

Duxbury Beach, Duxbury, MA Beach Nesting Bird Summary Report 2008

Prepared by Alexis Clark



Photos by Patricia Levasseur



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Introduction

Duxbury Beach is a 4.5-mile-long barrier beach that is bordered on the east by Massachusetts Bay, on the west by Duxbury Bay, and Plymouth Bay to the south. The beach spans two towns; the northern portion of the beach from the Pedestrian zone south past High Pines is located in Duxbury, and the southern section from just south of the 3rd crossover to the Gurnet and Saquish Head is located in the town of Plymouth. A dirt road runs down the middle of the barrier beach to the southern residential area of Gurnet and Saquish. There are two active crossovers with one additional crossover that is accessed by emergency vehicles only vehicular access from the main road to the ocean side beach.

The ocean side substrate is primarily a sand-cobble mix. Vegetation, mainly sea rocket and beach grass, but also including *Rosa rugosa* and beach plum, begins at the toe of the dune and extends throughout the dune system. The bay side habitat is comprised primarily of salt marsh and mudflats. South of the 2nd crossover begins the shrubby, forested habitat of High Pines, which is a mix of deciduous woody vegetation.

The beach is owned by the Duxbury Beach Reservation, who leases it to the Town of Duxbury. The Town sells both parking permits and off-road vehicle (ORV) permits to the public. Upon entering the beach, all drivers must show a beach and/or ORV permit to access the front beach, with access to all vehicles going to Gurnet/Saquish. Dogs are allowed on the beach, however there are specific restrictions that dog owners must comply with. Owners must obtain a permit from the Town, which is required to be carried with them at all times. Dogs must be leashed, and they are prohibited from disturbing endangered species or any wildlife on the beach. Other rules and regulations exist, such as those related to open fires and alcohol consumption. The Endangered Species Officers (ESOs) and the Harbormaster are responsible for enforcing these rules and for patrolling the beach.

The Endangered Species Monitoring Program carried out at Duxbury Beach is quite unique in that it is a collaborative effort between ESO/ Harbormaster staff, chick monitors (hired by the Harbormaster's office) and Mass Audubon's Coastal Waterbird Program (MAS CWP) staff. All of these stakeholders work together in protecting the piping plovers (*Charadrius melodus*) and least terns (*Sternula antillarum*) that inhabit Duxbury Beach. The ESOs play a crucial role in management of the beach by maintaining a delicate balance between wildlife protection and public access to the beach for recreational purposes. As defined in the Roles and Responsibilities document between MAS and DBR (3-27-08), the biological monitoring is the responsibility of MAS CWP. This partnership works due to essential daily communication between the CWP staff and ESOs.

Monitoring Activity

Monitoring began on April 3rd (fencing erected before this date by ESOs) and continued until all broods had fledged in late August (8/20), with additional visits later in the season to document staging tern activity. Site visits averaged 3-5 per week during April-May, 7 per week during June-July, and 5-6 during August. Initial monitoring was done by a part-time CWP staff member, CWP Director, and by ESO staff prior to full-time CWP staff beginning work. Most of these initial nests were lost to storms and tidal overwash.

Piping Plovers (*Charadrius melodus*)

A total of eight piping plover pairs nested on Duxbury Beach this year, including 16 nests, eight of which were renests. Unfortunately, 12 of the 16 nests were lost to predation, tidal overwash, and other unknown causes. Therefore, only half of the total number of pairs nested successfully, hatched and fledged chicks. Six pairs (of 10 nesting) fledged chicks in 2007, compared with four pairs (of 8 nesting) in 2008. The decline in the number of pairs nesting is likely at least partially due to a decrease in available habitat. Storms last year and this year have caused erosion of the oceanside beach. Due to a storm in early May (5/9-5/11), about five nests were lost within 2 days. More than half of all pairs re-nested either once or twice: pair # 2 & 5 renested just once and pair # 1, 3, & 4 renested twice; however several of these re-nests were also lost, mainly due to tidal overwash. Other factors likely contributing to nest loss included skunk and undetermined small mammal predation.

Hatching success was 24%; we estimated that 55 eggs were laid, with 13 of those hatching. The fledging rate was 69%; with 9 chicks fledging out of the 13 hatched eggs, and overall productivity was 1.125 fledglings per pair (9 fledglings from 8 pairs). Despite a decrease from 2007 in the number of pairs, overall chicks fledged per pair remained fairly steady from last year (in 2007 10 pairs fledged 11-13 chicks, depending on definition of fledging, for a rate of 1.1-1.3 fledglings per pair).

