

AMERICAN OYSTERCATCHER (*Haematopus palliatus*) MONITORING AT  
CAPE LOOKOUT NATIONAL SEASHORE

2014 SUMMARY REPORT



*American Oystercatcher dark green (J3) foraging in the ocean intertidal zone. NPS Photo 2014.*

NATIONAL PARK SERVICE  
CAPE LOOKOUT NATIONAL SEASHORE  
131 CHARLES STREET  
HARKERS ISLAND, NC 28531

## **Abstract**

There were 65 American Oystercatcher pairs nesting throughout the ocean beach habitat of the seashore in 2014. North Core Banks had 31 pairs, South Core Banks had 27 pairs, and Shackleford Banks had 7 pairs. Egg-laying was initiated on April 13<sup>th</sup> and a total of 87 nests were documented. Forty chicks fledged: 26 from South Core Banks, 10 from North Core Banks, and 4 from Shackleford Banks. There was a wide variation in fledge success among islands. South Core Banks was the most productive with a fledge success rate of 0.96, Shackleford Banks' fledge success was 0.57, and North Core Banks was at 0.32. Overall for the entire seashore, the fledge success rate was 0.62 per nesting pair.

## **Introduction**

American Oystercatchers are common nesters throughout the park, primarily on the ocean beach. They are listed as a 'Bird of Special Concern' in North Carolina by the North Carolina Wildlife Resource Commission. Their choice of nesting habitat makes them particularly vulnerable to disturbance by park visitors and off-road vehicles.

Monitoring American Oystercatcher nesting at Cape Lookout National Seashore (CALO) began in 1995. A researcher from Duke University studied nesting on South Core Banks and found low reproductive success (Novick 1996). She documented chick mortality caused by off-road vehicles. Researchers from North Carolina State University (NCSU) and park staff have also recorded vehicle traffic chick mortality (Schulte 2012). Since 1997 NCSU and park staff have conducted censuses, monitored nesting success, and banded oystercatchers in the park. Data in this summary report is presented from the last eleven breeding seasons when all of the seashore was monitored regularly, 2004 to 2014.

## **Site Description**

Cape Lookout National Seashore is located in the southern Outer Banks of North Carolina between Ocracoke and Beaufort Inlets. The seashore was divided into four barrier islands during the 2014 breeding season. The northernmost island, North Core Banks (NCB), is currently 18 miles long, extending from Ocracoke Inlet to Old Drum Inlet. Middle Core Banks (MCB) extends from Old Drum Inlet to Ophelia Inlet at four miles in length. For reporting purposes MCB is treated as part of NCB, representing breeding pairs from Ocracoke Inlet to Ophelia Inlet, mile 0 to mile 22.7. South Core Banks (SCB) extends southward from Ophelia Inlet almost 24 miles to Barden Inlet. The Core Banks have a northeast to southwest orientation and exhibit a low profile landscape. The fourth island, Shackleford Banks (SB), is 9 miles long and has an east-west orientation with a higher dune system and larger areas of vegetation. All islands in the park are subject to constant and dramatic change by the actions of wind and waves.

## Methods

The Interim Protected Species Management Plan/ Environmental Assessment (IPSMP/EA) 2006 contains guidelines of the management and monitoring protocols (National Park Service 2006). Park Service staff conducted surveys of Shackleford Banks nesting birds twice a week beginning in April. Weekly surveys of nesting habitat on North and South Core Banks also began in April and breeding monitoring was continued seven days per week until the end of the nesting season. Although NCSU research staff has regularly assisted in monitoring efforts in the past, park staff were solely responsible for American Oystercatcher monitoring along the seashore in the 2014 season. Park staff performed all management actions for oystercatchers.

Management actions for oystercatchers included closing the area around a nest with “Bird Sanctuary” signs if the nest was in danger of being run over by off-road vehicles or stepped on by pedestrians. Generally, nests found in the dunes were not posted. There is some concern that predators might learn to associate posts with nests. Small posted areas may also unnecessarily attract curious park visitors and cause disturbance.

In addition to the closure around the nest, a 600-foot buffer was established around each nest to reduce disturbance. McGowan and Simons (2006) found evidence that human recreational disturbance can alter incubation behavior. This buffer allowed vehicle and pedestrian traffic to pass by on the lower beach by the ocean shoreline, but prevented stopping, parking, or camping near the nest that could reduce nest attendance by parents. The buffer zone was defined by two sets of 18” X 18” yellow signs placed on each side of a nest.

The locations of the nests were recorded using a GPS unit and the park’s mile marker system. Nest locations were marked inconspicuously with either a stake or objects like sticks or shells to facilitate follow-up checks. Information about the habitat type was also noted. If one or both adults were banded, that information was recorded on the nest data sheet.

Nests were checked regularly, every 1 to 3 days, to monitor the status of incubation and document losses. One day before the expected time of hatch, the ocean beach in that area was closed to vehicles with traffic routed to the backroad, a sand trail behind the primary dunes. In areas where there is no backroad, signs were placed on the beach warning of the presence of flightless chicks and reducing the speed limit to 15mph. Chicks were monitored daily until they fledged or were lost. Since 2010, chicks were considered fledged at 35 days old for productivity records. For management purposes, the chicks are considered fledged when strong flight is actually observed.

## Results

Sixty-five pairs of American Oystercatchers nested at CALO (Table 1). Counts were for pairs on or near the ocean beach and did not include marsh islands.

