends a bit, and right near where the eventual grass nest would be located.

The psychological fencing for the snakelog nest was placed in the evening on 5/30. No piping plovers or their tracks were observed on the North end of Long Island between the lighthouses, an attempted nesting site in the recent past.

On 5/31 [X,G/O:O,-] was in a dispute with the snakelog male [X,Y], and [G/O] eventually flew North, giving territorial peeps. [X,O/G:O,-] was seen making scrapes again. There was also an unbanded male making scrapes near the bucket with a hole. There are two unbanded males on the South side of the

island, and one of these males was parallel walking with [X,R:O,-]. These birds are farther South than any of the other birds, located where the trees encroach near the dunes, and may have been pushed to this less suitable habitat. Bald Eagles frequently perched in the trees near where these birds were located.

On 6/1 [X,O/G:O,-] was seen copulating with [O,b:X,-] near the spot they were copulating the day before. Male [O/G] quickly goose-stepped for perhaps three seconds then mounted the female and copulated.

On 6/2, [X,G/O:O,-] and an unbanded female copulated. The male goose-stepped for around one minute then mounted the female and kneaded her back for about 90 seconds, then copulated.

However at 3:30pm on 6/2 he [G/O] appeared with [O,b:X,-] where they were both perched on a log.

Many species of shorebirds foraged throughout the dunes this week, including semipalmated plovers (*Charadrius semipalmatus*), black-bellied plovers (*Pluvialis squatarola*), dunlins (*Calidris alpina*), sanderlings (*Calidris alba*), ruddy turnstones (*Arenaria interpres*), and herring gulls (*Larus argentatus*). There was also frequent bald eagle (*Haliaeetus leucocephalus*) and raven (*Corvus corax*) activity.

#### **Dates: 6/3/14-6/6/14**

At this time one nest was already identified, coined “Snakelog” in reference to its proximity to a snake-like driftwood log which serves as an easy marker. Birds identified during this period will be listed singly or in pairs according to the position of their territories, on an axis beginning at the northeasternmost edge of the sand dunes, and ending with the last territory detected to the southeast. No plovers nested on the northern tip of the island, although they did in previous years. Birds identified include a male (Of, L/O 1 : X, B), which seems to be solitary, a pair named Willow Nest: Male (X, G/O : Of, -) Female (unbanded), the Snakelog Nest pair: Male (X,Y : Of B,B) Female (X,-: Of, B/O/B), and a pair called Grass Nest for their odd choice of nesting site at the base of a dune, amongst beach grass and sand versus cobble. Male (X,O/G: O, -) Female (O,b:X,-). In addition another single male bird (Gf, G:-Y/B) was detected to the south of Grass Nest territory, in an area close to a path from the south side of the island, often frequented by people. This bird is of particular interest because the green flag marks it as one from the Great Plains population. Just beyond this area (to be referred to henceforth as “driftwood

lean-to”, “fire pit”, and “bucket-stump” sequentially along the aforementioned axis) an un-banded male and a female (X,R:O, -) were sighted, but no nest was found (Table 1.)

**Table 1.** Piping Plover pair band combinations and territory locations on Long Island.

<b>Territory</b>	<b>Coordinates</b>	<b>Male</b>	<b>Female</b>
Benchlog	Not Recorded	Of, L/O 1 : X, B	N/A
Willow Nest	N46°42'24.7" W90°45'29.3"	X, G/O : Of, -	Unbanded
Snakelog Nest	N46°42'34.4" W90°45'41.3"	X,Y : Of B,B	X,-: Of, B/O/B
Grass Nest	N46°42'15.3" W90°45'14.4"	X,O/G: O, -	O,b:X,-
Driftwood Lean-to	N46°42'15.1" W90°45'14.4"	Gf, G:-Y/B	N/A
Bucket-Stump	N46°42'07.9" W90°45'03.8"	Unbanded	X,R:O, -

Two predator exclosures were erected during this time; one at Willow Nest on 6/4/14, and another at Grass Nest on the same day. Psychological fencing was put up at Willow Nest on 6/4/14, Grass Nest on 6/5/14. Birds returned to nests in both instances. Egg counts as of 6/6/14 were as follows: Willow -2, Snakelog- 4, Grass -2 (Table 2.)

**Table 2.** Egg counts as of 6/6/14.

<b>Nest</b>	<b>Egg Count</b>
Willow	2
Snakelog	4
Grass	2

Observed behaviors among pairs and individuals were mostly of territorial nature. Most notably the single males would often trespass into a pair's territory, resulting in one member or both of a mated pair chasing the single male out of the territory. In one instance pairs of adjoining territories (Willow and Snakelog) dealt with an interloper jointly. The females were foraging on their respective sides of the line

in the sand when Great Plains male flew in to Willow territory, resulting in the Willow female chasing him into Snakelog territory. Snakelog female in turn ran him back into Willow. This back and forth went on for a few moments until the males of both pairs joined the effort. Things became confused, however, when all five birds were aligned at the territory boundary. This resulted in a good deal of head-down-puffed-up running at one another, with the pairs for the most part staying on their own sides. At some point the Snakelog and Willow males forgot the intruder and occupied themselves with parallel walking up and down the boundary, and continued to do so even after the females successfully evicted the Great Plains male. The single male in what has been called “benchlog” territory at the northwestern-most part of the beach (Of, L/O 1 : X, B) was often engaged in territorial disputes resulting in wide circular flights with much peeping and chasing of any bird that entered the area, Plover or not. The other single male (Gf,G:-,Y/B) also engaged in these flights, but with less frequency and of a shorter duration.

No predation events on Plovers were recorded during this period, however evidence of other avian predation was noted. The remains of several birds were discovered along the shoreline, each carcass consisted of one or both wings and the bones of the pectoral girdle, and nothing else. These were photographed and noted in the day’s field notes. The predators could be birds of prey, as the remains show no tooth marks or broken bones that a canid or felid would leave. Birds of prey observed in the area include several bald eagles, northern harriers (*Circus cyaneus*), and turkey vultures (*Cathartes aura*). Bird remains were of a variety of sizes, from warbler to dabbling duck, thus the predation is likely the work of several different species. Coyote (*Canis latrans*) tracks were observed in the area, as well as raccoon (*Procyon lotor*).