The first nest of the season (1A) was located on April 23rd, and the last nest (3C) was found on June 21st, with these pairs first seen on April 17th and April 20th, respectively. Dates of first and last eggs laid for nest 1A were April 22nd and April 30th, and dates of first and last eggs laid for nest 3C were estimated to be between June 20th-June 21st and June 23rd.

All broods, with the exception of one, fledged chicks at over 30 days old. The chick from nest 8A (the only bayside nest) was 25 days old when it was able to fly at least 50 ft, the 5B brood was 32 days old, the 1C brood was 38 days old, and the 7A brood was approximately 38-40 days old upon fledging (exact hatch date unknown). Federal guidelines consider chicks to be fledged at 35 days on beaches that allow ORV use. Even using this guideline, there remained two broods—1C and 7A—that were not completely capable of flight at 35 days of age. On 7/22, when the 7A chicks were approx. 32-34 days old, only 2 of the 3 chicks were capable of sustained flight. There was no change three days later, at approx 35-37 days old - only 2 of the 3 chicks were capable of sustained flight; finally, on 7/28, all three chicks were able to fly at approximately 38-40 days old. We are not sure why it took so long for the entire brood to fly; we don't believe bad weather influenced their success, but access to food (only oceanside used for foraging) must have been an issue for this brood.

Similar to the 7A brood, the 1C chicks had a prolonged fledge date. After 3 fledging attempts—beginning when the chicks were 26 days—1 chick was observed flying approximately 5 meters at 33 days on 8/16. Five days later on 8/21 when the brood was 38 days old, we witnessed one of the chicks fly over the snow fencing and witnessed the second chick fly low over the ground. We suspect that consistent stormy weather in early to mid-August limited the brood's foraging time, therefore reducing chances to gain essential body weight, which likely affected the brood's ability to fly. Both 7A and 1C were in the area of heaviest human and bird activity (oceanside only),

between the 1st and 2nd crossover, so their ability to forage at a high enough rate may have been influenced by these factors as well.

All nests that hatched chicks lost at least one chick, with most chicks lost to unknown causes. We suspect that chicks from broods 5B and 7A were lost to either gull or mammalian predation, as we observed loafing gulls and small mammal tracks in each brood's territory. In both of these cases, no signs of the chicks' bodies or body parts were found. On the day after it was last seen, crows were observed in between the 1st and 2nd crossover in the same area where the 1C brood had been, however the chicks were at least 18 days old at that point. The 8A chick disappeared after June 17th. It had been seen on the bayside up until this date, and the brood and parents may have begun crossing to the ocean side around this time. On June 20th neither chick was found; on June 21st the single remaining chick and adults were found on the ocean side, where they stayed until the chick fledged. This pair's nest was never actually located; only two approximately 1-day old chicks were found on June 2nd on the bayside (the only pair that likely nested on the bayside this year).

Least Terns (*Sternula antillarum*)

This year two major least tern colonies existed— colony 1 was located between the 1st and 2nd crossover, and colony 2 was located near the Gurnet, with a total of 64 pairs during the census period (based on actual nest counts on 6/20). No established colonies were located in the Pedestrian area, although on 5/30 numerous fresh scrapes were found inside and outside of the symbolic fencing (which was extended by ESOs on our recommendation). At that time only 4 adult least terns were seen in the area, but they were flying/foraging and not defensive or landing on the beach. After that date, no nesting activity was seen in this area. A single nest was found near the 3rd crossover during the census (6/20), along with at least 57 scrapes, and a high count of 7 adult least terns, but this colony never really established, and numbers of adults and nesting activity in this area diminished after this date.

Overall, the number of breeding pairs on Duxbury was quite low. The Gurnet tern census results of 6/20 yielded a total of 7 nests, however early high counts indicated that the colony was larger than on this date; as many as 60 individuals were counted on 5/29. After the 6/20 census, high counts ranged from zero to twelve individuals. Around 7/11, we noticed significantly fewer Least Terns. We are not sure what led to this decrease; we suspect the colony was predated based on possible coyote tracks seen inside the fencing on 7/14 and small mammal tracks (likely skunk) consistently seen in the area in late June and early July. No nests were known to have hatched and the beach was quiet and devoid of terns by the end of July.

