2002 New Jersey Piping Plover
Nesting Site Summaries
Current and Recommended Management

photo courtesy of Clay Myers

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This report provides a site-by-site summary of monitoring and management efforts put forth by The New Jersey Division of Fish and Wildlife (NJDFW) -- Endangered and Nongame Species Program (ENSP) for the 2002 piping plover nesting season. Only those sites that ENSP actively monitored or managed and where nesting activity occurred in 2002 are included in this report. This report serves as a supplement to two other reports produced by NJDFW -- ENSP regarding the monitoring and management of piping plovers in New Jersey:

Jenkins, C.D., T. Pover 2002. Federal Aid Performance Report: Project E-1-26. Study IV. Job-B. Piping Plover Population Survey.

and

Jenkins, C.D., T. Pover 2002. Federal Aid Performance Report: Project E-1-26. Study IV. Job-C. Piping Plover Threat Assessment and Management.

Copies of those reports are available by mail at:

New Jersey Division of Fish and Wildlife
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or can be downloaded from our website at: www.njfishandwildlife.com.

This report is organized on a site-by-site basis, moving from north to south. Topics addressed for each site include: *Monitoring and Patrolling, Fencing/Posting, Predator Exclosures, Predator Control, Municipal Beach Management, Coordination/Communication, Beach Nesting Bird Management Plan* and *Outreach.* Where necessary, additional topics are covered under the heading of *Other.*

The **Management** heading provides current monitoring and management practices relevant to each management topic, while the **Recommendations** heading presents a discussion of recommended changes to these policies and practices. A brief summary of piping plover nesting results is included under the heading **Nesting Results**. At those sites where least terns and/or black skimmers also nested, a brief summary of nesting results for these species is included as well.

Sea Bright North

Management

Monitoring and patrolling: The site was monitored 6 days a week, including patrolling on both weekend days by ENSP staff and/or student interns from Monmouth University. ENSP staff patrolled the site during the July 5th municipal fireworks display.

Fencing/Posting: ENSP staff used string-and-post symbolic fencing to protected nests as they were found. "Area Closed" signs were posted on every third post. When nests hatched, feeding corridors were created using signage ("Nest Hatched," "Plover Crossing" and "5 MPH") running down to the intertidal zone.

Predator exclosures: Predator exclosures were used on 3 of the 7 nests. Due to avian predation and harassment in recent years, exclosures were considered for all nests. In two cases, nests were destroyed just before an exclosure was scheduled to be erected. In two other cases, nests were located in a least tern colony so exclosures were not considered necessary or feasible to erect.

Predator control: None undertaken.

Municipal beach management: The municipality does not mechanically rake the beach where nesting took place. An annual beach clean-up, where large debris and litter is removed using heavy equipment and a prisoner work force, was conducted in mid-May (as close as feasible to the start of the summer tourist season). This effort was completed through the New Jersey Clean Shores Program. ENSP staff briefed clean-up supervisors and monitored some of the work.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. Direct contact with the municipality was initiated through the Municipal Clerk on an as-needed basis.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: Beach nesting bird brochures were placed at the local library and handed out to beachgoers. No interpretative signs were used because of the lack of a central access point and the fact that the nesting area stretched out for over a half a mile on the beach.

Nesting results

Five (5) pairs of plovers nested at this site for a total of 7 nesting attempts. Four (4) nests hatched. Of the 3 failed nests, 1 failed due to avian predation, 1 failed due to abandonment and for 1 the cause of failure could not be determined. A total of 12 chicks hatched, of which 10 fledged.

In addition to plovers, a medium-sized least tern colony (74 peak adults) was present at this site. Productivity for the colony was high. (1.0+ fledges per pair).

Recommendations

Monitoring and patrolling: Increase the intensity of early season nest searches for the entire stretch of beach up to Sandy Hook since the nesting area expanded northward in 2002 and a beach renourishment project completed in the fall of 2002 could create even more suitable habitat outside the traditional nesting area.

Fencing/Posting: "No Dogs" signs should be posted at any nearby beach accesses, as there are many dog walkers.

Predator exclosures: Although crows (and predation, in general) were less of a problem in 2002 compared to recent years, continue to monitor predators closely and consider using predator exclosures on all nests.

Predator control: Work with the municipality to better enforce the existing local dog ordinance. Investigate the feasibility of this site being included in the crow conditioned taste aversion trial study being proposed by the U.S. Fish & Wildlife Service's Atlantic Coast Piping Plover Recovery Team.

Municipal beach management: The annual Clean Shores Program beach clean-up should be scheduled before the nesting season begins (i.e., prior to April 1) in order to minimize disturbance of the birds. If this is not possible, activities should be closely monitored and supervised for the duration of the clean-up. Excessive vehicle use by municipal law enforcement (using all-terrain vehicles) posed a threat to the birds. This has been an ongoing threat to unfledged chicks that move outside fenced areas, but it was also a problem during the egg-laying stage since much of the nesting activity in 2002 was outside of the traditional nesting areas and more spread out. In general, it was harder to pinpoint and protect nesting pairs. ENSP and USFWS should approach municipal officials, in particular law enforcement, prior to the season in order to foster a greater degree of cooperation regarding vehicle use on the beach.

Coordination/Communication: No change

Beach nesting bird management plan: Work with the municipality and appropriate agencies (USFWS, USACE) to initiate the process of the municipality developing a beach nesting bird management plan.

Outreach: Develop other outreach opportunities, in addition to the distribution of brochures.

Other: Continue intern partnership with Monmouth University. Intern start date should be moved up to April instead of when classes are completed in mid-May. Intern coverage should be mandatory on weekends, or, at the very least, weekend availability should be increased compared to previous years.

Monmouth Beach North/Sea Bright Beach South

Management

Monitoring and patrolling: The site was monitored 6 days a week, including patrolling on both weekend days by an ENSP staff member and/or student interns from Monmouth

University. A student intern patrolled the site during the July 4th and 5th municipal fireworks displays.

Fencing/Posting: Prior to the nesting season (April 6), a 1/3 of a mile stretch of beach in front of the Monmouth Beach Cultural Center and a smaller area at the Monmouth Beach/Sea Bright border was fenced by ENSP staff and Monmouth University Environmental Club volunteers using string-and-post symbolic fencing. A strand of polypropylene rope was also used as part of the fencing in order to provide additional protection. A nest found outside (south) of the "pre-fenced" area was protected with string-and-post symbolic fencing when it was discovered by ENSP staff. "Area Closed" signs were posted on every third post. When nests hatched, feeding corridors were created using signage ("Nest Hatched," "Plover Crossing" and "5 MPH") running down to the intertidal zone. "No Dogs" signs were placed at all beach accesses located close to nest sites.

Predator exclosures: Predator exclosures were used on 3 of 4 nests. Due to avian predation and harassment in recent years, exclosures were considered for all nests. In one case, a nest was destroyed prior to completion of a full clutch, so an exclosure was not erected.

Predator control: None undertaken.

Municipal beach management: The municipalities do not mechanically rake the beach where nesting took place. An annual beach clean-up, where large debris and litter is removed with heavy equipment and a prisoner work force, was conducted in mid-May (as close as feasible to the start of the summer tourist season). This effort was completed through the New Jersey Clean Shores Program. ENSP staff briefed clean-up supervisors and monitored some of the work.

Coordination/Communication: This site falls within two municipalities: Monmouth Beach and Sea Bright. Weekly updates were faxed to both municipalities to keep them informed of the current status of plover activity and ENSP management recommendations. Direct contact was initiated through the Municipal Clerk in Sea Bright and the Mayor in Monmouth Beach, both on an as-needed basis.

Beach nesting bird management plan: No plans exist.

Outreach: Beach nesting bird brochures were placed at the local library and handed out to beachgoers. An interpretive sign was placed near the most heavily used beach access in front of the Monmouth Beach Cultural Center. For the first time in three years, a public slide presentation was not presented by ENSP at the Monmouth Beach Cultural Center.

Nesting results

Three (3) pairs of plovers nested at this site for a total of 4 nesting attempts. Two (2) of the nests hatched. Of the failed nests, 1 failed due to avian predation and 1 failed due to flooding. A total of 7 chicks hatched, of which 2 fledged.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: Because a beach renourishment project that was completed at this site in the fall of 2002 will likely change habitat conditions (especially at the southern end of the beach where nesting has not traditionally occurred), we need to make an assessment prior to the season to determine where (if anywhere) prefencing would be most effective.

Predator exclosures: Although crows (and predation, in general) were less of a problem in 2002 compared to recent years, continue to monitor predators closely and consider using predator exclosures on all nests.