Four visitors came over the dune from the south side to the fire-pit area on 6/6/14. They were friendly and courteous, also had some knowledge of the recovery efforts regarding piping plovers. They were from Washburn.

### **6/7-6/10**

Two nests were found in the past week, named “Willow” and “Grass.” On 6/8, an unbanded male copulated with female [X,R:O,-]. The male mounted the female and kneaded her back for nearly two minutes, then copulated. The male quickly made another scrape after the copulation.

On 6/8 grass nest laid another egg, which brought the total to three eggs. Four eggs are now on the snakelog nest as of 6/9 (Table 3.) The flock of herring gulls was seen throughout the beach this week, along with many crows (*Corvus brachyrhynchos*), ravens, and bald eagles. Two immature bald eagles were seen near the northern part of Long Island, where the dunes begin.

The fourth egg was seen on grass nest on 6/10. Also on 6/10, a nest was found far down on the southern end of the beach with one egg. The nest was named “Roots.” The nest was located almost directly on a stick. The female was [X,R:O,-] and the male was unbanded. There were many scrapes, at least six, around this nesting site. The same evening, an exclosure was placed on the Roots nest along with signage.

Two guests were on the island for a short period of time on 6/10.

**Table 3:** Egg Count

6/7-6/10	
Nest	Eggs
Willow	4
Snakelog	4
Grass	4
Roots	1

**Dates: 6/11/14-6/14/14**

Between this time period and the previous summary, Andrew Harry determined there to be a nest in the area previously described as “bucket-stump”, with the pair consisting of the unbanded male and female (X,R:O, -) observed in that location. He named the nest site “Roots Nest”, thus hereafter the pair and area will be referred to as so. Roots nest coordinates are N46°42’06.8” W90°45’02.6”.

Psychological fencing was put up at Roots Nest on 6/11/14; birds returned to nest quickly. The three original nests are currently all up to four eggs each, and at the end of the week Roots nest contained three eggs (Table 4.)

**Table 4.** Egg Count as of 6/14/14

Nest	Egg Count
Willow Nest	4
Snakelog Nest	4
Grass Nest	4
Roots Nest	3

An unbanded female was seen in Benchlog territory. This bird was initially thought to be a new unique individual, however it was just the unbanded Willow Nest female foraging farther outside her territory. It is possible the single male in Benchlog territory (Of, L/O 1 : X, B) allowed her presence because he viewed her as a potential mate. Of, L/O 1 : X, B made attempts to court her, but she always rebuffed him. The unbanded bird was followed back to Willow territory, where it was determined she was in fact the Willow female. Territory/courtship flights and scrape digging by the Benchlog male increased dramatically when the unbanded female was present. The female was seen chasing him out of his own territory, although that had little effect on his efforts to court her.

A number of territory show-downs occurred this week. One interesting incident involved the Willow and Snakelog females teaming up to run off the Benchlog male. Initially the females bounced him back and forth over each other's boundary line. Then, all three birds stood in a tight circle facing one another, not moving for a full five seconds before both females puffed up and ran at him in unison, causing him to fly off a short distance away, on the Snakelog side. While this was happening the Willow and Snakelog males were incubating, not participating in the turf war. Snakelog female had to abandon her cause, because a family of Canada Geese (*Branta canadensis*) was walking through her territory, briefly surrounding her mate and the clutch he was sitting on. Benchlog male vacated the area while she was distracted by the geese.

There were high winds this week, which caused some of the psychological fencing to blow down. I repaired and replaced broken lengths and flagging. The fencing at Roots Nest was down on 6/13/14 because a bear walked through it, the birds, eggs, and exclosure were unmolested. Black bear (*Ursus americanus*) tracks were noted from north of camp to a distance of four miles to the SE, where I stopped following them. Tracks were in a northwest to southeast direction, away from camp and the nesting beach. In addition on 6/13/14 I saw two people come over the dunes to read signs surrounding Roots Nest, but I was unable to speak with them as they retreated upon my approach.

Other predators observed included the aforementioned bald eagles, which cruised the beach, occasionally landing on pieces of driftwood or swooping at gulls. This was primarily an activity of the two immature individuals. Coyote and raccoon tracks were found at regular intervals. More bird remains were found this week, all consistent with the previous observations of disembodied wings and pectoral girdle bones. These were photographed and logged in field observations.

**6/15-6/18**

Four nests reside on Long Island. There were 11 adult birds on the island as of 6/15. The male [Gf] was still looking for a mate along with an unbanded male far down on the southern end of the beach. A lone male was also on the northern end of the beach, but still in the dunes [Of,L/Ob:X,B].

Roots nest laid their fourth egg on 6/15 (Table 5.) GPS coordinates of Roots nest are N46°42'06.8" W90°45'02.6".

After storms and strong winds over the weekend of 6/14 and 6/15, high water reached onto the beach and formed pools in slight depressions around the foredunes. The high winds and water spilled driftwood throughout the beach, and the composition of the beach differed from the past two weeks. Gone was the scattered driftwood and plant matter right along the shoreline ridge, instead the driftwood was scattered along the beach and the plovers were foraging along the upper and middle parts of the beach more often. This was likely a response to the scattered driftwood and the insects that find shelter around these areas.

Three of the nests seemed unaffected by the water. There was no water near these nests, and debris was generally not near the nests or was stopped by the enclosure or stopped by a stick which the plovers strategically picked/placed in front of the nest.

One nest was affected by the water. The Snakelog nest was either displaced by water, or the pair on this nest moved it out of fear of the coming water. On 6/15, right next to where their nest used to sit, there was a temporary pond that formed. Three of the eggs were in a scrape/nest in a line of little sticks and driftwood along the foredune. The positioning of this nest (on top of the debris) would suggest that the plovers moved the eggs there after the water moved the debris to the base of the foredune. The fourth egg was about five feet away from the other eggs. The egg outside of the nest was left there by the monitor and watched closely, to determine if the adults would move the egg into the new nest.