Between the 1st and 2nd crossover, tern census results from 6/20 yielded a total of 56 nests. We also noted 258 scrapes that appeared to be fresh/active, 2 broken eggs, 1 dropped egg, 1 washed egg, and an adult high count of 24 individuals (an underestimate because of the low density of widely dispersed this colony). We observed significantly fewer terns in this area around 7/11 just as we had for the Gurnet colony, and suspect that this colony also got predated. We noticed small mammal tracks (likely skunk) throughout the colony, found 5 empty nest cups, and found one eggshell with 2 canine holes. However, it appeared that the colony tried to reneest as we found new scrapes and a 1-egg nest on 7/11. Three days later on 7/14, there were 4 incubating individuals. In late July on 7/26, 2 tiny chicks were being brooded just north of the 1C enclosure; however they were never seen again, and no fledglings likely resulted from this site. Since that date, no nests

were known to have hatched and only loafing/staging/foraging terns were observed throughout the end of August. On 8/20 a high count of 25-40 least terns including at least 11 fledglings were observed foraging and loafing in “Tern Cove” north of the 3rd crossover on the bayside, and north of the 3rd crossover oceanside. These sites were also used by staging/foraging common terns throughout the end of August, with a high count of 204 common terns staging on the ocean side on 8/29.

Beach Management

Symbolic fencing was erected prior to 4/3/08 by the Endangered Species Officers and maintained throughout the season. Before the 1C nest hatched, symbolic fencing at the 1st crossover was extended northward approximately 150 ft, in order to provide an extra buffer around the nest from human activity (the total distance from the nest to the edge of symbolic fencing was approximately 300 ft). Symbolic fencing was extended or added promptly in other areas in response to requests by CWP (e.g., north of pedestrian access area, least tern scrapes outside fencing 5/30).

Two exclosures were erected, one at the Gurnet for nest 5B, and the other south of the 1st crossover for nest 1C. Exclosures were successfully constructed in a collaborative manner with both the ESOs and Mass Audubon Coastal Waterbird Program staff, including Director, Becky Harris. All ESOs who assisted with exclosure construction had previously attended a training session led by Becky Harris on 5/29. Other nests were not exclosable based on being located either in the dunes, under snow fencing, or in close proximity to the high tide line. Exclosures were removed by ESO staff on August 22nd.

This year the relationship between CWP staff and the ESOs was greatly improved, despite several issues and misunderstandings. Early in the season, ESO staff located several nests, which was a great help, although CWP staff were not shown all nests that ESOs found. When either party locates a new nest, it is imperative that the other partner is shown the exact location as soon as possible so that accurate monitoring can take place. Additionally, ESO staff did not immediately inform CWP staff of nests they identified as lost. There was a misunderstanding early on when ESOs reported nests as present, and CWP staff did not initially realize that ESOs had been defining nests as present if they saw adults in the general area, not just incubating. Although the effort not to walk right up to nests was well-intentioned, the timing of some nest losses may have been missed when neither egg presence or direct nest attendance was confirmed. Later in the season when it came time to fledge chicks, ESOs attempted to fledge broods without informing CWP staff. CWP staff explained on several occasions that it was important that CWP staff confirm fledging (on the first occasion when this became a concern, ESOs reported chicks had fledged when they couldn't find chicks that were 20-22 days old, that were not even close to being able to fly).

Some initial friction was caused by the lack of immediate collaboration, which may have resulted partly due to full time CWP staff arriving later than we had hoped. The CWP Director and part time CWP staff had to fill in for the initial part of the field season while we tried to fill the CWP South Shore Coordinator job. We had difficulty filling the position (two possible candidates turned down the position initially due to low salary, so the full time CWP coordinator position was not filled until late May). The transfer of knowledge from ESOs to new CWP staff was challenging, but collaboration improved quickly. The log book was very helpful, in addition to daily communication by CWP staff with the ESOs that was established soon after full time CWP staff arrived.

Another concern this year was the inconsistency of information given to the public regarding when people could enter closed areas. The ESOs allowed people to enter at low tide by the waterline only if chicks were above the high tide line. However, if chicks were present at the waterline even at low tide people could not enter, nor were they allowed to enter at high tide. Chick monitors either were not fully aware of these guidelines, or told beachgoers something different than ESO rules. CWP staff feels that no one should be allowed in closed areas at any time, regardless of tide and brood location. Varying and often conflicting messages given to the public made it challenging when dealing with insistent beachgoers, walker, and joggers (these issues occurred mainly between the first and second crossover).