Predator control: Work with the municipality to better enforce the existing local dog ordinance. Investigate the feasibility of this site being included in the crow conditioned taste aversion trial study being proposed by the U.S. Fish & Wildlife Service's Atlantic Coast Piping Plover Recovery Team.

Municipal beach management: The annual Clean Shores Program beach clean-up should be scheduled before the nesting season begins (April 1) in order to minimize disturbance of the birds. If this is not possible, activities should be closely monitored and supervised for the duration of the clean-up.

Coordination/Communication: No change

Beach nesting bird management plan: Work with the municipality and appropriate agencies (USFWS, USACE) to initiate the process of the municipality developing a beach nesting bird management plan.

Outreach: Develop other outreach opportunities, in addition to the distribution of brochures. Reestablish contact with Monmouth Beach Cultural Center and offer to present a beach nesting bird slide show to the public.

Other: Continue intern partnership with Monmouth University. Intern start date should be moved up to April instead of when classes are completed in mid-May. Intern coverage should be mandatory on weekends, or at the very least weekend availability should be increased compared to previous years.

Monmouth Beach South

Management

Monitoring and patrolling: The site was monitored 6 days a week, including patrolling on both weekend days by ENSP staff and/or student interns from Monmouth University. No patrolling was necessary for the July 4th municipal fireworks displays since all chicks present at this site had fledged by that date.

Fencing/Posting: Prior to the nesting season (April 6), 2 small areas just south of the Monmouth Beach Municipal Beach and Pool were fenced by ENSP staff and Monmouth University Environmental Club volunteers using string-and-post symbolic fencing. A strand of polypropylene rope was also used as part of the fencing in order to provide additional protection. "Area Closed" signs were posted on every post. When the site's single nest hatched, a feeding corridor was created using signage ("Nest Hatched," "Plover Crossing" and "5 MPH") running down to the intertidal zone. "No Dogs" signs were placed at all beach accesses located close to nest sites.

Predator exclosures: A predator exclosure was used on the 1 nest found at the site.

Predator control: None undertaken.

Municipal beach management: The municipality does not mechanically rake the beach where nesting took place. An annual beach clean-up, where large debris and litter is removed with heavy equipment and a prisoner work force, was conducted in mid-May (as close as feasible to the start of the summer tourist season). This effort was completed through the New Jersey Clean Shores Program. ENSP staff briefed clean-up supervisors and monitored some of the work.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. Direct contact was initiated through the Mayor on an as-needed basis.

Beach nesting bird management plan: No plan exists.

Outreach: Beach nesting bird brochures were placed at the local library and handed out to beachgoers. An interpretive sign was placed near the northern end of the fenced areas closest to the Monmouth Beach Municipal Beach and Pool. For the first time in three years, a public slide presentation was not presented by ENSP at the Monmouth Beach Cultural Center.

Nesting Results

One (1) pair of plovers nested at the site, resulting in 1 nesting attempt. The nest hatched 4 chicks, all of which fledged.

In addition to plovers, a small least tern colony (8 peak adults) was present at this site. All adults abandoned the site early in the season before any nests hatched. Predation (most likely from cats) was the suspected cause of failure, although human disturbance may have also played a role.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: No change.

Predator exclosures: Although crows (and predation, in general) were less of a problem in 2002 compared to recent years, continue to monitor predators closely and consider using predator exclosures on all nests.

Predator control: Work with the municipality to better enforce the existing local dog ordinance. Monitor cat activity (feral and pet) since it seems to be a problem for least terns nesting at site and likely also affects plovers.

Municipal beach management: The annual Clean Shores Program beach clean-up should be scheduled before the nesting season begins (April 1) in order to minimize disturbance of the birds. If this is not possible, activities should be closely monitored and supervised for the duration of the clean-up.

Coordination/Communication: No change

Beach nesting bird management plan: Work with the municipality and appropriate agencies (USFWS, USACE) to initiate the process of the municipality developing a beach nesting bird management plan.

Outreach: Develop other outreach opportunities, in addition to the distribution of brochures. Reestablish contact with Monmouth Beach Cultural Center and offer to present a beach nesting bird slide show to the public.

Other: Continue intern partnership with Monmouth University. Intern start date should be moved up to April instead of when classes are completed in mid-May. Intern coverage should be mandatory on weekends, or at the very least weekend availability should be increased compared to previous years.

Sea Girt - National Guard Training Center

Management

Monitoring and patrolling: The site was monitored 3-5 days a week, including patrolling on at least 1 weekend day by ENSP staff and/or student interns from Monmouth University.

Fencing/Posting: ENSP staff used string-and-post symbolic fencing to protect the site's single nest when it was found. (This was done several days before a large area was scheduled to be pre-fenced in anticipation of least terns nesting at the site.) "Area Closed" signs were posted on every third post. "5 MPH" signs were posted in front of the nesting area.

Predator exclosures: A predator exclosure was placed on the 1 nest found at the site. However, the exclosure was not "accepted" by either adult (they would not return to the nest to incubate) and was removed within an hour of being erected. No additional attempt to exclose this nest was made.

Predator control: None undertaken.

Municipal beach management: As agreed upon by NGTC and ENSP the northern portion of the beach where least tern nesting has taken place the last several years was not mechanically raked. The southern portion of the beach is used as a recreational beach. NGTC contracts beachraking and lifeguard services for this portion of the beach from the Borough of Sea Girt. Lifeguards drive by the nesting area (on quads) to reach the recreational beach.

Coordination/Communication: Weekly updates were faxed to the NGTC and the Borough of Sea Girt to keep them informed of the current status of plover activity and ENSP management recommendations. In addition, updates were sent to Dean Arrighi, of the Department of Military and Veterans Affairs, who acts as a liaison between ENSP and NGTC for endangered species protection efforts on the base.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: An interpretive sign is permanently placed near the main beach access just south of the nesting area.

Nesting Results

One (1) pair of plovers nested at the site, however, the pair's single nest never hatched. The adults incubated the nest for almost 2 months (nearly a month past the average 27-day incubation period) before giving up. The eggs eventually disappeared once the adults stopped incubating, presumably destroyed by an undetermined predator. An additional unpaired adult was present at the site for much of the nesting season. This was the first year that ENSP has recorded piping plovers nesting at this site.

In addition to plovers, a small least tern colony (48 peak adults) was present at the site. Productivity was moderate (0.5>1.0 fledges per pair) among nesting pairs, although nearly half of the adults initially present at the site left before establishing nests. The site experienced various problems including evidence of foxes, crows, dogs and human trespassers within the fenced nesting area.

Recommendations

Monitoring and patrolling: Surveying should be initiated earlier in the season (April 1) now that plovers have nested at the site. ENSP and/or NGTC staff should assess human use patterns at the site since more than occasional evidence of human disturbance was observed inside the fenced area.

Fencing/Posting: Pre-fencing was scheduled for mid-May in 2002 since only least terns had previously nested at the site. Now that plovers have nested at this site, consideration should be given to pre-fencing earlier (no later than mid-April).

Predator exclosures: Even though the pair present at the site this year would not return to incubate their nest once an exclosure was placed on the nest resulting in exclosure removal, evidence of foxes and crows at the site the past two years and generally poor success of the least tern colony suggest exclosure use is still warranted.

Predator control: Closely monitor predator activity to determine if predator control is necessary. A greater number of dogs were observed on-site (both inside and outside of the fence) this year. Work with the base and bordering municipalities to enforce existing municipal dog ordinances and base regulations that prohibit dogs on the beach.

Municipal beach management: No change.

Coordination/Communication: No change.

Beach nesting bird management plan: ENSP currently has an informal agreement with NGTC regarding the management of the northern portion of the beach for nesting birds. A more formal agreement or a full management plan should be considered.

Outreach: No change.

Other: Continue intern partnership with Monmouth University. Intern start date should be moved up to April instead of when classes are completed in mid-May. Intern coverage should be mandatory on weekends, or at the very least weekend availability should be increased compared to previous years.

Barnegat Light

Management

Monitoring and patrolling: ENSP staff monitored the site 3 times a week, including patrolling on 1 weekend day.

Fencing/Posting: Prior to the nesting season (April 13), ENSP staff and NJDFW Citizen Scientist volunteers fenced a large area adjacent to the Barnegat Inlet with string-and-post symbolic fencing. A strand of polypropylene rope was also used to provide additional protection in this area. An area between 13th and 14th Street was also pre-fenced with string-and-post symbolic fencing. On Memorial Day weekend, numerous people walked through the 13th St. side of this fencing and therefore wire pasture fence was added along that side for further protection. Additional nests (between 15th and 17th Streets) were fenced with string-and-post symbolic fencing when they were found. "Area Closed" signs were posted on every third post. When nests hatched, feeding corridors incorporating "Chicks Hatched" and "5 MPH" signs were posted in areas where chicks were feeding.