The male and female from snakelog did not move this egg and subsequently it remained there overnight on 6/15.

On 6/16, the plover monitor was instructed to move the egg, and noticed a slight crack in the egg which was likely the reason why it was left out of the nest. The egg was placed in the nest and the male promptly returned to the nest to incubate after the egg was moved. Around 6:15pm that same day, the enclosure was moved onto the nest, and again the male returned almost immediately.



The evening of 6/18 saw high winds and very high waves, but it was around sunset when the winds picked up and there was no apparent damage, although further disturbance was certainly possible as the waves swelled to seven or eight feet.

**Table 5.** Egg count

6/15-6/18	
<b>Nest</b>	<b>Eggs</b>
Willow	4
Snakelog	4
Grass	4
Roots	4

**Dates:** 6/19/14-6/22/14

In the days prior to these observations, high waves inundated large portions of the nesting area. Wave action washed away considerable stretches of beach in some areas, and the surf-line was up to the foot of the dunes in places. Snakelog Nest was in jeopardy, and the pair moved the eggs to higher ground, on top of some small driftwood pieces. Andrew Harry moved the exclosure to the new nest site, and deposited an egg that the birds left on the beach back into the nest, noting a crack in the egg. My subsequent observations lead me to believe that the cracked egg is not disturbing the birds, and I saw no evidence of increased insect activity around the eggs that would indicate spoilage. The pair seems to treat it the same as the others, so perhaps there is a chance it will survive. The new Snakelog nest site coordinates are N46°42'34.3"W90°45'41.4". Willow Nest appears unscathed, although the eggs are now situated closer to the edge of the exclosure. The pair does not seem bothered by this, so it was unnecessary to re-position the exclosure, as the birds are capable of moving the eggs if they so please. Grass Nest is on higher ground than the others, it sits at the foot of a dune where water did not reach. Roots Nest is also on high enough ground to be unaffected by this storm. No eggs were lost in this incident. All the nests now contain four eggs (Table 6.)

**Table 6.** Egg Count as of 6/22/14.

Nest	Egg Count
Willow Nest	4
Snakelog Nest	4
Grass Nest	4
Roots Nest	4

All ten birds were found daily, with the exception of the Great Plains male on 6/19/14. The plovers appear to have settled into distinct territories, making it relatively easy to determine their whereabouts. Weather this week was quite foggy, which made detailed observation difficult. Nevertheless, a few observation forms were filled out. As hatch date approaches for the Snakelog and Willow Nests the adults are more wary of human presence, and react with more alarm than they have previously. These two pairs spend more time trying to lead intruders away from the nesting area. Although the adults are vigilant, they are not distressed to the point of putting on a broken wing display. In contrast, the Grass Nest pair is relatively blasé to approach, especially the male. This could also be a reflection of individual temperament and tolerance.

Two people in a boat visited the fire-pit/ driftwood lean-to on 6/21/14. They had some knowledge of the monitoring program, and were very curious about the life history and breeding habits of the birds. The spotting scope was set up some distance away from Grass Nest so they could see the female sitting on the nest. Although Roots Nest was closer to their picnic area, the Grass Nest pair is more tolerant of human observation. The visitors were very excited to have the opportunity to observe the birds and learn about the efforts to help the population. Another individual was seen on 6/22/14 south of Roots Nest, but was not contacted.

Aerial predator presence was down this week, possibly due to foggy conditions. More wings were found in the surf, they photographed and documented in notes. A ring-billed gull (*Larus delawarensis*) carcass washed up on the beach near the driftwood lean-to, and gave some insight to the other remains that have been found. This bird still had its head, legs, and most of its skeleton intact. The organs and muscle were gone, and bones were picked clean. Whether this was the work of whatever killed it or a result of being tumbled around in the lake and eaten by fish is uncertain. Aside from being dead, disemboweled, and lacking all critical musculature, the bird looked to be in good condition. Flight feathers were all in good shape, and there was little evidence of excessive mites or other parasite infection. There was a bright red rim around the eyes, as well as at the corner of the mouth. Upon

observing a living flock of ring-billed and herring gulls none were seen with this peculiar coloring, although one individual did have weepy eyes and looked to be in poorer condition than the rest. The physical condition and behavior of other birds in the area will continue to be monitored.

### 6/23-6/26

The week of 6/23 was very cold, with high winds and waves on the evening of the 23<sup>rd</sup> and all throughout the day on the 24<sup>th</sup>. On 6/23, [Gf] (male) physically attack three gulls. He peeped loudly and then proceeded to fly at the gulls and possibly struck one of the gulls. The gulls flew away quickly. After this transgression, [Gf] landed on the beach and made a scrape, all the while peeping. [L/Ob] exhibited similar behavior on 6/24. He also flew at three gulls, then flew around making territorial peeps, finally landing to make a scrape, still peeping. This behavior could demonstrate an attempt by the males to draw attention from any females in the area, though there were no females with which to breed. Perhaps, then, they were marking out territory in case they return next year, though this now seems unlikely since they stayed about five weeks after the confrontation with the gulls.

On 6/23, the cracked egg from the snakelog nest was ejected from the nest. On the morning of 6/24 the cracked egg was disposed of far beyond the dune by the monitor.

On the evening of 6/24, two chicks from the snakelog nest had hatched and were lying in the scrape. On approach, both the male and female gave strong broken wings.

On the morning of 6/25, the remaining egg was gone, and only two chicks were with the parents. It is unknown what happened to the third egg, and the shells were never recovered. Lacey Hill suggested that it was likely that the chick hatched and was subsequently preyed upon the night of 6/24. This seems most likely, since the egg was within the enclosure the last time it was witnessed.

The missing egg was searched for throughout the day on 6/25, with no luck. Curiously, when the former snakelog nest was approached, [X,Y] would often alight and peep repeatedly at the monitor. This behavior perhaps suggested that the egg was buried under driftwood or in the sand, however, after hours of searching, the egg remained undiscovered (Table 7.)