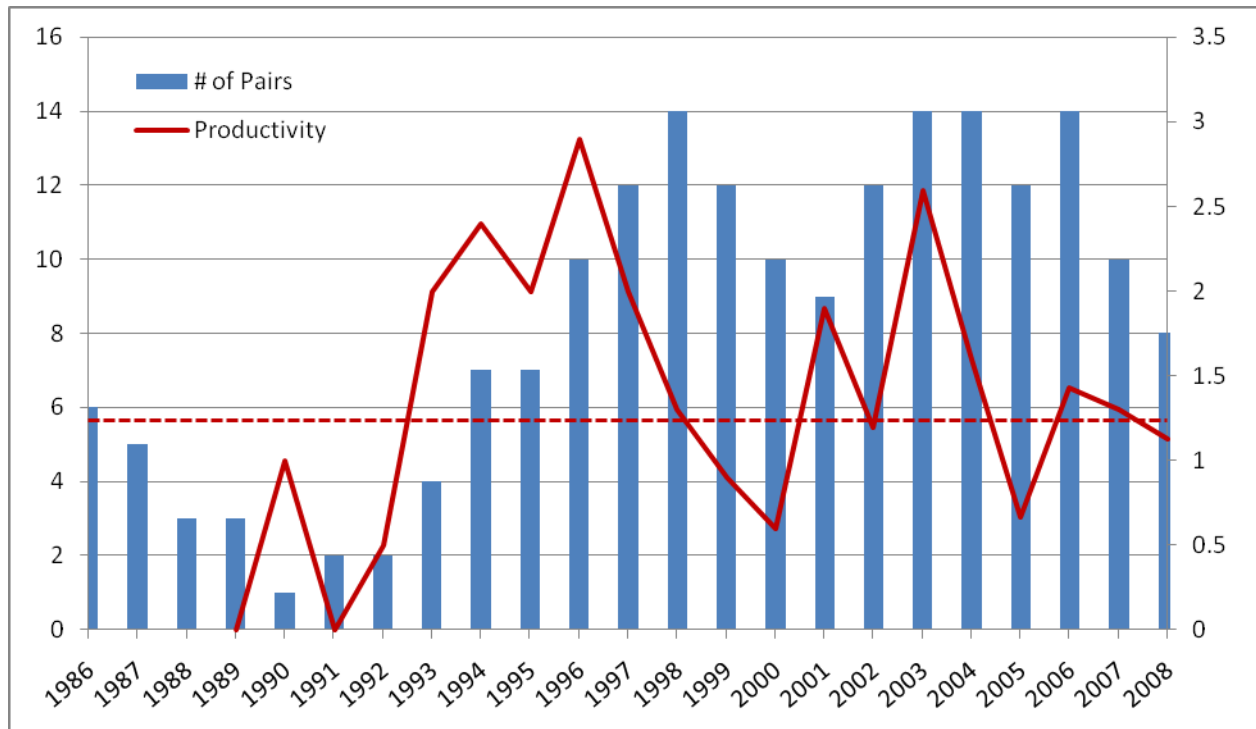
Almost all chick monitors attended a Mass Audubon sponsored training session on 6/27 (led by Becky Harris and two CWP staff) which covered piping plover and least tern natural history, identification techniques, aging of chicks, and management of these threatened species. Federal regulations were also part of the training session. In the future, a stronger connection between these regulations and how to consistently enforce them on the ground should be made by ESOs training plover monitors in the field. It is important that chick monitors be more vigilant in their role of preventing public entry into closed areas in order to avoid wildlife and human conflict.

To better communicate the various issues that occurred on the beach, CWP staff and ESOs implemented the use of a log book this year in which CWP staff, ESOs, and chick monitors recorded daily events (including both problems that occurred and/or positive events like fledging of chicks). We recommend a review of the log at season's end by both Mass Audubon and Duxbury Beach Reservation representatives so that we can ensure that all concerns have been addressed.

Management Recommendation Summary

1. Establish clear and consistent rules early in the season regarding when and how joggers/walkers can enter closed areas, so as to avoid confusion among staff and minimize conflict with beachgoers. We ***strongly*** urge that the public not be allowed inside closed areas at any time, regardless of tide and brood location. There were numerous occasions when inconsistent information was given to the public by chick monitors, ESOs, and CWP staff regarding when they could or couldn't enter closed areas; this only led to frustration on the part of beachgoers and confusion among all staff people working at Duxbury. Expectations for plover monitors' role as enforcers of these rules need to be made more clear from the start.
2. Establish the dynamics of the CWP-ESO working relationship early on; that both parties need to work cooperatively together and share crucial information such as new nest locations, nest loss, and fledging attempts.
3. Continue to maintain positive relationship between CWP and ESO staff by communicating with ESOs on a daily basis, preferably before or upon arrival to Duxbury Beach.
4. Continue to utilize the log book in order to document all events taking place; we recommend simply stating the facts of a situation rather than placing blame.

Figure 1. Nesting pairs of piping plovers on Duxbury Beach and productivity (fledglings per pair) from 1986-2008. The dotted red line represents the minimum productivity estimated necessary to maintain a stable population (1.24 fledglings per pair).