Table 1. American Oystercatcher Nesting Pairs- 2014.

|                   |          |
|-------------------|----------|
| North Core Banks  | 31 pairs |
| South Core Banks  | 27 pairs |
| Shackleford Banks | 7 pairs  |

Nesting pairs were spread throughout most of the ocean beach habitat in the park (Figures 1 & 2). The birds did not use areas adjacent to buildings and concentrations of people. The Middle Core Banks section is considered part of the North Core Banks for reporting purposes, mile 0 to mile 22.7

### Hatch and Fledge Success

Throughout the seashore, eighty-seven nests were found, 38 of which hatched at least one egg. Forty chicks were known to survive 35 days to fledge (Table 2). Of the nests that failed, 27 nests failed due to unknown causes, 15 were lost to predation, six were lost to weather events, and one was abandoned (Table 3). Raccoon (4), coyote (4), ghost crab (3), and cat (1) were found to be predators of oystercatcher eggs. There were two nests predated by undetermined predators. Table 4 summarizes the reproductive success over the last 11 years. The fledgling success is calculated using the known nesting pairs. This allowed for cross-year comparisons with variable monitoring efforts and other unknowns. Chart 1 illustrates the reproductive success over the last 11 years. In 2014, sixty-five known nesting pairs produced forty fledglings for a fledge success rate of 0.62. Individual nest data are found in Appendix 1. Tables 5, 6, 7, and 8 summarize the reproductive success by island with known and comparable data.

Table 2. Oystercatcher Nesting by Island 2014.

| <b>Island</b>     | <b>#pairs</b> | <b>#Nests</b> | <b>#Nests Hatched</b> | <b>#Chicks Fledged</b> |
|-------------------|---------------|---------------|-----------------------|------------------------|
| North Core Banks  | 31            | 44            | 11 (25%)              | 10                     |
| South Core Banks  | 27            | 35            | 23 (66%)              | 26                     |
| Shackleford Banks | 7             | 8             | 4 (50%)               | 4                      |
| CALO Total        | 65            | 87            | 38 (44%)              | 40                     |

Table 3. 2014 Causes of Nest Failure.

| <b>Island</b>     | <b>Predation</b> | <b>Flooding/<br/>Storms</b> | <b>Human<br/>Disturbance</b> | <b>Abandoned</b> | <b>Unknown</b> |
|-------------------|------------------|-----------------------------|------------------------------|------------------|----------------|
| North Core Banks  | 9                | 1                           | 0                            | 1                | 22             |
| South Core Banks  | 6                | 4                           | 0                            | 0                | 2              |
| Shackleford Banks | 0                | 1                           | 0                            | 0                | 3              |
| CALO total        | 15               | 6                           | 0                            | 1                | 27             |

Table 4. Summary of Seashore Oystercatcher Reproductive Success Data, 2004-2014.

| <b>Year</b> | <b>Island</b>     | <b>#Nests</b> | <b>#Nests Hatched</b> | <b>#Pairs (nesting)</b> | <b>#Chicks fledged</b> |
|-------------|-------------------|---------------|-----------------------|-------------------------|------------------------|
| 2004        | Cape Lookout N.S. | 71            | 38 (54%)              | 52                      | 45 (0.86)              |
| 2005        | Cape Lookout N.S. | 66            | 26 (39%)              | 54                      | 18 (0.33)              |
| 2006        | Cape Lookout N.S. | 70            | 23 (33%)              | 52                      | 26 (0.50)              |
| 2007        | Cape Lookout N.S. | 99            | 21(21%)               | 61                      | 31 (0.51)              |
| 2008        | Cape Lookout N.S. | 91            | 17 (19%)              | 57                      | 15 (0.26)              |
| 2009        | Cape Lookout N.S. | 83            | 20(24%)               | 61                      | 21 (0.34)              |
| 2010        | Cape Lookout N.S. | 113           | 28 (25%)              | 62                      | 34 (0.55)              |
| 2011        | Cape Lookout N.S  | 114           | 29 (25%)              | 62                      | 37 (0.60)              |
| 2012        | Cape Lookout N.S. | 99            | 31 (31%)              | 58                      | 42 (0.72)              |
| 2013        | Cape Lookout N.S. | 104           | 32 (31%)              | 63                      | 25 (0.40)              |
| 2014        | Cape Lookout N.S. | 87            | 39 (37%)              | 65                      | 40 (0.62)              |

Chart 1. The Number of Seashore Oystercatcher Nesting Pairs and Chicks Fledged by Year with Simple Linear Regression Lines, 2004 to 2014.