One snapping turtle (*Chelydra serpentina*) made its way along the beach on 6/25, moving northwest-southeast. I followed its tracks up the beach and found it walked directly past the Willow nest. Since the Willow nest proper had been pushed back from the waves, the nest now sat almost against the back of the enclosure. It seemed that the turtle's tracks slowed and it turned toward the nest, though its

head was likely too large to fit through the wire gaps. The enclosure was promptly centered over the nest. The parents returned immediately.

**Table 7.** Egg and chick count

6/23-6/26		
<b>Nest</b>	<b>Eggs</b>	<b>Chicks</b>
Willow	4	0
Snakelog	0	2
Grass	4	0
Roots	4	0

**Dates: 6/27/14-6/30/14**

Two chicks hatched at the Snakelog nest, the third egg was too damaged by the previous week's flooding to survive, and the fate of the fourth remains a mystery. The other three nests still contained four eggs each. A storm blew through on the evening of 6/29 that produced grape-sized hail. On the morning of 6/30 the eggs of all nests were inspected for damage. The hail struck a Willow nest egg, leaving it with a hairline crack. The adults of all nests were very agitated by close approach, and preformed broken wing displays and a great deal of alarm peeps. Birds were very disturbed for the remainder of the day, however all recovered and returned to their respective nests after departure. Great Plains male and Benchlog male remain bachelors, and often are the cause of territory disputes with nesting pairs. Both single males cross into paired birds' territories with regularity. As of 6/30/14, there are two Snakelog chicks, and four eggs at willow, grass, and roots nests. (Table 8.)

**Table 8.** Egg and chick count as of 6/30/14.

<b>Nest</b>	<b>Egg Count</b>	<b>Chick Count</b>
Willow Nest	4	0
Snakelog Nest	0	2
Grass Nest	4	0
Roots Nest	4	0

Sand-flies were very abundant and troublesome in the first three days of observation, but eventually cleared out on 6/30 when strong winds limited their movements. The profusion of biting flies kept most visitors away, only two boats were contacted, one with two dogs off leash.

More avian pectoral girdles washed up on the beach this week. Remains identified to species include a blue jay (*Cyanocitta cristata*) and a wood duck (*Aix sponsa*), other remains found were too damaged or non-descript to identify.

Predator presence was dominated by birds this week, and included turkey vultures, eagles, and a pair of northern harriers. On 6/30 what was thought to be a coyote pup was seen in the dunes, however there is reason to believe it was a red fox (*Vulpes vulpes*) kit. Coyote, raccoon, and fox tracks were noted on the beach and in the dunes.

#### **7/1-7/4**

The week leading up to the Independence Day holiday was busy for both the plovers and their monitor. On the evening of 7/1, the Grass nest was being observed when the monitor heard a great deal of peeping from the snakelog pair. Looking through the scope, a Merlin (*Falco columbarius*) was visible, perched on a branch of a driftwood pine tree. [B/O/B] was facing the Merlin and peeping repeatedly. After approximately five minutes, the Merlin flew to the North. Just half an hour earlier, there were two chicks with the snakelog pair. After the Merlin departed, the site was investigated and only one chick was seen. There were no signs of remains, only a few small feathers clung to one of the branches of the pine, which may or may not have been from the chick. After this event, the snakelog pair was observed for a long period of time to determine if the second chick was indeed preyed upon, or was simply hidden somewhere along the beach. [B/O/B] was sitting and repeatedly peeping throughout the evening, a curious behavior.

Fox tracks were found throughout the backside of the dunes on 7/2, though none tracked toward the beach. At 3pm that day, a red fox appeared on a parallel ridge. The fox looked at the monitor curiously, and then trotted back over the dune from which it came.

On the morning of 7/3 Andrew Harry, Sumner Matteson, Lacey Hill, Christina Dzwonkowski, Peggy Burkman, and seasonal park service employees banded the only remaining chick from the snake log nest. Andrew (Drew) spotted the chick in the scope and directed the group while they moved in from the dunes. The chick made a move for the Lake and jumped into the water but Christina grabbed it before

it either swam away or sunk. The band given to the chick was [X, G<sup>175</sup>: -,O], Federal Band # 2331-95913. The chick was nine days old and weighed 16 grams. The chick returned to its parents shortly after the banding.

There were 12 people in two boats on the island on 7/3, one overnight.

7/4 was by far the biggest day for visitation to the island. There were well over 50 people on Long Island in approximately 15 to 20 boats. For the most part, visitors stayed outside of the range between the willow nest and the grass nest, and the psychological fencing and signs likely helped to keep them on either end of the beach. The monitor talked with as many people as possible, handing out fliers and giving information and stories about the plovers. Most people were very interested to hear about the birds, and the scope was used to show the birds from a safe distance to many interested children and parents. The weather was beautiful and calm, in the 70's throughout the day, and people were using both sides of the island.

In the afternoon of 7/4, one parent and his child discovered egg shells along the beach and reported this to the monitor. The monitor was concerned that perhaps someone had tampered with the plover eggs or perhaps a predation had occurred. The father and daughter said they had found the eggs right near the Willow nest. On approach, the male gave the broken wing. In the nest all four chicks were resting flat. Earlier that morning there were four eggs, so the chicks must have hatched sometime in the late morning/early afternoon on 7/4 (Table 9.)

**Table 9.** Egg and chick count

7/1-7/4		
Nest	Eggs	Chicks
Willow	0	4
Snakelog	0	1
Grass	4	0
Roots	4	0

**Dates: 7/5/14-7/8/14**

One of the Snakelog chicks disappeared last week, a Merlin (*Falco columbarius*) is the suspected culprit, as Andrew reported the falcon close to the remaining birds. Willow chicks hatched last week, and Grass chicks hatched on 7/6/14. Roots nest still contained 4 eggs. (Table 10.) Both sets of new chicks are

frequently brooded by their parents, in warm and cool weather, as the chicks cannot fully thermo-regulate yet. Chicks are quite independent, and able to move about and forage on their own. The chicks, however, still rely on their parents for protection and are very responsive to alarm calls and other behavioral cues.