Duxbury Beach monitoring extent and overall nesting locations 2008





Close up view of nesting sites – Map 1 of 3 (1st and 2nd Crossover)



Close up view of nesting sites – Map 2 of 3 (3rd Crossover)



Close up view of nesting sites – Map 3 of 3 (Gurnet)

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Observer(s): Alexis Clark & Patricia Levasseur, Becky Harris, Belinda Rubinstein

Site Name: Duxbury Beach

Agency: Mass Audubon Coastal Waterbird Program

Town: Duxbury/Plymouth

Address: 2000 Main Street, Marshfield, MA 02050 / PO Box 275, Cummaquid, MA 02637

Ownership: Duxbury Beach Reservation

Telephone: 508-362-7475 x9351

E-mail: alexis.m.clark@gmail.com

⇒ *Please attach a map of this site that shows locations of all nests and pairs that did not nest.*

<i>Census Results:</i>	Index Count^a	Total Count^b
No. of Pairs	8	8
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks: N/A

List pairs not present during Index Count: N/A

Note: based on dates and re-nest locations, nest 7A could = 2B (or vice versa), but switching these nest #s doesn't affect the overall number of pairs, so to remain consistent with all notes taken over the course of the season we kept the labels as they are.

Month	Average # of visits to site per week
April	3-5
May	3-7
June	7
July	7
August	5-6

Indicate type(s) of enclosure design(s) used:

Enclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	4 in x 2 in		
Total Height	4ft 8 in		
Height above ground:	4 ft		
Depth buried:	8in		
Cover material	Black bird netting		
Cover spacing/Mesh size	¾ in		

Site Name: Duxbury Beach
Rubinstein, Becky Harris

Year: 2008

Observer(s): Alexis Clark & Patricia Levasseur, Belinda

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Other management undertaken or needed/Remarks:

Symbolic fencing was erected prior to 4/3/08 by the Endangered Species Officers and maintained throughout the season. Two exclosures were erected, one at the Gurnet and the other at the first cross-over. Exclosures were successfully constructed in a collaborative manner with both the ESOs and Mass Audubon Coastal Waterbird Program staff, including Becky Harris. Other nests were not exclosable based on locations either in the dunes, under snow fencing, or in close proximity to high tide line. Before the 1C brood hatched, fencing at the first cross-over was extended northward approximately 150 ft, to provide an extra buffer around the nest (total distance from nest to end of symbolic fencing = 300ft). Fencing north of the pedestrian access point was extended after 5/30 in response to CWP reporting LETE scrapes outside the fencing. Most symbolic fencing was erected well above the mean high tide line in response to anticipated storm tides which eventually did come up to the level of the fencing. Early in the season, several plover scrapes were located outside of the symbolic fencing, but these would have likely been lost to overwash, even if they had been protected by symbolic fencing. In future years, caution should be used to make sure symbolic fencing is erected far enough towards the water line to make sure all early nest attempts are protected, keeping in mind the likely extent of the storm tide.

Productivity was similar to last year, although fewer pairs nested. Four nests that hatched and fledged chicks versus the six nests last year, but fledging rate was similar (1.125 vs. 1.1-1.3 last year). Due to a storm in early May around 5/9-11 we lost about 5 nests within 2 days. We also had many first and second nest attempts lost due to tidal overwash and predation. As the majority of nests were lost early in the season there were numerous renests, many of which were also lost.

Management:

This year the relationship between CWP staff and the ESOs was on a good track despite some issues and misunderstandings. Early in the season, ESO staff was responsible for locating several nests, which was a great help, however CWP staff were not shown the nests that ESOs found. Additionally, ESO staff did not immediately inform CWP staff of nests they identified as lost. There was a misunderstanding early on when ESOs were confirming nests still present, that they were defining nests as still present if they saw adults in the general area, not just incubating. Although the effort not to walk right up to nests was well-intentioned, the timing of some nest losses may have been missed when neither egg presence or direct nest attendance was confirmed. At that point in the season, there was a lack of feeling of collaborative effort. Later in the season when it came time to fledge chicks, ESOs attempted to fledge broods without informing CWP staff. We had to explain on several occasions our need to be present while fledging chicks (the first occasion, ESOs reported chicks had fledged when they couldn't find chicks that were 20-22 days old). The log book likely helped the situation, in addition to daily communication by CWP staff with the ESOs.

We were concerned about the inconsistency of information given to the public regarding when people could enter closed areas. The ESOs allowed people to enter at low tide by the waterline only if chicks were above the high tide line. However, if chicks were present at the waterline even at low tide people could not enter, nor were they allowed to enter at high tide. Chick monitors either were not fully aware of these guidelines, or told people something different than ESO rules. CWP staff feels that no one should be allowed in closed areas at any time regardless of tide and brood location. Conflicting messages given to the public made it challenging when dealing with people who felt they should be allowed inside the closed areas (mainly between the first and second crossover). There were numerous instances when joggers and walkers entered the fenced areas and they were asked to leave. For future years, it is very important that chick monitors be more vigilant about preventing public entry into closed areas to avoid wildlife conflict. To help make everyone aware of various issues that occurred on the beach, this year CWP and ESOs created a log book for CWP staff, ESOs, and chick monitors to record daily events (both problems that occurred and/or positive events like fledging chicks).