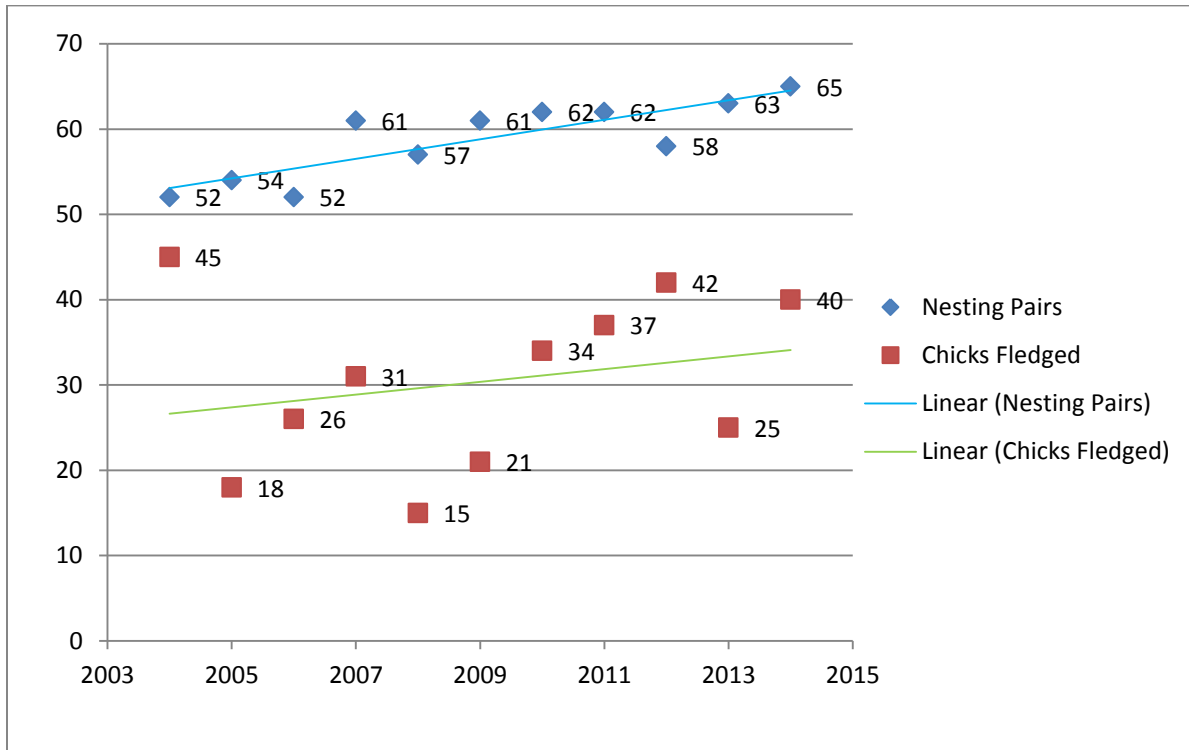


Table 5. Summary of North Core Banks, Ocracoke Inlet Mile 0 to Ophelia Inlet mile 22.7 Oystercatcher Reproductive Success Data, 2004-2014.

| Year | Island           | #Nests | #Nests Hatched | #Pairs (nesting) | #Chicks fledged |
|------|------------------|--------|----------------|------------------|-----------------|
| 2004 | North Core Banks | 30     | 24 (80%)       | 26               | 38 (1.46)       |
| 2005 | North Core Banks | 29     | 16 (64%)       | 23               | 15 (0.65)       |
| 2006 | North Core Banks | 28     | 16 (57%)       | 24               | 15 (0.62)       |
| 2007 | North Core Banks | 46     | 17 (37%)       | 30               | 27 (0.90)       |
| 2008 | North Core Banks | 30     | 9 (30%)        | 22               | 10 (0.45)       |
| 2009 | North Core Banks | 40     | 7 (18%)        | 29               | 8 (0.28)        |
| 2010 | North Core Banks | 58     | 15 (26%)       | 31               | 15 (0.48)       |
| 2011 | North Core Banks | 54     | 18 (33%)       | 32               | 24 (0.75)       |
| 2012 | North Core Banks | 45     | 16 (36%)       | 28               | 26 (0.93)       |
| 2013 | North Core Banks | 50     | 12 (24%)       | 30               | 13 (0.43)       |
| 2014 | North Core Banks | 44     | 11 (25%)       | 31               | 10 (0.32)       |

Table 6. Summary of Middle Core Bank Section of NCB, Old Drum Inlet Mile 18.85 to Mile 22.7 Ophelia Inlet, Oystercatcher Reproductive Success Data from 2004 to 2014.

| <b>Year</b> | <b>Island</b>     | <b>#Nests</b> | <b>#Nests Hatched</b> | <b>#Pairs (nesting)</b> | <b>#Chicks fledged</b> |
|-------------|-------------------|---------------|-----------------------|-------------------------|------------------------|
| 2004        | Middle Core Banks | 5             | 4 (80%)               | 5                       | 7 (1.40)               |
| 2005        | Middle Core Banks | 9             | 5 (55%)               | 7                       | 9 (1.28)               |
| 2006        | Middle Core Banks | 10            | 8 (80%)               | 10                      | 10 (1.00)              |
| 2007        | Middle Core Banks | 14            | 9 (64%)               | 13                      | 13 (1.00)              |
| 2008        | Middle Core Banks | 8             | 5 (62%)               | 8                       | 7 (0.88)               |
| 2009        | Middle Core Banks | 13            | 3 (23%)               | 10                      | 1 (0.10)               |
| 2010        | Middle Core Banks | 24            | 4 (17%)               | 13                      | 2 (0.15)               |
| 2011        | Middle Core Banks | 23            | 8 (35%)               | 14                      | 12 (0.86)              |
| 2012        | Middle Core Banks | 19            | 7 (37%)               | 13                      | 12 (0.92)              |
| 2013        | Middle Core Banks | 17            | 7 (39%)               | 13                      | 9 (0.69)               |
| 2014        | Middle Core Banks | 18            | 4 (22%)               | 13                      | 5 (0.38)               |

Table 7. Summary of South Core Banks Oystercatcher Reproductive Success Data from 2004 to 2014.

| <b>Year</b> | <b>Island</b>    | <b>#Nests</b> | <b>#Nests Hatched</b> | <b>#Pairs (nesting)</b> | <b>#Chicks fledged</b> |
|-------------|------------------|---------------|-----------------------|-------------------------|------------------------|
| 2004        | South Core Banks | 33            | 13 (39%)              | 20                      | 6 (0.30)               |
| 2005        | South Core Banks | 27            | 9 (33%)               | 22                      | 3 (0.14)               |
| 2006        | South Core Banks | 31            | 6(19%)                | 19                      | 10 (0.53)              |
| 2007        | South Core Banks | 41            | 4(21%)                | 21                      | 4 (0.19)               |
| 2008        | South Core Banks | 44            | 5 (11%)               | 24                      | 5 (0.21)               |
| 2009        | South Core Banks | 30            | 11(37%)               | 22                      | 11 (0.50)              |
| 2010        | South Core Banks | 43            | 11 (25%)              | 23                      | 17 (0.74)              |
| 2011        | South Core Banks | 51            | 9 (18%)               | 24*                     | 12 (0.50)              |
| 2012        | South Core Banks | 41            | 15 (36%)              | 22                      | 16 (0.73)              |
| 2013        | South Core Banks | 46            | 19 (41%)              | 27                      | 12 (0.44)              |
| 2014        | South Core Banks | 35            | 23 (66%)              | 27                      | 26 (0.96)              |

\*Shackleford and South Core shared a nesting pair

Table 8. Summary of Shackleford Banks Oystercatcher Reproductive Success Data from 2004 to 2014.