Predator exclosures: A predator exclosures was used on 1 of 4 nesting attempts. An attempt was made to exclose another nest, however, the pair would not return to incubate the nest, so the exclosure was removed the same day it was erected.

Predator control: None undertaken.

Municipal beach management: The municipality does not mechanically rake any portion of their beach. Although the municipality makes efforts to limit vehicle use in the nesting area near the jetty, other areas of the beach (south from 9th Street) receive heavy vehicle use (primarily Public Works and Beach Patrol).

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: An interpretive sign was placed at the northwest corner of the fenced area along the jetty.

Other: Due to jetty repairs in the area of the lighthouse that limited public access to this area of the beach for much of the nesting season, the volume of human activity was considerably lower along the jetty this year. Vehicle use by the borough in the vicinity of the jetty nesting area, which is suppose to be limited to emergency use only during the nesting season (but has not always been strictly followed in the past), was also much reduced for the same reason.

Nesting results

Three (3) pairs of plovers nested at the site, resulting in 4 nesting attempts. Two (2) of the nests hatched. One (1) nest was lost to predation (species undetermined) and the other was lost to undetermined causes. A total of 7 chicks hatched, of which 6 fledged. An additional unpaired adult was present near the jetty for most of the nesting season.

In addition to plovers, a small least tern colony (34 peak adults) was present in the area between 15th and 17th Streets. Productivity was low (<0.5 fledges per pair). Predators (crows, gulls and foxes) were the likely cause of low productivity, although human disturbance also probably played a role.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: Symbolic string-and-post fencing (with two strands of string/rope) should still be sufficient for pre-fencing in the area near the jetty, however, pole density and signage should be increased to enhance protection. ENSP staff should continue to pre-fence an area between 13th and 14th Streets. In other areas, nests should be fenced as they are discovered since other nesting areas are not well established and/or habitat is changeable in these areas.

Predator exclosures: Since this site has a history of predator problems (both avian and mammalian), use of exclosures should be considered in most cases.

Predator control: The number of dogs on the beach, especially early in the season and during the early morning and evening hours during the entire season, has increased the last few seasons. ENSP should actively encourage the borough to better enforce their existing dog ordinance.

Municipal beach management: Heavy vehicle usage by the borough, especially in the area between 12th and 18th Streets where nesting activity was observed this year, continues to be a problem. ENSP should continue to educate Barnegat Light Public Works Department, Beach Patrol and Long Beach Township Police about the negative impact of vehicle use on nesting birds, and seek changes in vehicle use by these departments/agencies.

Coordination/Communication: No change.

Beach nesting bird management plan: No change.

Outreach: No change.

North Brigantine Natural Area

Nesting at this site was divided between three general areas. The primary nesting site was the large overwash located at the southern end of the nesting area. This overwash has hosted most of the nesting activity at North Brigantine Natural Area since it was created by storms in 1994 and 1995. However, due to the increased density of vegetation and persistent flooding in this overwash, as well as the likelihood that it has reached its carrying capacity, nesting activity outside the overwash has steadily increased over the last few years. The second most important nesting area this year was the northern tip, which has two distinct areas; a small dune fringed overwash and the large open flat area that extends to the inlet. Nesting also occurred in several places on the oceanfront beach between the main overwash and the northern tip. The exact location of suitable habitat on the oceanfront portion of the beach is highly changeable due to storms and flooding.

Management

Monitoring and patrolling: ENSP staff monitored the site 3-5 times weekly, including one weekend day. The Brigantine Police Department, Brigantine Beach Patrol, and NJDFW Conservation Officers patrolled the area up to the vehicle barrier.

Fencing/Posting: Brigantine Public Works Department (BPWD) repaired a 0.2 mile stretch of string-and-post symbolic fencing in front of the overwash prior to the nesting season. ENSP placed "Area Closed" signs on every other post. A row of cedar posts just behind this fencing is permanently outfitted with rope (although it must be periodically repaired by either BPWD or ENSP) to provide additional protection of the nesting area. Nests found on the oceanfront portion of the beach were protected by ENSP with string-and-post symbolic fencing as they were found. The small overwash at the northern tip already had symbolic fencing around it that BPWD had erected several years ago. ENSP repaired portions of this fence and placed "Area Closed" signs on every third post. The nesting area on the exposed outer portion of the northern tip was protected by ENSP with string-and-post symbolic fencing after nesting activity was detected. As more plovers (and least terns) moved out on the outer tip, nearly all the habitat in this area not subject to normal tidal flooding was fenced.

Vehicle barrier: During the past several years, a vehicle barrier was erected just south of the main overwash once the first plover nests hatched (generally a week or so before Memorial Day). This year, because nesting was anticipated by ENSP on unfenced portions of the northern tip and on the oceanfront beach, ENSP requested that nearly the entire northern area be prefenced by BPWD or that a vehicle restriction be put into place by early April. In response, BPWD erected a vehicle barrier just south of the "vehicle cut" near the northern tip on April 16. The vehicle barrier was moved by BPWD to its traditional location just south of the overwash on May 20 (to coincide with the first nest hatching in the overwash). The vehicle barrier consisted of cedar posts connected by rope running perpendicular down to the waters' edge. The seasonal vehicle closure was reinforced with large "Plover Nesting Area - No Vehicles Beyond This Point" signs posted as vehicles approached the barrier. In addition, ENSP staff posted "No Dogs" at the barrier. The vehicle barrier was destroyed by vandals on the night of August 15 and replaced by BPWD the following day. Both "Plover Nesting Area - No Vehicles Beyond This Point" signs were also stolen during the season. The barrier was removed by BPWD on August 22, after ENSP determined the last chick had fledged.

Predator exclosures: Predator exclosures were used to protect 14 out of the 23 nesting attempts. They were strongly considered for each nesting attempt. Electric fencing was used in conjunction with all exclosures to further deter fox predation. Ten (10) of 12 nests in the overwash were exclosed. Of the two unexclosed nests in the overwash, one was abandoned before reaching a full clutch and the other was destroyed by an avian predator before it reached a full clutch. Two of the three nests located on the oceanfront beach were exclosed. Heavy fox activity was noted near both of these nests, while the third nest was located well out on the beach close to the wrack line so an exclosure was not used in that case. One of the three nests in the small overwash at the northern tip were exclosed. An attempt was made to exclose one of the other nests in this area, but the adults would not return to the nest to incubate, so the exclosure had to be removed. (That nest was destroyed by flooding within a few days so no additional attempt was

made to exclose it). The third nest in that location was not exclosed because it was not being "regularly" incubated and therefore it was not a good candidate for an exclosure. (ENSP staff strongly believes that this nest, which successfully hatched and fledged young, only had one adult present soon after copulation). Nests located out on the exposed northern tip presented the greatest challenge regarding whether or not they should be exclosed. Nests in this area where potentially exposed to tidal surges, and, in general, ENSP staff initially believed fox only occasionally ventured out that far. However, fox tracks were seen in that area later in the season, and subsequently one late re-nest out on the northern tip was exclosed.

Predator control: None undertaken.

Municipal beach management: This site is a state owned Natural Area and as such no active management, including beach raking, occurs on this beach.

Coordination/Communication: Weekly updates were faxed to the City of Brigantine, NJDPF and the NJ Office of Natural Lands Management to keep them informed of the current status of plover activity and ENSP management recommendations. ENSP, NJDPF and the City of Brigantine met at the beginning of the nesting season (April 9) to discuss changes in management efforts, primarily relating to enhanced fencing needs and the placement of the vehicle barrier.

Beach nesting bird management plan: No formal plan exists, although the State of NJ and the City of Brigantine have a signed agreement outlining the City's beach nesting bird management responsibilities required in exchange for being able to issue ORV permits for the site.

Outreach: None.

Nesting results

Fifteen (15) pairs of plovers nested at the site, resulting in 23 nesting attempts. Twelve (12) of the nests attempts were in the overwash, three between the overwash and the north tip, and eight at the northern tip area (three in the small overwash and five on the outer tip). Nine nests hatched. Of the 14 nesting attempts that failed, six were abandoned, five were flooded, one was destroyed by an avian predator, and two were lost to undetermined causes. All six of the abandoned nests were located in the main overwash, and five of those were exclosed. Three of the exclosed nests were most likely abandoned at the same time (same night). The nine successful nests hatched a total of 25 chicks, of which 17 fledged.

In addition to plovers, a small least tern colony (23 peak adults) was present on the outer portion of the northern tip. The colony completely failed largely due to persistent flooding, although foxes were probably also a factor.