**Table 10.** Egg and chick count as of 7/8/14.

Nest	Egg Count	Chick Count
Willow Nest	0	4
Snakelog Nest	0	2
Grass Nest	0	4
Roots Nest	4	0

Snakelog, Willow, and Grass nest adults are very alert and react with some degree of alarm each time a human comes into view. The adults call to the chicks with soft peeps to send them to cover in the beach grass or driftwood, where the chicks become virtually invisible if still. One or both parents will then approach the intruder and “peep-lo” at them, running parallel to or just in front of where the encroaching biped is walking, always checking back to see if they are being followed. After whatever the bird deems an appropriate distance they will abruptly turn away, fly, or just stop running, then return to their chicks and mate. Snakelog and Grass nest males are particularly vigilant, and will fly from the opposite end of their territory to alight in front of me with a perturbed peep. Snakelog male goes so far as to fly along the dune just below the monitor’s field of vision. As he flies by the hiding place he pops over the dune gives one loud peep, then returns to the beach.

An unbanded male made an appearance on the nesting beach, and spent some time hanging around with the Great Plains male. Neither bird displayed any aggression, they were observed napping on opposite sides of a small driftwood log, occasionally getting up to stretch or preen. Nesting birds were not tolerant of either lone male’s presence in their territories, and this week was marked by many parallel walks and territory scuffles among all plovers.

The holiday weekend brought many visitors to the island, between 7/5 and 7/8 thirty-four people were contacted. Several of them had dogs off leash, but were very responsive to explanations of why their dogs were required to be under control. Visitors often returned their dogs to boats anchored off shore if they failed to bring leashes or did not want to deal with holding on to their dogs.

Predators noted include eagles and black bear. No new bird carcasses washed up this week.

### 7/10-7/13

All the eggs on Long Island have hatched. The last egg on the Roots nest hatched on 7/11 (Table 11.) Three of the eggs on that nest hatched the day before, on 7/10. The lone chick remaining from the snake log pair was doing well and the parents diligently watched over this chick. The chick has been observed jumping and flexing its feathers. On the willow nest, all four chicks have frequently been brooding under both the female and the male.

One predation did occur in this past week. A fox likely took a chick from the grass nest on the evening of 7/10. Fox tracks were found in between Snakelog nest and the grass nest on the morning of 7/11, and the chick was noticed missing that same morning. A fourth chick was not seen with the Snakelog pair again. On 7/12 the monitor waited until dusk to try and spot any predators roaming the beach. As the monitor walked over the crest of a dune at 9:00 pm, a red fox was walking towards the beach. The fox stopped, looked at the monitor, then turned around. A few minutes later it sounded like a duckling had been killed or attacked on the bayside of the island. An adult duck was making quick, enervated calls and sounded like it was flying around in circles. Perhaps a predation from a fox or coyote.

**Table 11.** Chick count

7/9-7/12	
<b>Nest</b>	<b>Chicks</b>
Willow	4
Snakelog	1
Grass	3
Roots	4



**Dates: 7/13/14-7/16/14**

Roots nest chicks hatched last week, and a Grass nest chick disappeared. The predator was most likely a fox, as Andrew saw fox tracks on the beach in the area, the fox was seen on the beach close to birds twice this week. Willow nest still has four chicks, Snakelog one, Grass three, and Roots four (Table 12.) Snakelog female departed from the beach, and the unbanded male was not seen during this observation period. The Snakelog chick began stretching its wings and doing some tentative runs and flaps, but no real flight yet. Its primary feathers are still growing in, but there seems to be more contour feathers than down.

**Table 12.** Chick Count

Nest	Chick Count
Willow Nest	4
Snakelog Nest	1
Grass Nest	3
Roots Nest	4

Willow, Roots, and Grass chicks were banded on 7/16/14 by Sumner Matteson, with assistance from Lacey Hill and Christina Dzwonkowski of BRNRD, Julie Van Steppen and seasonal employees from the National Parks Service, Chris from the St. Louis River Alliance, as well as other volunteers. A photojournalist from the Milwaukee Journal Sentinel documented the activities and produced a visual story corresponding to one written by Meg Jones, also of the Journal. The group assembled on the north end of the beach at approximately 9:00 am, and worked our way south from nest to nest. The monitor would go out first to locate the birds, then direct the rest of the group to where they were. Chicks were captured by hand on the beach, with the group lining up behind the dune, then slowly advancing over the top towards the chicks, closing in around them in a pincer movement to trap them against the water. Once the group was close enough to the chicks, an individual would scoop up a chick and put it into a cloth bag, in which it would be weighed and held in until ready to be banded. After banding, chicks were released back to the beach, pointing them in the direction of the adults. The adults were very agitated during banding, continually peeping and broken-wing displaying. After banding all chicks returned to the adults, and all birds were calm by afternoon. All known chicks are now banded. Each set of siblings has a unique color combination, with individuals identifiable by a number inscribed on one of their green bands. The exception to this is Willow nest chicks, two of which had different band combinations.

Banding was finished by approximately 11:30 am. Band combinations only include orange, green, and metal bands (Table 13.) Banding day was the first witnessed flight of the Snakelog chick.

**Table 13.** 2014 Long Island chick band combinations.

Nest	Band Combination	Federal Band Number
Willow chick 1	X, -: O, G <sup>176</sup>	2331-95914
Willow Chick 2	O, G <sup>177</sup> :X,-	2331-95915
Willow Chick 3	X,-:O,G <sup>178</sup>	2331-95916
Willow Chick 4	X,-:G <sup>179</sup> , O	2331-95917
Snakelog Nest	X, G <sup>175</sup> : -,O	2331-95913
Grass Nest Chick 1	X,G <sup>180</sup> :O,O/G	2331-95918
Grass Nest Chick 2	X,G <sup>181</sup> :O,O/G	2331-95919
Grass Nest Chick 3	X,G <sup>182</sup> :O,O/G	2331-95920
Roots Nest Chick 1	X, G:O,G <sup>183</sup>	2331-95921
Roots Nest Chick 2	X, G:O,G <sup>184</sup>	2331-95922
Roots Nest Chick 3	X, G:O,G <sup>185</sup>	2331-95923
Roots Nest Chick 4	X, G:O,G <sup>186</sup>	2331-95924

After banding, predator control options were discussed, leading to the decision to set leg-hold traps for fox and coyote in the coming weeks. APIS was contacted for these actions.