| Year | Island            | #Nests | #Nests Hatched | # Pairs (nesting) | #Chicks fledged |
|------|-------------------|--------|----------------|-------------------|-----------------|
| 2004 | Shackleford Banks | 8      | 1 (12%)        | 6                 | 1 (0.17)        |
| 2005 | Shackleford Banks | 10     | 1 (10%)        | 9                 | 0 (0.00)        |
| 2006 | Shackleford Banks | 11     | 1 (9%)         | 9                 | 1 (0.11)        |
| 2007 | Shackleford Banks | 12     | 0 (0%)         | 10                | 0 (0.00)        |
| 2008 | Shackleford Banks | 17     | 3 (18%)        | 11                | 0 (0.00)        |
| 2009 | Shackleford Banks | 13     | 2 (15%)        | 10                | 2 (0.20)        |
| 2010 | Shackleford Banks | 12     | 2 (17%)        | 8                 | 2 (0.25)        |
| 2011 | Shackleford Banks | 9      | 2 (22%)        | 7*                | 1 (0.14)        |
| 2012 | Shackleford Banks | 13     | 0 (0%)         | 8                 | 0 (0.00)        |
| 2013 | Shackleford Banks | 8      | 1 (12%)        | 6                 | 0 (0.00)        |
| 2014 | Shackleford Bands | 8      | 4 (50%)        | 7                 | 4 (0.57)        |

\*Shackleford and South Core shared a nesting pair

### Banding

Thirty-two chicks were captured and banded along the seashore by park staff working under a banding permit from NCSU. Eight chicks fledged without bands mainly due to inaccessibility of the MCB section. Park staff recorded band re-sights of individuals and nesting pairs in the seashore throughout the summer. Of the 65 nesting pairs, 47 pairs (72%) had at least one individual of the pair banded, while 18 pairs (28%) were unbanded. NCB had 23 pairs banded and eight pairs unbanded. SCB had 23 pairs banded and 4 pairs unbanded. SB had one pair banded and six unbanded pairs. There were 61 (47%) individual adults that are banded and 68 (52%) that are unbanded in the nesting population in 2014. There was one individual that was not identified on NCB (pair 28). See appendix 1 for nesting pair re-sight data and 2014 chick band data. Round bands with three letter codes in a triangle configuration were used this year on all birds. There was no chick mortality due to banding efforts. Details on oystercatcher band combinations can be found at the website: <http://www.amoywg.org/banding-re-sighting/>.

### Discussion

Hurricane Arthur made landfall on the seashore on July 4<sup>th</sup>, affecting American Oystercatcher productivity. The Category 2 hurricane caused the failure of 4 nests, one nest on NCB and three nests on SCB. There were no new nesting attempts after the storm. Four broods are suspected to have been lost due to Hurricane Arthur. Two broods on NCB and two broods on SCB were



active during last checks before the storm while no chicks were seen after. Twelve broods survived the storm and the American oystercatcher chicks fared better than other chick species.

Hatch rates in 2014 varied throughout the park. Hatch success rates were 25% on North Core Banks, 66% on South Core Banks and 50% on Shackleford Banks. Predators (15), weather events (6), and abandonment (1) were the known causes of nest losses. There was no indication of human disturbance as a cause of nest loss. There were 27 unknown nest losses, 22 on NCB, 2 on SCB, and 3 on SB. On NCB, raccoon, ghost crab, and feral cat predation lowered the hatch success, but the majority were lost to unknown causes. Late and re-nesting pairs on NCB appear to have experienced a mid-season drop off in hatch success. While 10 out of 25 (40%) of nests laid by May 13 on NCB successfully hatched, only 1 out of 19 (0.05%) laid after May 13 survived. Coyote predation was recorded for 4 nests on SCB. Despite the presence of coyote on SCB the hatch success was the highest recorded in 11 years at 66%. Raccoon, a primary nest predator, predation was low on SCB in 2014. Evidence of fox and coyote activity has been suspected to have played a role in low productivity on SB in past years. There was no coyote or fox predation documented on SB in 2014 and hatch success increased to 50%. Hurricane Arthur caused the failure of 4 nests across the seashore.

Fledge success in the park was 0.62 chicks per nesting pair with a large variance by island. SCB and SB showed the highest fledge success in the last 11 years, 0.96 and 0.57, respectively. Conversely, NCB saw a decrease in fledging success at 0.32. Out of 11 nests that hatched on NCB, 8 fledged chicks (73%). NCB's poor hatch success is reflected in its low fledge success rate. On the MCB section, productivity declined down to just 5 fledglings. Nest failure was problematic with the lowest hatch success in 11 years. Predation appears to have increased on all beach nesting birds on MCB in the last three years. However MCB still shows the highest concentration of oystercatcher pairs along the seashore at 3.4 pairs per mile, while NCB (mile 0-19), SCB, and SB have approximately 1 pair per mile. Although MCB may continue to attract more breeding pairs than other islands, productivity (0.38) was comparable to the rest of NCB (0.32) in the 2014 season. Out of 23 nests that hatched on SCB, 13 fledged chicks (57%). Ten broods were lost after hatching on SCB. Though the causes of these chick failures are unknown the presence of a canine predator on SCB is suspect. Two broods on NCB and two broods on SCB are suspected to have been lost due to Hurricane Arthur.

A range-wide productivity standard was established defining fledging at 35 days old. This standard provides consistency throughout the nesting range. A total of 40 chicks reached 35 days old and were considered fledged: this is reflected in the seashore-wide 0.62 productivity rate. However, we know that most chicks cannot actually fly at day 35. The average age of chicks fledging in 2014 from 17 broods was 42 days from the hatch date. This calculation excludes 8 broods with unknown exact fledge dates. The range of fledging age, determined from the 17 broods, was from 37 to 46 days (Appendix 1). Chicks are monitored and managed until they exhibited strong flight greater than 150 feet. There was no known chick loss to motor vehicles this year.

Nesting pairs increased from 63 pairs in 2013 to 65 pairs in 2014. Part of this change can be explained with the addition of new pairs and/or marked individuals. There were four new pairs identified by either their unique leg bands and/or establishment of new territories. Dark Green HR, PY, RR, WF, TN, UJ, CX, LN, and RU were all new nesters along the shoreline. Dark Green CFX, an NCB nester from previous years, was re-sighted with its mate on territory throughout the breeding season. However, a nest was never found and they were not counted as a breeding pair for this season. The long term banding and monitoring program at the seashore can also tell us about the nesting population dynamics, such as pairs that persist and produce fledglings over the years. Dark green 16 has been nesting at Cape Point on SCB every year since 2003 when it was first tagged and has produced seven fledglings. In 2009 dark green (CP) fledged from Cape Point and has since established its own nesting territory at Power Squadron Spit in 2013 and fledged one chick in 2014.