Recommendations

Monitoring and patrolling: In addition to those areas covered during normal regular surveying, the area south of the main overwash should be surveyed (by foot) on a more regular basis as long as suitable habitat exists. Although no plovers have nested in this area to date, as of the end of the 2002 season suitable habitat existed. Habitat on the bay side should also be closely watched. In general, as the beach continues to change over

time, an assessment of nesting habitat must be made before every nesting season to determine how the changing beach ecosystem has altered nesting habitat and to aid in developing appropriate management strategies.

Fencing/Posting: Prefencing of existing nesting areas, including the overwash and the northern most dune system, has proven to be an effective management tool. It provides the means to separate vehicle and foot traffic from areas of nesting activity and therefore prevents accidental crushing of eggs by vehicles or walkers. Prefencing also limits disturbance to birds setting up nesting territories and establishing nests. The overwash used to be the primary nesting site, but nesting activity is spreading out across the oceanfront beach north of the overwash and on the open northern tip. Even with the vehicle barrier in place, these large areas need to be fenced in order to protect nests from foot traffic. In 2002, these nests were fenced by ENSP as they were found. Under the agreement reached by the State of NJ and the City of Brigantine, fencing is the primary responsibility of the City, therefore this issue needs to be addressed. Request that NJDPF make new "Plover Nesting Area – No Vehicles Beyond this Point" signs, since the two existing ones were stolen this year.

Vehicle barrier: The vehicle barrier was erected early this year (April 16) just south of the vehicle cut near the northern tip, and was moved to its traditional location south of the main overwash on May 20. Keeping the north end free of ORV's early in the season gave the birds an undisturbed beach to set up nesting territories and establish nests. ENSP should assess habitat in March and recommend to the City where the barrier should be placed. Nesting did occur on the oceanfront beach last year near the "shipwreck" in an area that was not protected by the vehicle barrier. If suitable habitat exists anywhere between the main overwash and the northern tip, ENSP would recommend that the vehicle barrier be placed just south of the main overwash starting April 1. A second option would be for BPWD to fence **all** suitable habitat north of the main overwash with string-and-post symbolic fencing by April 1. This later option would likely entail at least 2000 meters of fence, as well as additional equipment and manpower costs for the City. It would likely also require ongoing maintenance of fencing since some of these areas are prone to tidal flooding.

Predator exclosures: ENSP staff should continue to erect predator exclosures on every nest, unless circumstances dictate otherwise. Electric fence should continue to be used in conjunction with exclosures, although it may not be necessary in every case. Use of both predator exclosures and electric fence should be closely monitored, especially in the overwash where five exclosed nests (outfitted with electric fence) were abandoned in 2002. Night time monitoring may be useful in this regard. There was extensive bird droppings on at least one of the poles holding the electric chargers. This nest was in area of the overwash where three nests were abandoned at the same time. An avian predator, perched on top of the pole holding the charger, could account for that abandonment, although, in general, fox are believed to be more of a threat at this site. To counter potential avian harassment, poles holding the electric chargers should be placed as low as possible. (The pole from the nest that had whitewash on it was placed higher than others used this year because of difficulty in digging a deep enough hole.) Commercially available anti-perching devices could be used on top of the poles.

Predator control: Fox were observed on numerous occasions, and regular observations of fox and raccoon tracks were made throughout the nesting areas. ENSP should encourage fox trapping during the regular trapping season to help ease predatory pressures. Encourage the City of Brigantine, N.J. Division of Parks and Forestry, and the N.J. Office of Natural Lands Management to implement an education program to dissuade people from feeding foxes, such as creating a brochure to hand out with 4x4 permits informing citizens of the impact feeding fox has on the environment.

Municipal beach management: Since these nesting sites are part of a state designated Natural Area, snow fence should not be erected in front of and north of the overwash area by either the City of Brigantine or NJDPF. Placement of snow fence in the Natural Area would inhibit the creation of new habitat. In addition, some suitable nesting habitat now exists in the portion of the Natural Area south of the overwash, and although this section has not historically supported nesting plovers, snow fence should not be erected in this area either.

Coordination/Communication: No change.

Beach nesting bird management plan: No change.

Outreach: Literature that the City of Brigantine handed out with the ORV permits included a statement that the vehicle barrier would come down no later than August 15. This year the vehicle barrier was not removed until August 22 (to coincide with the last chick fledging), which created confusion and some anger among ORV users. Strongly suggest to the city that they not to mention a specific date for the vehicle barrier removal since it can vary.

Brigantine Inlet (Cove)

Management

Monitoring and patrolling: ENSP surveyed the site once a week in the early part of the nesting season. Although plovers had not nested at the site since 1995, the increased suitability of the habitat over the last two years led ENSP to believe nesting was likely. Once the nest was discovered, ENSP monitored the site at least 3 times a week, including patrolling 1 weekend day.

Fencing/Posting: ENSP staff protected the 1 nest found at this site with string-and-post symbolic fencing when it was discovered. "Area Closed" and "Do Not Enter" signs were posted on every third post. "No Vehicle" signs were posted around the outer perimeter of the nesting area (100 yards from the nest) since vehicle usage was permitted on this beach. This included protection of a semi-permanent tide pool directly adjacent to the nesting area.

Predator exclosures: No predator exclosures were used at this site.

Predator control: None undertaken.

Municipal beach management: ORV use by the public is permitted on this beach. The only nest at the site was located near a tide pool at the back of the beach (well removed from the inlet shoreline). This alternative feeding area functioned as the primary feeding

area for the chicks. ENSP was prepared to recommend a vehicle closure for the eastern end of the beach (extending out to the inlet) during the brood rearing stage. However, the chicks did not move outside of the "No Vehicle" area established near the tide pool until they were fledged. Mechanical raking of this beach is not permitted under DEP Coastal Rules regarding beach maintenance. The City was observed raking (bulldozing) sand at the site and was informed by providing them with an update of the Coastal rules.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: None undertaken.

Nesting Results

One (1) pair of piping plovers nested at this site, resulting in 1 nesting attempt. Three (3) chicks hatched, of which 1 fledged.

Recommendations

Monitoring and patrolling: ENSP should survey this site more frequently, especially early in the nesting season.

Fencing/Posting: No change.

Predator exclosures: No change.

Predator control: No change.

Municipal beach management: Remind the City of the DEP beach maintenance regulations regarding raking at this site. ENSP should be prepared to recommend the closure of a portion of the beach to vehicles depending on the location of nesting territory or nests, and if broods are using the inlet shoreline as a feeding area.

Coordination/Communication: No change.

Beach nesting bird management plan: No change.

Outreach: No change.

Ocean City - North

Management

Monitoring and patrolling: ENSP staff and CCRP student researchers monitored the site daily, including patrolling on both weekend days.

Fencing/Posting: ENSP staff, the Ocean City Department of Public Works, NJDFW Citizen Scientist volunteers and students from Ocean City High School fenced a large nesting area at the Inlet section prior to nesting activity (March 19) with wire pasture fence. "Area Closed" signs were posted on every third post. "Detour" signs were placed adjacent to the nesting area to direct beachgoers around the fenced area. As the season progressed, the ocean-facing side of the fence was repeatedly washed away. Eventually,

the entire ocean-facing side of the wire fence was replaced with string-and-post symbolic fencing. ENSP staff fenced 5 additional nests (with string-and-post symbolic fencing) located outside the pre-fenced area as they were discovered. ENSP staff posted "No Dogs" signs at all of the beach access paths from the inlet bridge south to the terminal groin. As nests hatched, "Nest Has Hatched" signs were posted at each of the beach access paths.

Predator exclosures: No predator exclosures were used at this site.

Predator control: The Ocean City Animal Control Officer patrolled the site early in the season and responded to several dog problems. As nests hatched, ENSP requested that the officer refrain from using his vehicle near the nesting area. This resulted in less patrolling by him as he consistently uses a vehicle for patrolling. Fox were reported in the area by Ocean City Department of Public Works.

Municipal beach management: The City did not mechanically rake the beach north of the terminal groin. Areas south of the terminal groin were raked. Municipal vehicle use was limited to emergency use only in the area north of the terminal groin for the entire nesting season. The area south of the terminal received light vehicle use (primarily Public Works Department and Beach Patrol).

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. In addition, communication between the ENSP Field Supervisor and Roger Leeds, of the Ocean City Public Works Department was ongoing throughout the season.

Beach nesting bird management plan: A draft plan exists and has been used as a working plan between the City and ENSP for the last five years.

Outreach: Distribution of beach nesting bird brochures to the public. Literature about why dogs and beach nesting birds "don't mix" and the city's dog ordinance was distributed to dog walkers.

Nesting results

Eight (8) pairs of plover nested at this site for a total of 14 nesting attempts. Four (4) nests hatched. Seven (7) nests were lost due to flooding and 3 were lost due to undetermined causes. The 4 successfully hatched nests yielded a total of 10 chicks, of which 5 fledged.