^aThe Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).

^bTo be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.

Site Name: Duxbury Beach

Year: 2008 Observer(s): Alexis Clark & Patricia Levasseur, Belinda Rubinstein, Becky Harris

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Pair No.	Nest No.	No. eggs laid	No. eggs hatched ^c	No. chicks fledged ^d	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed ^c	Exclosure		
									Y/N	Design (A, B...)	Date installed
1	01A	4	0	0	4/23/08	2	4/30/08	5/9/08-5/10/08	N	N/A	N/A
1	01B	3	0	0	5/21/08	2	5/23/08	6/9/08	N	N/A	N/A
1	01C	3	3	2	6/18/08	2	6/20/08	7/14/08 hatch date	Y	A	6/24/08
2	02A	2?	0	0	4/30/08	2	4/30/08 (unknown)	5/4/08	N	N/A	N/A
2	02B	4	0	0	6/20/08	4	unknown	6/23/08	N	N/A	N/A
3	03A	4	0	0	5/6/08	4	Unknown (4 eggs)	5/11/08	N	N/A	N/A
3	03B	4	0	0	5/21/08	2	5/26/08	Bet. 6/15/08 & 6/16/08	N	N/A	N/A
3	03C	3	0	0	6/21/08	1	6/23/08	7/11/08-7/12/08	N	N/A	N/A
4	04A	4	0	0	5/6/08	4	Unknown (4 eggs)	5/9-5/11/08	N	N/A	N/A

4	04B	4	0	0	5/24/08	3	5/25/08	6/7/08	N	N/A	N/A
4	04C	2	0	0	6/17/08	1	6/18/08	6/18/08-6/20/08	N	N/A	N/A
5	05A	4	0	0	5/7/08	4	Unknown (4 eggs)	5/11/08	N	N/A	N/A
5	05B	4	4	3	6/1/08	3	6/3/08	6/26/08	Y	A	6/10/08
6	06A	4	0	0	5/27/08	4	Unknown (4eggs)	Bet. 6/18/08 & 6/19/08	N	N/A	N/A
7	07A	4	4	3	6/1/08	4	5/26/08 est.	6/20/08 est.	N	N/A	N/A
8	08A	Unkno-wn	2?	1	Never located	N/A	5/7/08 est.	6/1/08	N	N/A	N/A

^cIndicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.

^dChicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
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01A	Nest lost due to unknown causes on 5/10; possibly predation but tracks not visible due to rain. Storms May 9-10. Nest last seen on 5/8/08.	01C	Unknown loss of 1 chick; last seen on 8/1 by CWP staff. We found no signs of body/body parts nor any significant predator tracks. On 8/2 crows were observed in between the 1 st and 2 nd x-over in same area where chicks had been, but unlikely crow predation because chicks were 18+ days old at that point. Chick was lost between 8/1 and 8/2.
01B	Lost likely due to predation on 6/9/08 as small mammal tracks were found all around nest when it was found empty (no sign of egg/shell remnants, tracks are not well-defined).		
02A	Lost due to possible tidal overwash on 5/4/08 as nest was too close to the high tide line (found at 2 eggs, unsure whether additional eggs laid before overwash)		
02B	Lost due possibly due to predation on 6/23/08 as there were missing eggs and egg shells were observed (no obvious tracks could be seen)	05B	Unknown loss of 1 chick, last seen 7/15 by ESOs. Very small mammal tracks (possibly weasel or mink) seen at the 3 rd x-over where these chicks were observed. Small mammal tracks (possibly fox) were found at the 1 st x-over near nest 01C. Many gulls loaf in the area where these chicks were located. However, unknown cause and no signs of chick bodies or body parts were found.
03A	Lost due to tidal overwash		
03B	Lost possibly to tidal overwash. We were informed about loss by ESOs on 6/16, however loss probably occurred before this date. ESO found nest cup indistinguishable with eggs gone, 2 nd ESO did not see any chicks when he searched area.		
03C	Suspected predation (skunk tracks leading directly to nest cup)	07A	Unknown cause of loss of one chick. The chick disappeared and we found no signs of its body or body parts, or significant predator tracks. Many gulls loaf in the same area as this brood's territory, so chick could have been depredated by a gull. We know it was lost between 7/15/08 and 7/16/08.
04A	Lost due to tidal overwash. Strong NE winds on 5/9/08-5/10/08.		
04B	Possibly predation; no sign of eggs or tracks		
04C	Lost to unknown causes, possibly predation. There were no obvious tracks, however there were storms around the time of nest loss.	08A	This nest was never located so unknown how many eggs laid or chicks hatched, but 2 approx. 1-day-old chicks were found on 6/2. One chick disappeared – last seen on 6/17 on the bayside (where pair and chicks were observed until this point). No signs of chick body or body parts were found. On 6/20 both chicks were not seen; on 6/21 one chick was seen on ocean side with parents (where they stayed until fledging).
05A	Lost due to unknown cause. Any tracks lost to rain.		
06A	Lost due to unknown cause. Any tracks lost to rain. Adult was last seen by ESOs in proximity to nest on 6/18/08.		