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Figure 1.

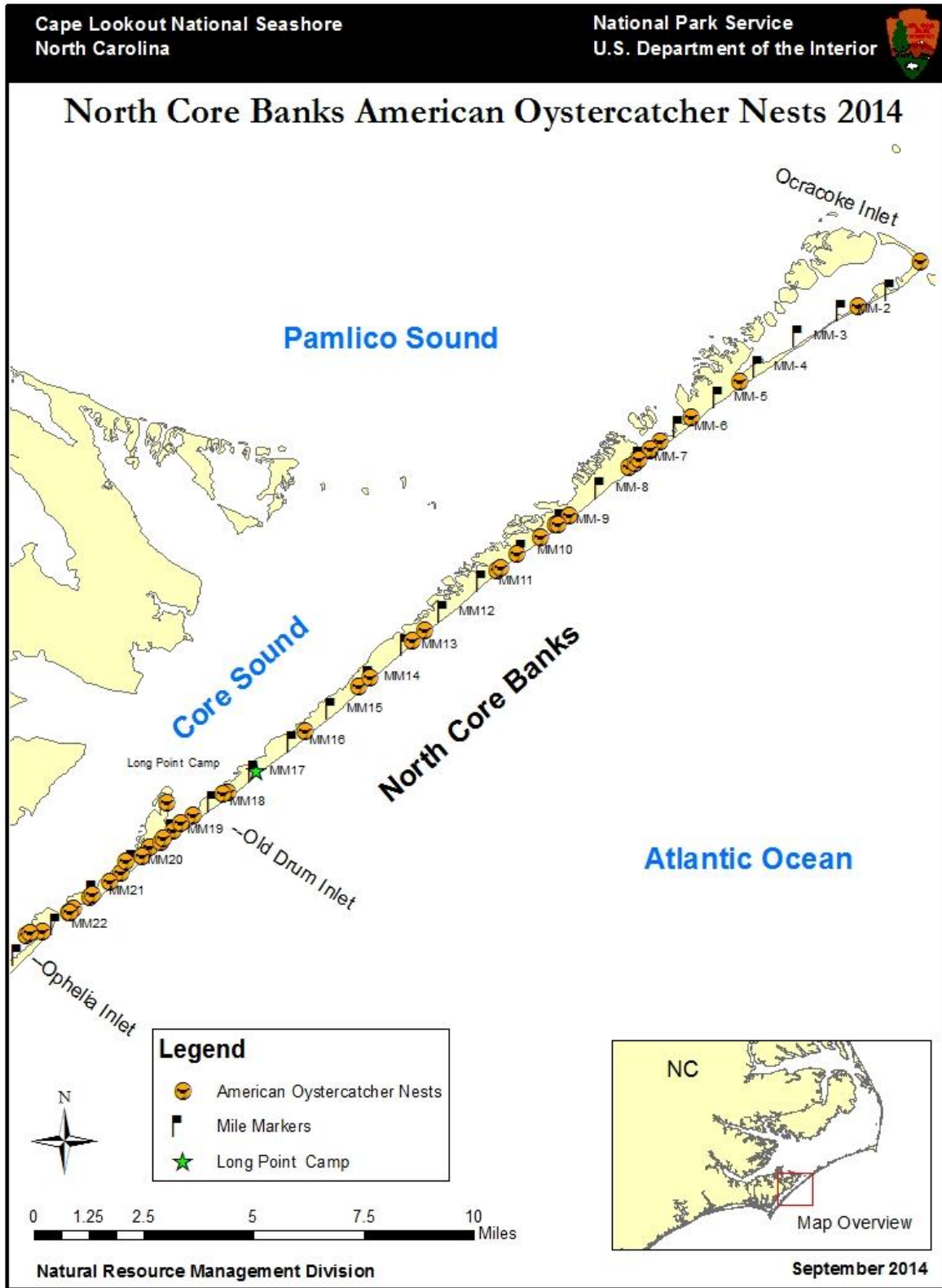
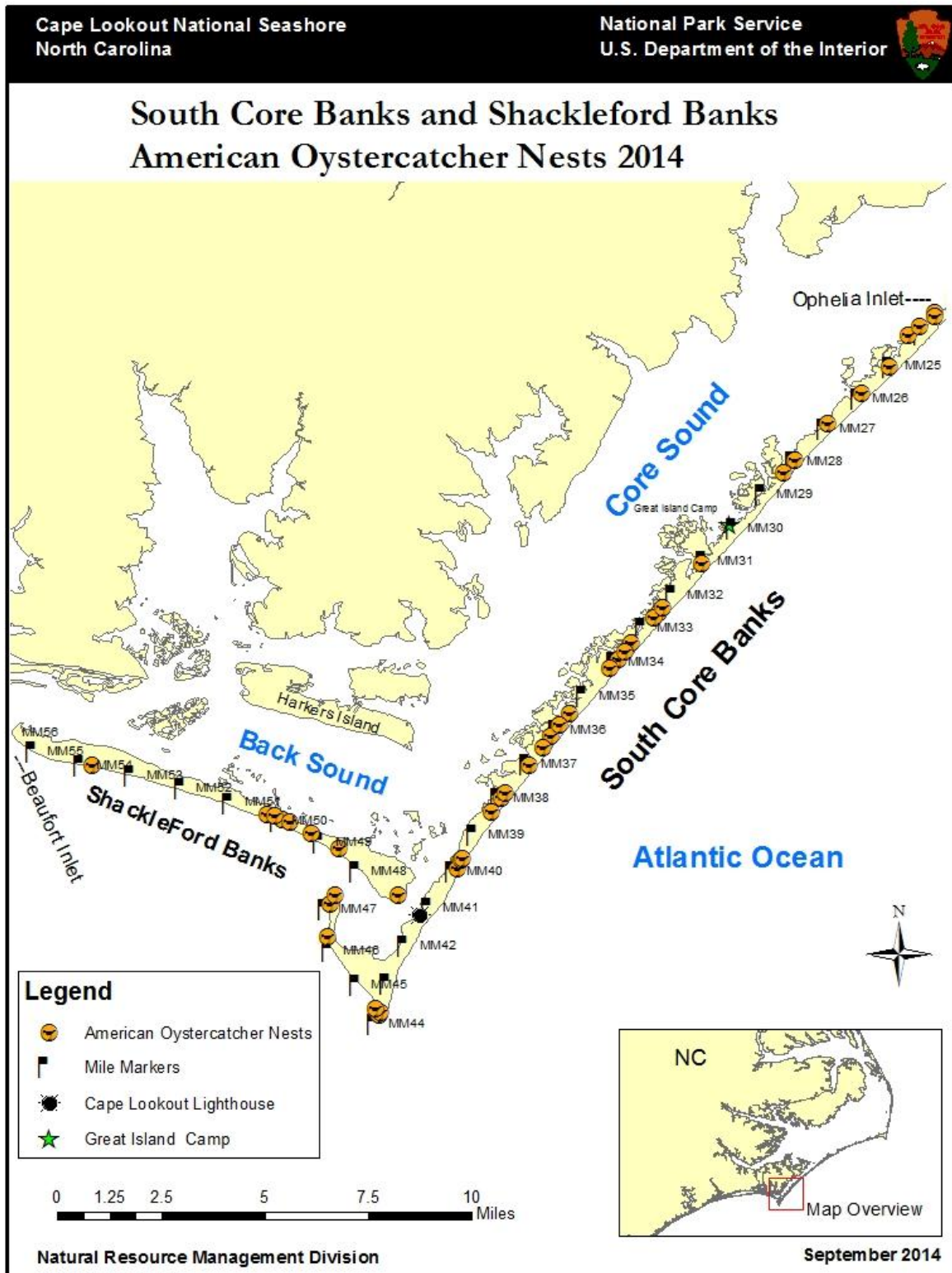