In addition to plovers, a large least tern colony (215 peak adults) was present at the site. Productivity was low (<0.5 fledges per pair). In fact, the colony nearly completely failed due to persistent flooding and fox predation. Nearly 500 black skimmers were also present at the site early in the season, although only a handful actually nested and no nests hatched. Continual flooding was the primary reason for the failure of the colony and nearly all the skimmers abandoned the site by mid-June.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: The use of the wire pasture fence seemed to reduce the number of people and domestic animals entering the nesting area. However, the ocean's continuous battering of the fence made maintenance extremely labor intensive. In addition, the beach is now being continuously eroded to the point that a much smaller area may be available for nesting in 2003. About half of this year's nesting took place outside of the pre-fenced area, and a much smaller number of least terns and black skimmers nested compared with 2001. Taking these factors into consideration, both prefencing itself and the exact type of fencing used will have to be determined after a site assessment early in the 2003 season (i.e., in March). If a large enough area of suitable habitat exists, ENSP should consider use of wire pasture fence on the back and sides of the nesting area, and use of string-and post symbolic fencing on the oceanfront side.

Predator exclosures: No change.

Predator control: Monitor predator problems more closely, especially regarding cats and red fox. Encourage the City to enforce their dog ordinance throughout the entire season, even if that means that patrolling by their Animal Control Officer would have to be done partially on foot in the nesting zone.

Municipal beach management: No change.

Coordination/Communication: No change.

Beach nesting bird management plan: ENSP should review and update the Ocean City Beach Nesting Bird Draft Management Plan/Agreement with the goal of having it formally adopted by the City.

Outreach: Interpretive signs were not used this year because of ongoing flooding (and fear that signs might be washed away). Depending on the habitat, ENSP should revert to placing signs on the beach or in locations likely to be safe from flooding tides and beach erosion.

Ocean City - Center

<u>Management</u>

Monitoring and patrolling: ENSP staff and CCRP student researchers monitored nests daily, including patrolling on both weekend days. ENSP staff and 3 N.J. Conservation Officers patrolled the nesting area on the night of the July 4th fireworks.

Fencing/Posting: ENSP staff protected nests as they were found using string-and-post symbolic fencing that supplemented existing snow fence. A strand of polypropylene rope was also used to provide additional protection in areas of high beach usage. "Area Closed" signs were posted on every third post. "Detour" signs were placed adjacent to several of the nesting areas that were located near beach access paths to guide beachgoers. In addition, a mid-block beach access path located between 25th and 26th Streets was closed during the nest incubation period. Once nests hatched, feeding corridors were established in order to allow chicks less disturbed access to the water's edge. The corridors consisted of string and post fencing supplemented with "Plover Crossing," "Nest Has Hatched," "No Ball Playing, Kite Flying, etc." and "5 MPH" signs.

Predator exclosures: No predator exclosures were used at this site.

Predator control: An active fox den was located near 21st Street. The City did not have the resources for fox predator control and ENSP felt it was unfeasible to remove the fox due to their location on a heavily used beach in the middle of the tourist season.

Municipal beach management: The area between 18th and 28th Street was not raked by the City during the nesting season. On several occasions, the City requested to rake heavy accumulations of wrack material. Requests were reviewed on an individual basis and raking was permitted if no nesting activity was present in the area. Raking was phased-in later in the season as plovers left the site. Due to chicks foraging at outfall pipes, ENSP staff requested that cleaning of outfall pipes be curtailed in nesting areas, except in emergencies. Ocean City Department of Public Works erected cedar poles between 23rd St. and a dune on the beach, to redirect vehicle and catamaran traffic away from nesting/foraging areas. ENSP staff did not present an orientation to the Ocean City Beach Patrol because of unprofessional treatment of ENSP staff by the lifeguards during the presentation in 2001. However, the ENSP field supervisor briefed the Ocean City Beach Patrol Captain prior to the season regarding lifeguard activities that would be detrimental to nesting, in particular with regards to vehicle use.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. In addition, communication between ENSP Field Supervisor and Roger Leeds, of the Ocean City Public Works Department was ongoing throughout the season.

Beach nesting bird management plan: A draft plan exists and has been used as a working plan between the City and ENSP for the last five years.

Outreach: Distribution of beach nesting bird brochures to the public. An interpretive sign about beach nesting birds was placed near the 23rd Street vehicle beach access path.

Nesting results

Eight (8) pairs of plovers nested between 18th and 26th Streets for a total of 13 nesting attempts. Six (6) nests hatched. Of the nests that failed, 5 were lost due to predation, 1 to abandonment and 1 due to undetermined causes. The presence of a fox den in the nesting area is suspected to be the cause of several of the predated nests and possibly some of the lost chicks. A total of 17 chicks hatched, of which only 1 fledged.

In addition to plovers, a small scattered least tern colony (12 peak adults) was present in the area between 18th and 26th Streets. The colony completely failed, likely due to fox predation and possibly human disturbance.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: No change.

Predator exclosures: If fox continue to be a problem, consider the use of predator exclosures to protect some nests.

Predator control: Work with the City and Animal Control Officer to assess options in managing the fox population, including trapping. Survey the beach in the winter to determine updated status of fox den(s) before birds arrive.

Municipal beach management: The use of ORVs by the Ocean City Department of Public Works and Beach Patrol should continue to be limited during the nest laying/incubation period and entirely restricted during the chick rearing period except for emergencies and valid essential purposes. ENSP should continue to work with Public Works and Beach Patrol (as well as any other appropriate city departments) to educate them about how their activities can have a harmful effect on beach nesting birds. Municipal cooperation has improved, however, compared to other sites (municipalities) the volume of vehicle use is still very high. Young chicks were once again observed this season foraging at outfall pipes, therefore, cleaning of outfall pipes in nesting areas should continue to be curtailed during the nesting season, except in the event of an emergency. Kiteboaders began using the area near 23rd Street on a regular basis this year. ENSP should continue to monitor the use of this area by kiteboarders, and if necessary, recommend that the City restrict their use within the nesting area. Catamaran owners were less cooperative this year and since their designated usage area at 23rd Street is in the middle of the nesting zone, consideration should be given to moving the location or redirecting activities. ENSP should elicit the City's help in this regard. Public ORV usage is allowed in the early part of the season via the 23rd Street access. Consideration should be given to redirecting public vehicles outside the nesting area starting April 1 by only allowing public vehicle access from the 29th Street access to points south.

Coordination/Communication: No change.

Beach nesting bird management plan: ENSP should review and update the Ocean City Beach Nesting Bird Draft Management Plan/Agreement with the goal of having it formally adopted by the City.

Outreach: No change.

Corson's Inlet State Park

Management

Monitoring and patrolling: ENSP staff monitored the site 3-4 times a week, including patrolling at least 1 weekend day. N.J. Division of Parks & Forestry personnel, including rangers, patrolled the area daily. At ENSP's request vehicle patrols were reduced, especially in areas where unfledged chicks were present.

Fencing/Posting: ENSP staff and NJDFW Citizen Scientist volunteers fenced a large area prior to the nesting season (April 10) with string-and-post symbolic fence. A strand of polypropylene rope was also used to provide additional protection. "Area Closed" signs were posted on every third post.

Predator exclosures: One (1) predator exclosure was used on the single nesting attempt. The exclosure was supplemented with electric fence.

Predator control: None undertaken, although evidence of high fox activity continues to be observed.

Beach management: The site is a state park, and as such no active management occurs on the beach. A boat and PWC landing area, as designated by NJDPF, is situated at the southern tip of the park.

Coordination/Communication: Weekly updates were faxed to NJDPF to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: Distribution of beach nesting bird brochures to the public. ENSP staff installed an interpretive sign about beach nesting birds at the northernmost end of the fenced area where a walking path came out on the beach.

Nesting results

One (1) pair of plovers nested at this site, resulting in a single nesting attempt. The nest hatched 4 chicks, of which 3 fledged. An additional unpaired adult was present at the park for much of the nesting season.

In addition to plovers, a small least tern colony (7 peak adults) was present at the site. The colony formed late in the season and completely failed, likely due to fox predation.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: No change.

Predator exclosures: No change.

Predator control: Breeding habitat continues to be excellent at the park, however, ENSP believes the fox population at the park and the associated predation pressure continue to suppress the number of piping plovers nesting at the site. In order to regain the nesting population, NJDPF and NJDFW should jointly develop a predator removal program that could include live trapping and relocation or temporary opening to licensed trappers during the regular trapping season.

Beach management: Driving by all park staff in the vicinity of nesting activity or foraging chicks should be limited to emergency and essential purposes only. A sign should be placed at the docking ramps and landing areas alerting boaters/PWC users about the presence of chicks and asking them to use caution when docking on inlet beaches. Consideration should be given to relocating or eliminating the landing away from prime foraging habitat.