Site Name: Duxbury Beach
Belinda Rubinstein Page 4 of 4

Year: 2008

Observer(s): Alexis Clark & Patricia Levasseur, Becky Harris,

Massachusetts Tern Census Form, Year 2008

Colony Name: <u>Duxbury Beach, North of pedestrian access</u>	Observer/Agency: <u>Alexis Clark/ Mass Audubon CWP</u>
Colony Number: _____	Street: <u>PO Box 275</u>

Town: <u>Duxbury</u>	Town & State: <u>Cummaquid, MA</u> Zip: <u>02637</u>
Ownership: <u>Duxbury Beach Reservation</u>	E-mail: <u>alexis.m.clark@gmail.com</u> Telephone: <u>(508) 362-7475 x93</u>

⇒ ⇒ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇐ ⇐

Species Code	A-Count				B-Count				P	Remarks: (e.g., evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/20/08	0	N C	H C	N/A					
COTE	06/20/08	0	N C	H C	N/A					
ARTE	06/20/08	0	N C	H C	N/A					
LETE	06/11/08	0	N C	R C	5/30/08	3.2	A C	R C	0	On 5/30 many LETE scrapes (recent) were found within and outside of symbolic (symbolic was extended by ESOs in response). Only 4 birds were seen in air (ac = 4x0.8 = 3.2), but none defending or on beach. No terns ever were found to nest in this area, and no sign of scrapes/birds/nests were found after this date.
LAGU	06/20/08	0	N C	H C	N/A					
BLSK	06/20/08	0	N C	H C	N/A					
KILL	5/30/08	1	A C	H C	N/A				?	Killdeer very defensive in area of dunes adjacent to beach where LETE scrapes observed (between parking lot and beach).

E-mail address for electronic filing (please make sure all necessary information is included): carolyn.mostello@state.ma.us

Massachusetts Tern Census Form, Year 2008

Colony Name: <u>Duxbury Beach, 1st-2nd X-over</u> Colony Number: _____ Town: <u>Duxbury</u> Ownership: <u>Duxbury Beach Reservation</u>	Observer/Agency: <u>Alexis Clark/ Mass Audubon CWP</u> Street: <u>PO Box 275</u> Town & State: <u>Cummaquid, MA</u> Zip: <u>02637</u> E-mail: <u>alexis.m.clark@gmail.com</u> Telephone: <u>(508)362-7475 x9351</u>
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⇒⇒ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇐⇐

Species Code	A-Count				B-Count				P	Remarks: (e.g., evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/20/08	0	N C	H C	N/A					
COTE	06/20/08	0	N C	H C						
ARTE	06/20/08	0	N C	H C	N/A					

LETE	06/20/08	56	N C	H C	7/14	4	IC	R C	0- 1?	<p>On census date, 6/20, there were 56 nests counted, and 258 empty scrapes that appeared to be fresh/active, 2 broken eggs, 1 dropped, 1 washed, and an adult high count of 24 (underestimate because colony was spread out). 1 coyote scat observed.</p> <p>We noticed significantly fewer LETE on 7/11/08. We suspect that this colony got predated before this date as we noticed small mammal tracks (likely skunk) throughout, found 5 empty nest cups. One egg had what appeared to be 2 canine holes. However, it appears that that the colony tried to renest as we found new scrapes and a 1-egg nest on that date, and by 7/14 there were at least 4 adults still incubating. One LETE nest with 2 small chicks being brooded was found on 7/26, but we think it's unlikely that these chicks survived to fledge - no fledglings were observed in this area later. Aug fledgling counts (8/15 – 8/22 ranged from 2 to 14 fledglings in other areas on Duxbury Beach), likely fledglings from other sites, but impossible to confirm that all were from elsewhere.</p> <p>Recent human footprints in this area were noticed during the census. Management of human activity was fairly effective by DBR ESOs, however people and dogs still managed to enter fenced off areas.</p>
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LAGU	06/20/08	0	N C	H C	N/A					
BLSK	06/20/08	0	N C	H C	N/A					
WILLET HOLA	6/20/08	Present Present	A C	R C	N/A				?	