Figure 2.



APPENDIX 1A AMERICAN OYSTERCATCHER NESTS- NORTH CORE BANKS-2014

| Nest # | Pair # | Adult Bands      | Mile  | Location                 | Found     | Eggs | Closure     | Comments (Abbreviated)  |
|--------|--------|------------------|-------|--------------------------|-----------|------|-------------|---|
| 1      | 1      | DG(UT), DG(CER)  | 18.55 | shell bed                | 4/23/2014 | 3    | interior    | <b>Fledged 1 chick DG (CLE) banded on 6/24/14. Fledged at 40 days</b>                                 |
| 2      | 2      | DG(CE), UNB      | 17.69 | upper beach              | 4/23/2014 | 1    | 600' buffer | Nest failed 4/24/2014- crow and ghost crab tracks at nest   |
| 3      | 3      | DG(73), UNB      | 9.23  | shell bed, upper beach   | 4/23/2014 | 3    | 600' buffer | Nest failed, unknown. 1 egg in nest cup 4/29, 0 eggs on 4/30  |
| 4      | 4      | DG(E0), UNB      | 14.36 | side of dune             | 4/23/2014 | 3    | 600' buffer | <b>Fledged 1 chick DG(CLN) banded on 6/24/14. Fledged at 42 days</b>                                  |
| 5      | 5      | DG(M8), UNB      | 19.64 | base of dune, up swash   | 4/26/2014 | 3    | no          | <b>Fledged 2 chicks by 38 days, unbanded. 1 unhatched egg.</b>  |
| 6      | 6      | DG(R2), UNB      | 19.41 | side of dune             | 4/28/2014 | 2    | interior    | <b>Fledged 1 chick by 44 days, unbanded.</b>  |
| 7      | 7      | UNB, UNB         | 19.86 | raised shell bed         | 4/28/2014 | 2    | no          | Nest failed 5/23- unknown   |
| 8      | 8      | DG(K2), UNB      | 21.21 | raised shell bed         | 4/28/2014 | 2    | no          | Nest failed 5/23- unknown   |
| 9      | 9      | DG(AN), UNB      | 22.70 | raised shell bed         | 4/30/2014 | 3    | interior    | Nest failed 5/23- unknown   |
| 10     | 10     | UNB, UNB         | 8.91  | upper beach              | 5/3/2014  | 3    | 600' buffer | Brood failed ~7/4, suspected failure due to Hurricane Arthur. 1 chick found dead in nest cup 6/4      |
| 11     | 2      | DG(CE), UNB      | 17.78 | Shell bed behind dunes   | 5/3/2014  | 3    | 600' buffer | <b>Fledged 1 chick DG (CTL) by day 58, banded on 7/1/14. One egg unhatched.</b>                       |
| 12     | 11     | UR-Red, UNB      | 12.93 | side of dune             | 5/4/2014  | 3    | 600' buffer | Nest failed 5/14/14- raccoon tracks in nest cup   |
| 13     | 12     | DG(T6), DG(CE1)  | 10.73 | base of dune             | 5/4/2014  | 3    | 600' buffer | Nest failed 6/1- unknown  |
| 14     | 13     | RED(4L), UNB     | 7.36  | shell bed, base of dune  | 5/6/2014  | 3    | 600' buffer | Nest failed 6/1- unknown  |
| 15     | 14     | LL-Blue, UNB     | 20.41 | shell bed, upper beach   | 5/7/2014  | 3    | no          | Nest failed 5/13- unknown   |
| 16     | 15     | UNB, UNB         | 20.05 | upper beach              | 5/7/2014  | 4    | no          | <b>Fledged 2 chicks on 7/14, fledged by 41 days</b>   |
| 17     | 16     | UNB, UNB         | 6.83  | shell flat               | 5/8/2014  | 3    | 600' buffer | Failed 5/25, unknown. 1 egg 5/24, 0 eggs 5/25 with ghost crab tracks                                  |
| 18     | 17     | DG(C1),DG(F3)    | 5.77  | shell flat               | 5/8/2014  | 3    | 600' buffer | Brood failed on 6/7, cause unknown  |
| 19     | 18     | DG(CE3), UNB     | 6.55  | base of high dunes       | 5/8/2014  | 3    | interior    | Nest failed 5/15, raccoon tracks in nest cup  |
| 20     | 19     | DG(M0), DG(74)   | 19.05 | raised shell bed         | 5/9/2014  | 3    | no          | Nest failed 5/23, unknown   |
| 21     | 20     | DG(TF), UNB      | 21.61 | shell flat               | 5/9/2014  | 2    | no          | Nest failed 5/23, unknown   |
| 22     | 3      | DG(73), UNB      | 9.18  | shell flat               | 5/10/2014 | 3    | 600' buffer | Nest failed 5/27, unknown, possibly ghost crab  |
| 23     | 21     | DG(W5), UNB      | 14.08 | base of dunes            | 5/10/2014 | 3    | 600' buffer | <b>Fledged 1 chick DG (CTM) banded on 7/9/14. Fledged at 40 days. 1 piped egg that never hatched.</b> |
| 24     | 22     | UNB, UNB         | 20.70 | shell bed, base of dunes | 5/12/2014 | 3    | no          | Nest failed 5/23, unknown   |
| 25     | 23     | UNB, UNB         | 4.55  | shell bed, base of dunes | 5/13/2014 | 3    | 600' buffer | <b>Fledged 1 chick DG (CT3), banded on 7/9/14. Fledged at 42 days</b>                                 |
| 26     | 24     | DG (WF), DG (TN) | 18.85 | shell flat               | 5/14/2014 | 2    | interior    | Nest failed 5/30, unknown   |