Coordination/Communication: No change.

Beach nesting bird management plan: No change.

Outreach: No change.

Whale Beach

Management

Monitoring and patrolling: ENSP staff surveyed the site once a week early in the season. When no plover activity or nests were discovered by the end of May, surveying was scaled back to once every 2 weeks.

Fencing/Posting: No fencing or signage was used at this site because the site's 1 known nest was not found until after it had been destroyed.

Predator exclosures: No predator exclosures were used at this site.

Predator control: None undertaken.

Municipal beach management: Upper Township does not mechanically rake any portion of their beach. Vehicles are not normally permitted on the portion of the beach where nesting took place.

Coordination/Communication: None.

Beach nesting bird management plan: No formal plan currently exists, although Upper Township is currently in the process of developing a plan.

Outreach: None.

Nesting Results

One (1) pair of plovers nested just south of the last oceanfront house in Strathmere. Staff from the Richard Stockton College Coastal Research Center alerted ENSP of the presence of a pair of plovers, which they had observed during a beach engineering survey conducted in mid-July. ENSP staff immediately went to the site, where the crushed remains of a nest were discovered in the tire tracks of the vehicle used for the engineering survey. ENSP staff observed the adult plovers carry away the destroyed remains of the nest, including the embryos and eggshells. This incident occurred late in the season, therefore renesting did not occur and no chicks fledged from the site. This is the first time since 1998 that plovers have nested at this site.

Recommendations

Monitoring and patrolling: Surveying of the entire strand of beach in Upper Township (Strathmere and Whale Beach) should be increased to at least twice a week, starting early in the season and continuing through July.

Fencing/Posting: ENSP should protect nests with string-and-post symbolic fence and "Area Closed" signs as they are found.

Predator exclosures: Predator exclosures should not be used at this site until a predator problem is observed.

Predator control: None necessary at this point.

Municipal beach management: No major changes. However, if Richard Stockton College (or others) will be completing engineering studies on the beach during the nesting season, they will require a qualified escort or prior determination by ENSP that

no nesting activity exists. This, as well as other vehicle use on the beach, should be addressed in the management plan being developed by the Township.

Coordination/Communication: If nests are found or nesting activity is observed, begin faxing weekly updates to the township to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: ENSP and the Township should work to finalize, adopt and implement the beach nesting bird management plan, which was being developed by the Township this year.

Outreach: If nesting occurs next year, assess what type of outreach would be appropriate.

Townsend's Inlet

Management

Monitoring and patrolling: ENSP staff monitored the site at 3-5 times per week, including limited patrolling on both weekend days.

Fencing/Posting: ENSP staff pre-fenced (April 4) the area between 93rd Street and the Townsend's Inlet Bridge with post-and-string symbolic fencing. "Area Closed" signs were posted on every second post. After the single successful nest hatched, feeding corridors were not necessary because the symbolic fencing was already extended to the wrack line to protect a large tern colony and the plovers also utilized an alternate feeding area inside the fenced area. The area was posted with "Nest Has Hatched," "Plover Crossing" and "5 MPH" signs. A "No Dogs" sign was posted at the 93rd St. oceanfront access. The City posted large signs at either end of the nesting area outlining restrictions put in place as result of a municipal ordinance designating the area as nesting habitat.

Predator exclosures: The only nest was protected with a predator exclosure.

Predator control: None undertaken, although cats continue to be a concern.

Municipal beach management: The City did not mechanically rake the area between 93rd Street and the Townsend's Inlet Bridge during the nesting season. Vehicle use was limited to essential and emergency uses only.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists, however the City has adopted an ordinance which designates the area between 94th Street and the Townsend's Inlet Bridge as a beach nesting bird area and outlines various public and municipal restrictions.

Outreach: Distribution of beach nesting bird brochures to the public.

Nesting results

One (1) pair of plovers nested at the site, resulting in one (1) nesting attempt. The nest hatched 3 chicks, 2 of which fledged.

In addition to plovers, a medium-sized least tern colony (90 peak adults) was present at the site. Productivity was moderate (0.5>1.0 fledges per pair). Some predation was suspected, although it was not clear which species were responsible. Cats (possibly both feral and free-roaming pets) were the most likely cause.

Recommendations

Monitoring and patrolling: If the City receives a proposed "emergency" beachfill between 88th and 94th Streets prior to the next nesting season, expand regular surveying to include this area.

Fencing/Posting: Encourage the City to construct larger "No Dogs" signs and/or place current "No Dogs" signs in more prominent locations.

Predator exclosures: No change.

Predator control: Encourage the City to enforce current pet restrictions in the vicinity of the nesting area. Dog walking continues to be a problem, including owners bringing dogs on to the beach from the park located near the bridge. There was evidence of cats in the nesting area, although it is not clear whether they were feral cats or pets let outside of nearby dwellings. ENSP needs to better monitor the cat activity to determine if the City needs to address the situation by educating local pet owners or if it is a feral cat problem that requires predator removal.

Municipal beach management: No change.

Coordination/Communication: No change.

Beach nesting bird management plan: No change.

Outreach: Consider distribution of "Cats Indoors" brochures to homeowners in the vicinity of the nesting area.

Avalon North

Management

Monitoring and patrolling: ENSP staff surveyed the site 3 times a week in the beginning of the season (April-May). One (1) adult plover was observed scraping inside of and just south of the pre-fenced area early in the season. A second adult was briefly observed at the site but no nest was found. It is not believed that pair bonding occurred and eventually the male left the site (and was believed to have moved south to Avalon Dunes). Once the male left the site, surveys were reduced to once every week until July when surveying was discontinued.

Fencing/Posting: Post-and-string symbolic fencing was erected by Avalon Public Works between 8th and 9th Streets prior to nesting activity because of jetty construction in the vicinity of where a plover was scraping. A line of snow fence was used on the northern

end of fenced area (closest to the construction). "Area Closed" signs were posted on every second post.

Predator exclosures: No nests were located so no exclosures were used.

Predator control: None undertaken, although cats continue to be a concern.

Municipal beach management: As prescribed in beach nesting bird plan, although no special consideration necessary this year because nesting activity only lasted for several weeks early in the season.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. Direct contact with the Borough was initiated through the Public Works Director on an as-needed basis.

Beach nesting bird management plan: A plan signed by ENSP and the Borough of Avalon has been in place since 2000.

Outreach: ENSP worked with Avalon Environmental Commission to present a beach nesting bird slide show to all students at the Avalon Elementary School. A similar presentation and nesting update was made mid-season by ENSP as part of the public portion of an Environmental Commission meeting.

Nesting results

No nesting occurred at the site.

Recommendations

Monitoring and patrolling: The entire northern portion of Avalon's beaches received a beach renourishment in the fall of 2002, therefore, regular surveying should be expanded to include all suitable habitat (not just in the 8th and 9th Streets area).

Fencing/Posting: Contact Avalon Public Works to fence the area between 8th and 9th Streets as soon as nesting activity is observed. Fence any nests found in others areas as they are discovered.

Predator exclosures: Since predators have been a problem at this site, continue to use exclosures on all nests.

Predator control: Encourage the Borough to increase enforcement of current pet restrictions in the vicinity of the nesting area. ENSP needs to better monitor the cat activity to determine if the Borough needs to address the situation by educating local pet owners or if it is a feral cat problem that requires predator removal.

Municipal beach management: Continue to work with the municipality to limit vehicle access/use near the nesting area during the brood rearing stage. Vehicle limitations may also be necessary during the egg laying stage if there is early evidence of nesting activity in areas south of 9th Street as a result of the beach replenishment.

Coordination/Communication: No change.

Beach nesting bird management plan: No change. However, both ENSP and Borough should be prepared to adapt present policies in the plan to areas south of 9th Street if the

beach replenishment project attracts plovers to areas where nesting has not recently occurred.

Outreach: Continue to work with the Avalon Environmental Commission to develop new outreach opportunities within the community.

Avalon Dunes

Management

Monitoring and patrolling: ENSP staff monitored the site 3-5 times per week, including patrolling on both weekend days. In addition, CCRP student researchers monitored and patrolled the area on weekends. An ENSP staff member and volunteer patrolled the area during the July 4th fireworks display

Fencing/Posting: Avalon Public Works pre-fenced two areas between 40th and 44th Streets and 44th and 48th Streets in early April with sting-and-post symbolic fencing (that they provided). "Area Closed" signs were posted on every second post. The area that was pre-fenced proved to be insufficient as piping plovers (and least terns) began nesting outside the fenced area, so fencing was expanded considerably by ENSP staff. ENSP staff also fenced 3 additional areas between 50th and 57th Streets with string-and-post symbolic fencing as nests were discovered. Feeding corridors were not necessary this year since fencing extended nearly out to the intertidal zone. However, "Nest Has Hatched", "Piping Plover Crossing" and "5 MPH" signs were posted once nests hatched.