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337.

Telephone: (508)792-7270 x312 / Fax: (508)792-7821 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Massachusetts Tern Census Form, Year 2008

Colony Name: <u>Duxbury Beach, 3rd X-over</u>	Observer/Agency: <u>Alexis Clark/Audubon CWP</u>
Colony Number: _____	Street: <u>PO Box 275</u>
Town: <u>Duxbury</u>	Town & State: <u>Cummaquid, MA</u> Zip: <u>02637</u>
Ownership: <u>Duxbury Beach Reservation</u>	E-mail: <u>alexis.m.clark@gmail.com</u> Telephone: <u>(508) 362-7475 x9351</u>

⇒ ⇒ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇐ ⇐

Species Code	A-Count				B-Count				P	Remarks: (e.g., evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/20/08	0	A C	H C	N/A					
COTE	06/20/08	0	A C	H C						
ARTE	06/20/08	0	A C	H C	N/A					
LETE	06/20/08	1*	N C	H C	7/1	0**	A C	R C	0	On 6/11/08 we had an adult high count of 6 LETE individuals. This count is not an estimate of breeding pairs.

										<p>*During A-count we found 57 empty scrapes in addition to the single 2-egg nest in this area, with a high count of 7 LETE adults. We stopped the count due to a PIPL displaying broken wing in the area (and therefore we were only able to cover approx. 2/3 of the x-over area).</p> <p>**For B-count, on 7/1 AC was 10 (8 adjusted). However this high count includes loafing and foraging birds, and are not necessarily breeding pairs at this point. After around 7/11/08 we noticed fewer LETE in all areas; we are not sure what led to this decrease. It is possible that this colony got predated as we noticed coyote tracks outside the symbolic and what looked like dog tracks inside (could have appeared different due to differences in substrate) on 7/11. No productivity from this site.</p>
LAGU	06/20/08	0	A C	H C	N/A					
BLSK	06/20/08	0	A C	H C	N/A					
OTHER	06/20/08	N/A			N/A					

Massachusetts Tern Census Form, Year 2008

Colony Name: <u>Duxbury Beach, (Gurnet)</u> Colony Number: _____ Town: <u>Duxbury</u> Ownership: <u>Duxbury Beach Reservation</u>	Observer/Agency: <u>Alexis Clark/ Mass Audubon CWP</u> Street: <u>PO Box 275</u> Town & State: <u>Cummaquid, MA</u> Zip: <u>02637</u> E-mail: <u>alexis.m.clark@gmail.com</u> Telephone: <u>(508)362-7475 x9351</u>
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⇒ ⇒ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇐ ⇐

Species Code	A-Count				B-Count				P	Remarks: (e.g., evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/20/08	0	N C	H C	N/A					
	06/20/08	0	N	H						

COTE			C	C	N/A					
ARTE	06/20/08	0	N C	H C	N/A					
LETE	6/20/08	7	N C	H C	5/29/08	48	A C	R C	0	<p>Early high counts indicate that the colony was larger than on the nest census date, with an adult count of 60 (48 adjusted x 0.8) on 5/29 (in B count column, although earlier than census). The first 2-egg nest below high tide line in rocky substrate was found on 5/29. This was likely the earliest established colony, and pairs from this site likely attempted to nest in the 1st-2nd crossover area later (became the largest colony by the 6/20 census).</p> <p>Nest census was completed on 6/20, with 7 nests (4 1-egg, 2 3-egg), 1 washed egg, and 12 shell fragments (avian and canine predators possible based on shell fragments). On this date fewer adults in the air and fewer nests than had likely been present before this date (HC of adults was also 7). After around 7/11/08 we noticed fewer LETE. It is likely that this colony got predated early on and consistently throughout the season; possible coyote tracks seen on 6/18 and into fencing on 7/14 and small mammal (probable skunk) tracks consistently in the area in late June and early July. No nests were known to hatch and the beach was quiet and almost completely devoid of terns by the end of July.</p> <p>7/13 AC=0 7/30 AC=1 (0.8)</p>
LAGU	06/20/08	0	N C	H C	N/A					
BLSK	06/20/08	0	N C	H C	N/A					
KILL	06/20/08	1	A C	H C	N/A				?	Killdeer defensive in dunes near Gurnet

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337.

Telephone: (508)792-7270 x312 / Fax: (508)792-7821 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us