|    |    |                   |       |                            |           |   |             |  |
|----|----|-------------------|-------|----------------------------|-----------|---|-------------|--|
| 27 | 25 | DG (CY), DG (RR)  | 7.22  | shell bed, base of dunes   | 5/15/2014 | 2 | 600' buffer | Nest failed 5/19, unknown                                    |
| 28 | 26 | UNB, UNK          | 1.78  | top of low dune            | 5/20/2014 | 1 | interior    | Nest failed 5/21, unknown                                    |
| 29 | 27 | UNB, UNB          | 0.21  | top of dunelets            | 5/22/2014 | 1 | interior    | Nest failed 6/12, unknown                                    |
| 30 | 28 | DG (P5), UNB      | 22.39 | between dunelets           | 5/23/2014 | 2 | interior    | Nest failed 6/2, raccoon tracks                              |
| 31 | 11 | UR-Red, UNB       | 12.61 | shell bed                  | 5/24/2014 | 1 | 600' buffer | Nest failed 5/25, unknown                                    |
| 32 | 29 | RED(2L); UNB      | 10.20 | top of small dune          | 5/25/2014 | 2 | 600' buffer | Nest failed 6/8, raccoon tracks                              |
| 33 | 8  | DG(K2), UNB       | 21.12 | shell bed                  | 5/26/2014 | 3 | interior    | Nest failed 6/14, unknown. DG (K2) found dead on beach 7/10  |
| 34 | 20 | DG (TF), UNB      | 21.72 | raised shell bed           | 5/26/2014 | 1 | interior    | Nest failed 5/31, unknown                                    |
| 35 | 11 | UR-Red, UNB       | 12.89 | upper beach                | 5/28/2014 | 1 | 600' buffer | Nest failed 5/30, ghost crab                                 |
| 36 | 30 | DG (HR), DG(PY)   | 15.76 | shell bed, behind backroad | 5/28/2014 | 2 | no          | Nest abandoned, unknown reason                               |
| 37 | 9  | DG(AN), UNB       | 22.61 | shell flat                 | 6/2/2014  | 2 | interior    | Nest failed 6/6, ghost crab                                  |
| 38 | 19 | DG (M0), DG (74)  | 19.32 | between dunes              | 6/2/2014  | 2 | interior    | Brood failed ~7/4, suspected failure due to Hurricane Arthur |
| 39 | 16 | UNB, UNB          | 6.80  | shell flat                 | 6/5/2014  | 2 | interior    | Nest failed 7/4, Hurricane Arthur                            |
| 40 | 20 | DG (TF), UNB      | 21.70 | shell bed                  | 6/6/2014  | 1 | interior    | Nest failed 6/14, unknown                                    |
| 41 | 25 | DG (CY), DG (RR)  | 7.12  | shell bed between dunes    | 6/7/2014  | 2 | 600' buffer | Nest failed 6/28, unknown                                    |
| 42 | 3  | DG (73), UNB      | 9.63  | base of dunes              | 6/7/2014  | 3 | 600' buffer | Nest failed 6/21, cat tracks                                 |
| 43 | 12 | DG (T6), DG (CE1) | 10.63 | upper beach                | 6/12/2014 | 3 | 600' buffer | Nest failed 6/21, unknown predator, yoke in nest cup         |
| 44 | 31 | O/X:B/-, UNB      | 19.95 | soundside beach            | 6/20/2014 | 2 | no          | Nest failed 6/25, unknown                                    |