As summer progresses visitor numbers increase. On 7/13/14 alone 17 people were contacted. Nearly all visitors are respectful of the nesting birds, and curious about the birds' life history and efforts to help the population recover. When conditions and the birds allow, the monitors focus the spotting scope on chicks or an adult so visitors can see the real thing in action. This experience lets people connect with the birds firsthand, and is much more exciting than simply hearing about plovers or reading a brochure. Seeing a chick scurry down the beach gives people a direct emotional connection, and makes them care more about the well-being of the species, perhaps altering their attitudes and behaviors in the future.

7/17-7/20

There were multiple disputes on 7/17, as L/Ob partook in a dispute with the pair from the willow nest. Additionally, the snake log chick [X,G:-,O] entered its first documented territorial dispute with the female from the Grass nest [O,b:X,-]. The female charged at the chick and it quickly ran back to the North.

The flies were incredibly awful this week. Some evenings they would blanket the downwind arms and legs in a thick, black, moving mass.

On 7/18 the lone male [L/Ob] was after the gulls again. There were a few gulls in his territory and he started peeping and flying at the gulls. Two of the gulls quickly flew away but one stayed despite [L/Ob]'s attempts to keep him away. Then [L/Ob] flew out toward the lake and swooped back onto shore, landing on a piece of driftwood and standing alert.

7/17 was the last day the female from Grass nest [O,b:X,-] was observed. On 7/17 two of the grass nest chicks were flexing their wings and jumping. On 7/20, one of the willow nest chicks was flexing and jumping, but still no flight from these birds. Also, on 7/19 the snake log chick was flying (Table 14.) The chick had two spurts of flight, one toward the foredune and then one along the beach toward [X,Y:Of,bb].

[X,Y] exhibited some interesting behavior on 7/19. He first chased away a whimbrel from the beach, but minutes later there were two spotted sandpipers seen chasing [X,Y] along the beach.

All loner males were still on Long Island, and on 7/20 [Gf] flew to the South and landed near the lone unbanded male. Then both birds flew along shore to the South. They appeared to be chasing a group of sanderlings, but they were far away and could have just been chasing each other and the sanderlings got spooked as they flew past. Both plovers landed far to the South, but [Gf] shortly flew to the North of me.

Visitors who attempted to visit the island were quickly rebuffed by the flies. They would return to their boats within ten minutes of landing. One group of about twenty people did stay most of the day on 7/20. They were very interested in the plovers, though they may have simply been intoxicated.

**Table 14.** Chicks and chicks fledged

7/17-7/20		
Nest	Chicks	Fledged

Willow	4	
Snakelog	1	1
Grass	3	
Roots	4	

**Dates: 7/21/14-7/24/14**

Leg-hold traps were set by John from APIS on 7/21/14. The traps were baited with fox urine, chicken livers, and gland scent, in hopes of luring in the fox or coyote that potentially took a grass chick. The traps were set behind the Snakelog nest site, in an area heavily used by canids, and checked a minimum of twice a day. On 7/23/14 a fox and a coyote were found in the traps. The fox was young of the year, and the coyote was an adult male, and had mange. John came to dispatch them, and pulled the rest of the traps up.

One of the Willow chicks disappeared from the beach on 7/22/14, its band combination was one of the two X,-:O,G's. The number printed on the green band of the remaining X,-:O,G chick was not readable. The Snakelog chick has become an adept flier, and is considered fledged. It has been ranging farther from the nest site, and was sometimes seen foraging with other chicks. Willow and Grass females left the nesting area, Roots is the only adult female left on the beach. The unpaired adult males are still in the area, and are still often the cause of territory disputes. (Table 15.) Several semipalmated plovers (*Charadrius semipalmatus*) were on the beach this week, which also caused quite a few territory scuffles. Other birds noted include whimbrels (*Numenius phaeopus*), sandhill cranes (*Grus canadensis*), least sandpipers (*Calidris minutilla*), spotted sand pipers (*Actitis macularius*), sanderlings (*Calidris alba*), belted kingfisher (*Megaceryle alcyon*) and many cormorants (*Phalacrocorax auritus*).

**Table 15.** Piping Plovers present on Long Island as of 7/24/14.

Territory	Male	Female	Chick Count
Willow	Present	Absent	3
Snakelog	Present	Absent	1
Grass	Present	Absent	3
Roots	Present	Present	4

Driftwood Lean-to	Present	N/A	N/A
Benchlog	Present	N/A	N/A
South of Roots	Present	N/A	N/A

This week was the first time a visitor had their dog on a leash without being told to by monitors. All dogs encountered previously had been running free off leash. It seems the majority of dog owners assume that no one will know or care if they have their dog off leash on the beach. More outreach, education, and signage could potentially help this problem. Occasional law enforcement presence on busy weekends could also help remind people that leash laws are in place for a reason and not to be ignored.

### 7/25-7/28

All of the females on the island have left, with the exception of the Roots nest female [X,R:O,-]. The lone males still remained this week. One of the lone males, [Gf,GL:-,YB] was seen on 7/25 near the grass nest, and later in the day he flew to the southern plover range and got into a territorial dispute with the lone unbanded male. Both birds parallel walked and dipped heads, then [Gf] flew North and the unbanded male flew South. Once the unbanded male flew South, [Gf] flew back and landed on a driftwood log where the lone male was perched.

There were 24 visitors on 7/26 and about 15 were contacted. Most were from the surrounding area. A few of the groups had been seen on the island before, and they asked for any news with the plovers. Coyote tracks were spotted on 7/26 between the Grass nest and the lean-to. The tracks were on the beach for perhaps ten meters and then cut back into the dunes.