Predator exclosures: Five (5) nests were protected with predator exclosures. Nests close to the dunes or not otherwise protected by a least tern colony were considered as candidates for predator exclosures. CCRP student researchers assisted with the erection of predator exclosures.

Predator control: None undertaken.

Municipal beach management: The Borough closely followed all management guidelines prescribed in the beach nesting bird management plan, including limits on beach raking and vehicle use in the nesting area.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations. Direct contact with the Borough was initiated through the Public Works Director on an as-needed basis. An ENSP Field Assistant briefed Beach Patrol staff regarding beach nesting birds prior to Memorial Day.

Beach nesting bird management plan: A plan signed by ENSP and the Borough of Avalon has been in place since 2000.

Outreach: ENSP worked with Avalon Environmental Commission to present a beach nesting bird slide show to all students at the Avalon Elementary School. A similar presentation and nesting update was made mid-season by ENSP as part of the public portion of an Environmental Commission meeting. Distribution of beach nesting bird brochures to the public. ENSP placed an interpretive sign on the beach at 40th Street.

Nesting results

Seven (7) pairs of plovers nested at this site, resulting in 8 nesting attempts. All 8 nests hatched. One (1) pair renested after losing its entire brood. A total of 23 chicks hatched, of which 9 fledged.

In addition to plovers, a large least tern colony (293 peak adults) was present in the area between 40th and 48th Streets. Productivity was low (<0.5 fledges per pair). Predation was the suspected cause of low productivity since neither human disturbance or flooding was a factor. No actual predation was observed, although predominately nocturnal species such as foxes, feral cats and ghost crabs are the likely suspects.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: Continue to have the Avalon Public Works Department fence areas between 40th and 44th and 44th and 48th Streets prior to the nesting season (early April), however, ENSP should be present to review the area to be fenced (or the area could be demarcated by ENSP prior to fencing).

Predator exclosures: No change.

Predator control: Predator problems continue to be a concern, although the exact species causing problems have been difficult to pinpoint. Continue to survey the area for mammalian predators, but also monitor the ghost crab population (which seems to be increasing). Consider nighttime monitoring of the site with night vision equipment.

Municipal beach management: Work with the municipality to reduce beach raking near the nesting area. The municipality currently rakes the beach in front of the 44th, 48th and 50th Street beach accesses on a daily basis and in order to get to these areas the beach rake passes through plover nesting areas. If this raking pattern continues, ENSP should encourage the municipality to rake these areas less often (twice a week). The catamaran parking area, which is located in the nesting area between 44th and 48th Streets, continues to create some conflicts and increases the potential for human disturbance on nesting birds. The Borough has agreed to move the catamaran area beyond 58th Street, which should address the situation.

Coordination/Communication: No change.

Beach nesting bird management plan: The primary nesting area (Zone 4) is currently defined as 42nd to 60th Street. Due to changes in nesting patterns and plans to move the catamaran parking area, nesting area should be redefined as 40th to 58th Street.

Outreach: Continue to work with the Avalon Environmental Commission to develop new outreach opportunities within the community. Explore the feasibility of ENSP participation in weekly beach walks sponsored by The Wetlands Institute. Approach the Borough about moving the interpretive sign, currently located at 32nd Street, to a more appropriate location closer to the nesting area (i.e. at 40th Street, 44th Street) or ask the municipality to purchase an additional sign for this location.

Stone Harbor (Point)

Management

Monitoring and patrolling: ENSP staff monitored the site 3-5 times per week, including patrolling on both weekend days. In addition, CCRP student researchers monitored and patrolled the area 1-2 days per week. CCRP student researchers also patrolled this site during the July 4th fireworks display.

Fencing/Posting: ENSP staff pre-fenced all portions of the point that were not prone to normal tidal flooding (not including the berm of the CDF) as soon as the first plover nesting activity was discovered (April 22). String-and-post symbolic fencing was used. "Area Closed" signs were posted on every third post. A nest located on top of the berm of the CDF was protected with a combination of snow fence, wire pasture fence and string-and-post symbolic fencing. After nests hatched, "Nest Has Hatched" signs were posted. "No Dogs" signs were placed at the vehicle entrance at the parking lot and the footpath entrance off the street.

Predator exclosures: No predator exclosures were used at this site.

Predator control: At ENSP's request the Borough contracted to have feral cats removed from the bayberry area adjacent to the parking lot at the point. Approximately 12-20 cats were trapped within two weeks and placed in a shelter.

Municipal beach management: The Borough does not mechanically rake the beach at the point. Vehicle use at the point was minimal (although Beach Patrol was observed on a regular basis near the end of the season).

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal written plan existed prior to this season although the Borough was developing one during the season.

Outreach: Distribution of beach nesting bird brochures to the public. An interpretive sign was erected by ENSP at the end of the vehicle access path to the point.

Nesting results

Six (6) pairs of plovers nested at the site for a total of 12 nesting attempts. One (1) nest was located on top of the berm for the CDF. Five (5) of the nests successfully hatched. Seven (7) nests were destroyed, all due to flooding. A total of 14 chicks hatched, of which 1 fledged.

In addition to plovers, a medium-sized least tern colony (57 peak adults), a medium-sized common tern colony (50 peak adults) and a large black skimmer colony (397 peak adults) were present at the site. Productivity for the least terns was low (<0.5 fledges per pair), while productivity for the black skimmers and common terns was high (1.0+ fledges per pair). All three species suffered nest and chick losses due to flooding. In addition to the terns and skimmers nesting at the site, several hundred non-nesting adults and juveniles were present at the site from early-August through mid-September.

Recommendations

Monitoring and patrolling: Expand surveys to include the oceanfront stretch of Stone Harbor's beach since a beach replenishment project is scheduled in this area for the fall/winter of 2002-2003.

Fencing/Posting: Pre-fence any appropriate habitat at the point in early April before nesting occurs. The exact area to be fenced may depend on the status of the CDF and/or ecological restoration at the point. Fencing was completed by ENSP this year, and although ENSP should continue to take the lead role for now, the Borough should also be involved since responsibility for pre-fencing will eventually be turned over to the them under the conditions of the management plan. Volunteer assistance is likely as several conservation groups use this site for educational programs.

Predator exclosures: No change.

Predator control: Monitor the feral cat population at the point to assess if continued removal is necessary. The area is also likely populated by red fox, so populations and use of the beach habitat by foxes should also be monitored.

Municipal beach management: No major change, however, Beach Patrol vehicle use at the point should be limited to emergencies and bonafide essential usage.

Coordination/Communication: No major change, however, Beach Patrol should be added to the list of faxed recipients of weekly updates.

Beach nesting bird management plan: Continue to work with the municipality to finalize, adopt and implement a beach nesting bird management plan.

Outreach: Expand outreach efforts in the community, possibly through a partnership with The Wetland Institute. Stone Harbor Point hosts one of the greatest concentrations of beach nesting birds in the state, and as such would make an ideal location for ENSP seasonal monitors to offer some type of guided "nature tour".

North Wildwood (Hereford Inlet)

Management

Monitoring and patrolling: ENSP staff monitored the site 3-5 times per week, including patrolling on both weekend days. ENSP staff and a CCRP student researcher patrolled this site for the July 4th fireworks.

Fencing/Posting: ENSP staff pre-fenced (May 13) a large area along the inlet between Surf Road and Central Avenue as soon as nesting activity (scraping) was observed. String-and-post symbolic fencing was used. A strand of polypropylene rope was used on the back side of the fencing to provide additional protection. "Area Closed" signs were placed on every pole. A semi-permanent tidal pond that existed at the back of the beach served as the primary foraging area for the chicks (and adults). Therefore, once nests hatched this area was closed to vehicles, using "No Vehicle" signs at either end of the nesting area. "Nest Has Hatched" signs were also used to alert beachgoers walking in this area that vulnerable chicks were present. "5 MPH" and "Nest Has Hatched" signs

were used on the inlet side of the nesting area once nests hatched. Vehicle usage by the municipality in this area was limited to emergency and essential uses only.

Predator exclosures: No predator exclosures were used at this site.

Predator control: None undertaken.

Municipal beach management: Prior to this year (when no nesting occurred at this site) portions of this beach were mechanically raked by the City. Once nesting activity was observed this year, ENSP requested that this area not be raked. In addition, raking of this area is prohibited under DEP Coastal Rules pertaining to beach maintenance.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists, although one is being planned by the City.