High winds on the evening of 7/26 and into the morning of 7/27 led to strong waves crashing into shore. Walking the dunes on the morning of 7/27, most of the beach was apparently gone due to water. Water pooled up along the base of the foredunes, and the waves that crashed over the lower beach formed a shelf along the middle beach where water would flow downwards into the pools along the dunes. The wave action left few areas for the plovers to safely occupy, and most were foraging throughout the dunegrass. The first bird seen on 7/26, [L/Ob], was foraging on a straight of sand six feet long. He was also ducking for invertebrates in the water on either side. The chicks on 7/26 were found throughout the dunegrass (Table 16.) In one instance, as the monitor walked along a dune ridge, [X,Y] spotted this human and faced him while peeping. Simultaneously, a large wave tumbled over the beach and knocked over [X,Y]. This was the first instance of a plover being knocked over by a wave.

By the end of the day, the sun had peeked through and the beach quickly dried. The plovers responded by again moving throughout the beach, and a dispute occurred between four plovers that evening. The unbanded male from the Roots nest was in a dispute with the lone unbanded male to the South of Roots nest. The Roots nest father ducked his head for a while, then flew North of his nest. The loner followed. The Roots father landed right near the chick from snake log, who subsequently puffed his or her feathers and started to charge at both unbanded males. Then [X,Y] flew in and the chick retreated. [X,Y] charged at the unbanded males and both flew South.

On 7/28/14 there were ten visitors, and all were contacted. Around noon, a couple pulled onto the beach with two dogs off leash, and were informed about the piping plover and the leash rule. They were very cooperative. On the evening of 7/28, groups of plovers were flying around the beach, peeping as they flew. Around 2:30pm, five plovers were flying South along the beach, occasionally darting far over the lake. There may have also been one semipalmated plover in the group. About ten minutes later, three of the plovers flew back to the North, still peeping. All of the flying plovers looked like adults. Around 4pm, there were three plovers peeping and flying high over the dunes, and they flew somewhat close to the treeline. They flew North and it was unclear where they landed.

Some research (Environment Canada, 2012) and other handouts have indicated that piping plovers may congregate before migrating South. Boyne (2001) suggests that this indicates plover migration may occur in stages. However, research from Pompei and Cuthbert indicates that during the actual migration, piping plovers are often alone. The mean number of plovers seen at inland stopover sites was 1.34. They suggested that migration was a solitary endeavor, so it is unclear why plovers might congregate or “stage” before migration if they are migrating alone.

**Table 16.** Chicks and chicks fledged

7/25-7/28		
Nest	Chicks	Fledged
Willow	3	
Snakelog	1	1
Grass	3	
Roots	4	

**Dates: 7/29/14-8/1/14**

The Willow, Snakelog, and Grass nest chicks were all able to fly well by the end of this week. Roots chicks were stretching their wings, running, and flapping but did not demonstrate true flight. All the chicks were ranging farther afield from their respective nest sites, often joining up with neighboring nests to forage. The Grass Nest male was shepherding the Willow chicks around the beach on several occasions. When the Willow male returned from wherever he'd flown off to, a territory dispute would ensue while the chicks continued to forage. Snakelog male was gone this week, Roots female left last week, and the two single males Of, L/Ob, X,B and Gf, G:Y/B were not seen after 7/29/14 (Table 17.) The unbanded single male was not seen at all this week. The Snakelog chick had an extremely swollen right leg. The swelling was restricted to the intertarsal joint, at the base of the tibiotarsus. It looked to be either a growth or a localized infection, the swollen area was three times the size of the intertarsal joint on the left leg. The chick, however, was still actively foraging, and seemed to be behaving normally. It did not favor the affected leg and movement did not appear to be impeded by the swelling. A photograph documented the size and location of the apparent injury.

**Table 17.** Piping Plovers present on Long Island as of 8/1/14.

<b>Territory</b>	<b>Male</b>	<b>Female</b>	<b>Chick Count</b>
Willow	Present	Absent	3
Snakelog	Absent	Absent	1
Grass	Present	Absent	3
Roots	Present	Absent	4
Driftwood Lean-to	Absent	N/A	N/A
Benchlog	Absent	N/A	N/A
South of Roots	Absent	N/A	N/A

On 7/30/14 more leg-hold traps were set in an effort to capture canine nest predators. Fox and coyote tracks were present on the beach earlier in the week. The traps were set in the same location as before, behind the Snakelog nest site along the Bayside tree-line. These traps were set off on 8/1/14 because nearly all the chicks had fledged, greatly reducing the threat of predation. In addition we found it undesirable to have leg-hold traps out over the weekend, when many people were expected to visit the island with children and dogs.

There were many visitors to the island during this time period, 17 people were contacted on 7/31/14 alone. The amount of boat traffic seems to have steadily increased over the course of the summer. The visitors seemed relatively well informed about plover phenology, and many knew that the chicks were beginning to fledge. Several people correlated the birds' maturation to greater beach usage by humans, and felt that if the birds were almost grown up they were less vulnerable to disturbance.

The semipalmated plovers were still present on the beach, other species noted include common terns (*Sterna hirundo*) ruby-throated hummingbirds (*Archilochus colubris*), wood peewee (*Contopus virens*), bonaparte's gulls (*Chroicocephalus philadelphia*), great blue herons (*Ardea herodias*), cedar waxwings (*Bombycilla cedrorum*), and the resident bald eagles.

### 8/2/14-8/5/14

Sarah noted that all females had left the island as of 8/1, in addition to the lone males and the solitary male from the snake log nest [X,Y: Of, bb]. Additionally, the remaining males have lost most of the orange on their beaks.

Sarah also noted some type of growth on the right leg of the chick from snake log [X,G:-,O]. The leg was monitored throughout the week, and [X,G:-,O] seemed unaffected by its swollen leg. The chick was flying and foraging normally. The swollen area was located below the tibiotarsus and there was increased inflammation on 8/3. There also appeared to be small cuts and blood draining from the growth.

On 8/4 [X,-:O,G], one of the chicks from the willow nest, exhibited curious behavior. Approaching from just North of the Willow nest, two of the chicks were seen standing very near the monitor, and were not running away. The third chick was spotted, and it was hopping around on its right leg. In its left leg the bird clutched what looked to be a one-foot long tangle of roots from a dunegrass plant. The chick was still foraging and flying. The plant on its leg slightly altered the course of flight, as it looked like the bird had to direct itself slightly to its right in order to fly straight. However, it may be that the chick was still a relatively weak flyer.

The dunegrass seemed to be stuck to the chick's toes as the bird was foraging. However, upon further observation, it seemed that the root acted as a sort of crutch to balance the chick while it foraged along the beach. The two other chicks stayed near to the hopping chick, and even on approach from a human, they ran in different directions and peeped at me as the monitor neared the hopping chick, perhaps attempting to distract the human. The father [X,GO:O,-] did not seem to stay especially close to any of



the chicks throughout the day of 8/4. Later in the evening, [X,-:O,G] was resting parallel to shore behind a piece of driftwood, around where the old snakelog nest was located. Once the chick noticed me it flew to the North.

On the morning of 8/5, [X,-:O,G] had its left leg entirely tucked into its feathers. It initially appeared the bird had lost its leg. However, a few minutes later the chick was walking around, using both legs. It seemed to lightly favor its left leg and would occasionally leave it inches from the ground while foraging. Later in the afternoon that day, the bird was hopping around on its right leg again. However, once again, minutes later it was walking around on both legs.

All the chicks on Long Island have now fledged. Four chicks on the Roots nest were observed for many hours on 8/2, and finally fledged on 8/3. Around 5pm on 8/3, the first chick flew from the lower beach and headed to the North 50 feet and land on the middle beach. Another chick followed closely behind, but had a crash-landing of sorts as it stumbled and landed on its side. The chick walked normally and did not appear to be hurt. About 2 hours later, the other two chicks were seen flying as along the beach. One chick flew to the North upon approach, and its flight was strong. The other chick ran out in front of the monitor, then wheeled around to the middle of the beach and flew somewhat sporadically to the North.

Various literature has noted the tendency of piping plovers to congregate before their migrations. On 8/5 there were nine birds from three different families congregated together: [X,G/O:O,-] and his three chicks, [X,O/G:O,-] and his three chicks, and the chick from snake log [X,G:-,O]. All nine birds, from three different families, were foraging and resting together along the shore. No territorial disputes were observed between any of these birds. The snake log chick was also noticed with the Roots nest chicks on 8/5, again without disputes (Table 18.)

The monitors visited Long Island one last time on August 14<sup>th</sup> for clean-up of the campsite. The remaining signs and exclosures were also collected. No plovers or their tracks were observed. The birds from Roots nest would have presumably been the last ones to leave, and it is safe to assume that all birds had migrated by the 14<sup>th</sup>.

**Table 18.** Chicks and chicks fledged

8/2-8/5		
Nest	Chicks	Fledged
Willow	3	3
Snakelog	1	1
Grass	3	3
Roots	4	4

### Recommendations For Next Season

Because the piping plover monitoring project is based wholly in the field, it faces a unique suite of challenges. Long Island is a remote area without access to a power grid, potable water, permanent structures, or transportation. These factors limit communication and activities. In addition, the amount of work accomplished by a monitor is limited to hand-written notes and battery operated devices. As anyone who has worked in the field knows, batteries die, and technology can fail. A solar charger was available for use, but malfunctioned. The solar charger would charge itself from the sun, but would not distribute energy to a device plugged into it, rendering it completely useless. This year a portable charger was provided by BRNRD, which allowed the monitors to charge cell phones or other small devices. This worked well most of the time, however when it needed to return to the mainland to be charged itself, the monitor on the island was left without a power source. This could become dangerous in the event of an emergency if the monitor's cell phone battery was low or dead. Monitors had personal phones as well as a track phone to use when their batteries died. A radio provided by the park service was not programmed correctly and did not reach anyone when used, which was somewhat distressing for one of the monitors.

A more reliable source of energy would make work safer for the monitor, and potentially allow for greater productivity during down time. If a generator was available monitors could use it to run electronics such as laptops or tablets. This would make data organization more efficient, and if equipped with a wireless hot spot, up-to-date data could be delivered to the agencies involved instantaneously. Communications regarding injured birds, nest predators, or problematic visitors would improve.

Tent camping on the island was for the most part a lovely experience. Strong storms occasionally hit Long Island, but were generally short in duration and caused minimal damage. Keys to the triplex on the northwest end of the island were provided in case of very severe weather, however accessing the triplex from the campsite in a storm would be problematic, as the beach on both the NE and SW sides of the island was washed out, and would be dangerous if surf and winds were high, or lightning was frequent. Better access to a safe structure would be desirable. About 1/3 of boardwalk running from the campsite to the bay side of the island is in disrepair and underwater, making gear transportation difficult. In addition the Ericaceous vegetation bordering the boardwalk is very overgrown and needs to be trimmed back to prevent entanglement and tripping.

A major issue that must be addressed by next season is the flagrant disregard of leash laws on Long Island. The beach is very popular, and receives a high volume of visitors all summer. Over the course of the summer the majority of dogs encountered were off-leash. Although all visitors contacted were understanding of why their dogs must be under control and supervised, it was clear that without the presence of a monitor they would remain noncompliant. It would be of great benefit to the plover population if the beach was closed to dogs during nesting season, or at least during the time when chicks are most vulnerable after hatching. If this measure is deemed too unpopular, it is recommended that law enforcement presence is increased during this sensitive time.

Nearly all visitors to Long Island come by boat. A simple and inexpensive way to disseminate information regarding plovers is to provide educational materials at marinas or boat launches around the area. A poster or pamphlet near the launch site or dock will be read, or at least glanced at by all who pass, or are waiting their turn to launch their boat on a busy summer day. Low flying planes have also been an issue this year; local airports would be a good place to have information available. Another simple way to reach people is to contact local media outlets a few days before expected hatch dates, and ask them to run a piece about plovers. This would help raise awareness in the community, and potentially drum up support or volunteers for busy weekends like the Fourth of July.

From these monitors perspective, the forms required by the various agencies are redundant. It is understandable that each agency has its own information requirements and method of data entry. This does not, however, make the current protocols efficient. This is a multi-agency endeavor, it would make sense to streamline data collection through a central raw data source. We've been using Google drive this year, it would be relatively simple to make an interactive spreadsheet that all parties can access.

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