Outreach: Distribution of beach nesting bird brochures to the public. An interpretive sign was placed at the eastern end of the fencing where the most public use was anticipated.

Nesting Results

Three (3) pairs of plovers nested at this site, resulting in 5 nesting attempts. Three (3) nests hatched. Two (2) nests were destroyed due to flooding. A total of 10 chicks hatched, 4 of which fledged. This was an entirely new nesting site and was the first time since 1996 that plovers nested in the City of North Wildwood.

In addition to plovers, a large least tern colony (105 peak adults) was present at the site. Productivity was high (1.0+ fledges per pair).

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: Pre-fence the nesting area in early April if suitable habitat still exists. Because this was a new nesting site that took up a large portion of the beach (a least tern colony was also present) and the beach receives heavy public usage, there was a fairly high level of human encroachment within the fenced nesting area. String-and-post symbolic fencing may still be sufficient but pole density should be increased and a second strand of string/rope should be used.

Predator exclosures: Since all 3 pairs successfully hatched young, refrain from use of predator exclosures at this site, however, continue to monitor predator populations and activity closely.

Predator control: Encourage the municipality to enforce their existing dog ordinance since dogs (both leashed and unleashed) were a problem at this site.

Municipal beach management: Considering that this was the first year for nesting at this site, municipal compliance with management recommendations made by ENSP was excellent. Nonetheless, education of municipal staffs, including Public Works, Beach Patrol and Law Enforcement, regarding potential negative impacts of their activities on

beach nesting birds needs to be increased. A yearly informational slide show to these departments would be recommended. Beach raking was conducted right up to the fenced area, and although the fencing provided a sufficient buffer during the egg laying stage, close monitoring is necessary to determine if an additional raking buffer is needed during the brood rearing state when chicks can move outside the fenced area.

Coordination/Communication: No change.

Beach nesting bird management plan: Work with the municipality to develop a beach nesting bird management plan that encompasses this site as well as oceanfront portions of the beach.

Outreach: Consider placement of an interpretive sign at both ends of the nesting area since beachgoer access is heavy from both directions.

US Coast Guard Training Center (TRACEN)

Management

Monitoring and patrolling: ENSP staff monitored the site 2-3 times per week. The base's Environmental Officer (and other base staff) provided additional monitoring several days each week. USCG also patrolled the site for security purposes.

Fencing/Posting: USCG officials closed the beach to all base personnel (except security staff) and the public during the entire nesting season, and to reinforce the closure USCG staff pre-fenced the back portion of the beach. In addition, USCG staff pre-fenced most of the shoreline just above the intertidal zone to prevent public access by the occasional trespasser on the base. String-and-post symbolic fence was used in both areas. "Area Closed" signs were placed on every second post. USCG staff also installed a large "Beach Closed" sign at the base's southern border in an attempt to further restrict public access.

Predator exclosures: USCG staff and ENSP staff jointly erected 3 predator exclosures at the site.

Predator Control: Since mammalian predation (fox, cats and raccoons) is believed to be responsible for nest failures and chick loss at the site in recent years, USCG conducted a predator removal program in the spring of 2002 (and in 2001, as well).

Beach management: No active beach management (including beach raking) is conducted by USCG at this site. Removal of vegetation (by hand) was conducted by USCG on several trial plots in an effort to enhance beach nesting bird habitat.

Coordination/Communication: Weekly communication was maintained between ENSP and USCG via telephone and personal on-site conversations with the base's Environmental Officer.

Beach nesting bird management plan: No plan existed during this nesting season, however, the USCG developed a plan at the end of the year as part of their Integrated Natural Resource Management Plan.

Outreach: None undertaken.

Nesting Results

Three (3) pairs of plovers nested at the site, resulting in 4 nesting attempts. Three (3) nests hatched and 1 failed due to an unknown predator. A total of 9 chicks hatched, of which 3 fledged.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: Since nesting activity has been shifting northward at this site the last several years, USCG should consider extending fencing further north along the oceanfront.

Predator exclosures: No change.

Predator control: USCG should continue predator removal program that has been in place the last 2 years.

Beach management: No change.

Coordination/Communication: No change.

Beach nesting bird management plan: ENSP and USCG officials should work to finalize, adopt and implement the beach nesting bird management plan, which was developed by USCG this year.

Outreach: No change.

Other: Continue to encourage the USCG to take the lead role in management and monitoring at the site. ENSP should provide training to USCG staff as needed.

Cape May (City)

Management

Monitoring and patrolling: ENSP staff monitored the site 3 times a week in April and May, and then once a week through July after the site's only pair left the area.

Fencing/Posting: ENSP staff protected nests with string-and-post symbolic fencing as they were found. "Area Closed" signs were placed on every third post. "No Raking" signs were placed from the dune line down to the wrack line at Baltimore Avenue, as a reminder to the City that raking was not permitted from that point up to the USCG base.

Predator exclosures: No predator exclosures were used at the site.

Predator control: None undertaken, although cats remain a concern.

Municipal beach management: At ENSP's request the City's Public Works Department and Beach Patrol limited vehicle use in the nesting area to emergency and essential uses only, and suspended beach raking from Baltimore Avenue to the USCG base once nesting activity was observed.

Coordination/Communication: Weekly updates were faxed to the municipality to keep them informed of the current status of plover activity and ENSP management recommendations.

Beach nesting bird management plan: No formal plan currently exists, although one is under development by the City.

Outreach: None.

Nesting results

One (1) pair of plovers nested at the site, resulting in 2 nesting attempts. Both nests failed to hatch. The first nest was predated and the second nest was abandoned. The pair was not observed after they lost their second nest, even though it was early in the season.

Recommendations

Monitoring and patrolling: No change.

Fencing/Posting: No change.

Predator exclosures: Consider use of predator exclosures even though the beach receives heavy public usage.

Predator control: Encourage the City to enforce existing pet restrictions. ENSP needs to better monitor the cat activity to determine if the City needs to address the situation by educating local pet owners or if it is a feral cat problem that requires predator removal.

Beach management: The Poverty Beach section of the City should be designated as a "no-rake" area not just during the nesting season but for the entire year. This and other specific policies need to be formally addressed in the beach nesting bird management plan.

Coordination/Communication: No change.

Beach nesting bird management plan: ENSP and the City should work to finalize, adopt and implement the beach nesting bird management plan.

Outreach: Consider distribution of "Cats Indoors" brochures to homeowners in the vicinity of the nesting area.

Cape May Point State Park

Management

Monitoring and patrolling: Staff from The Nature Conservancy surveyed the site on a semi-regular basis as part of their normal monitoring of the adjacent TNC-owned beach. ENSP staff made periodic visits to the site (about once every 2 weeks).

Fencing/Posting: No fencing or signage was erected at this beach since no plovers nested at the site.

Predator exclosures: No predator exclosures were used since there were no nests at this site.

Predator Control: None undertaken.

Beach Management: One (1) brood of plover chicks, which originated from the adjacent TNC beach, used the northern portion of the park as a foraging and resting area. At

ENSP's request, park officials stopped all staff vehicle use in this area of the park once chicks were present (or had the potential to move onto the park beach).

Coordination/Communication: Bi-weekly updates were faxed to the park to keep them informed of the current status of plover activity and ENSP management recommendations. After chicks were observed moving onto the park beach, periodic telephone and e-mail communication between ENSP and TNC (Les Frie) was also necessary.

Beach nesting bird management plan: No formal plan currently exists.

Outreach: None.

Nesting Results

No plovers nested at this site, although it was used as a foraging and resting area by a brood of chicks (and associated adults) that moved from the TNC portion of the beach.

Recommendations

Monitoring and patrolling: No change, although responsibilities may not be clearly defined. Since the park is adjacent to the TNC owned portion of the beach and birds move between the 2 sites, ENSP should work with TNC to develop a coordinated monitoring and patrolling plan that uses existing staff resources efficiently.

Fencing/Posting: No change, although park staff should be involved in fencing if it becomes necessary.

Predator exclosures: No change.

Predator control: No change.

Beach management: Vehicle use by park staff should be limited near the nesting area (the northern end of the park) during the egg laying portion of the season starting April 1, and should be restricted to an emergency basis only during the brood rearing stage.

Coordination/Communication: The roles of ENSP, TNC and the Park staffs in the management of the site as a nesting area still need clarification, especially since beach replenishment is planned for Cape May Meadows Beach and is likely to result in more nesting activity in the future.

Beach nesting bird management plan: No change.

Outreach: Outreach materials should be provided to the park for distribution at their visitor's center. CMPSP should develop its own outreach opportunities with regards to beach nesting birds using its own naturalist staff. ENSP should meet with the park staff for an orientation on beach nesting birds, possibly including a once-a-year slide presentation to seasonal employees.