**31 nesting pairs, 44 nests, 11 nests hatched, 10 chicks fledged**

## APPENDIX 1B

## AMERICAN OYSTERCATCHER NESTS- SOUTH CORE BANKS-2014

| Nest # | Pair # | Adult Bands       | Mile  | Location                   | Found     | Eggs | Closure     | Comments (Abbreviated)   |
|--------|--------|-------------------|-------|----------------------------|-----------|------|-------------|--|
| 1      | 1      | DG (I6), UNB      | 44.2  | inside Point closure       | 4/13/2014 | 3    | Interior    | Nest FAILED 4/30/14 - Coyote predation, tracks at nest, 1 munched egg  |
| 2      | 2      | DG (L2), UNB      | 39.73 | side of dune               | 4/18/2014 | 2    | 600' buffer | Nest FAILED 4/20/14, likely due to bad weather. Nest cup gone, egg found on a dune away from nest                              |
| 3      | 3      | DG (R8), O-UL     | 38.01 | near dune base             | 4/18/2014 | 2    | 600' buffer | Fledged 1 chick- DG (CK0), fledged at day 39   |
| 4      | 4      | DG (UR), DG (UP)  | 39.93 | edge of dune base          | 4/20/2014 | 3    | 600' buffer | Brood FAILED 6/11 - unknown  |
| 5      | 5      | DG (K0), UNB      | 32.55 | upper beach /dunes         | 4/23/2014 | 2    | 600' buffer | Brood FAILED 6/11 - unknown  |
| 6      | 6      | UNB, UNB          | 31.1  | shell flat in dunes        | 4/23/2014 | 3    | 600' buffer | Fledged 3 chicks DG (CK6, CK7, CK8) at day 42  |
| 7      | 7      | DG (TE), UNB      | 28.37 | upper beach /dunes         | 4/23/2014 | 3    | 600' buffer | Fledged 3 chicks, 2 banded DG (CK2, CK1), Fledged at day 46  |
| 8      | 8      | DG (UY), UNB      | 23.46 | soundside dune             | 4/23/2014 | 3    | Interior    | Day 35 1 Fledgling, 7/2 - 1 fledgling found dead near adults   |
| 9      | 9      | DG (T8), UNB      | 32.71 | upper beach                | 4/23/2014 | 3    | 600' buffer | Brood FAILED 6/11 - unknown  |
| 10     | 10     | DG (NF), UNB      | 33.47 | upper beach                | 4/23/2014 | 3    | 600' buffer | Fledged 3 chicks DG (CLK, CLL, CLM). one day 35 fledgling, 2 chicks fledged at day 40  |
| 11     | 11     | DG (AR), DG (AP)  | 33.93 | upper beach                | 4/23/2014 | 2    | 600' buffer | Nest FAILED 5/2/14 - Unknown   |
| 12     | 12     | DG (JC), DG (TC)  | 27.98 | near dune base             | 4/25/2014 | 3    | 600' buffer | Fledged 2 chicks DG(CK9, CK3) at day 41  |
| 13     | 13     | DG (UL), UNB      | 43.72 | shell flat, Cape Point     | 4/25/2014 | 3    | Interior    | Brood FAILED 6/3- unknown  |
| 14     | 14     | UNB, UNB          | 47.00 | PSS, back on dunes         | 4/25/2014 | 3    | Interior    | Fledged 1 chick DG (CLP) by day 52   |
| 15     | 15     | DG (J3), UNB      | 24.32 | soundside                  | 4/26/2014 | 1    | Interior    | Brood FAILED 6/9 - unknown   |
| 16     | 16     | DG (MI), DG (J0)  | 35.56 | dunes                      | 4/27/2014 | 3    | 600' buffer | Brood FAILED 6/18 - unknown. Extra pair of yellow signs used for 600' buffer   |
| 17     | 17     | DG (CP), UNB      | 46.35 | dune line                  | 4/27/2014 | 3    | 600' buffer | Fledged 1 chick at day 41. 2 chicks banded DG (CK4, CK5) but one never seen after 6/16. Extra pair of yellow buffer signs used |
| 18     | 2      | DG (L2), UNB      | 39.71 | on dune                    | 4/30/2014 | 3    | 600' buffer | Nest FAILED 5/5/14 - unknown   |
| 19     | 18     | DG (CF7), UNB     | 26.92 | shell flat behind dunes    | 5/2/2014  | 3    | 600' buffer | Fledged 3 chicks at day 39, only 2 banded DG (CLJ, CLH)  |
| 20     | 19     | DG (RU), UNB      | 34.22 | upper beach                | 5/2/2014  | 2    | 600' buffer | Fledged 2 chicks at day 44 DG (CLR, CLT)   |
| 21     | 20     | DG (33), DG (LN)  | 25.07 | next to backroad           | 5/3/2014  | 2    | 600' buffer | Fledged 2 chicks DG (CLA, CLF) at day 44   |
| 22     | 21     | Red- UR, UNB      | 36.23 | shell flat near shrub line | 5/3/2014  | 2    | None        | Nest FAILED 5/8/14 - coyote tracks at nest   |
| 23     | 22     | DG (J9), UNB      | 37.05 | on top of dune             | 5/3/2014  | 3    | 600' buffer | Nest FAILED 5/28 - Coyote predation  |
| 24     | 23     | DG (AL), DG (AL)  | 23.56 | low dune                   | 5/6/2014  | 3    | None        | Fledged 2 chicks at day 37DG (CTF, CTE)  |
| 25     | 24     | Y; - ; W ; -, UNB | 23.91 | back shell flat            | 5/6/2014  | 3    | None        | Brood FAILED 7/5 - found one chick dead DG(CLW), did not see any other chicks after 7/5  |

|    |    |                  |       |                             |           |     |             |   |
|----|----|------------------|-------|-----------------------------|-----------|-----|-------------|---|
| 26 | 25 | UNB, UNB         | 38.40 | shell flat in between dunes | 5/9/2014  | 3   | 600' buffer | Fledged 1 chick DG (TCC) at day 39  |
| 27 | 26 | DG (UJ), UNB     | 25.92 | behind dunes                | 5/12/2014 | 1   | 600' buffer | Nest FAILED 6/2 - Faint predator tracks around nest, nest cup dug up. Unknown predator. |
| 28 | 11 | DG (AR), DG (AP) | 33.70 | Base of low dune on mound   | 5/14/2014 | 1   | 600' buffer | Brood FAILED 7/17 - hadn't seen chick since 6/28, unknown                               |
| 29 | 1  | DG (I6), UNB     | 44.37 | Point Closure               | 5/16/2014 | 2   | 600' buffer | Brood FAILED 6/13 - unknown   |
| 30 | 21 | Red- UR, UNB     | 35.89 | shell flat near shrub line  | 5/24/2014 | 3   | None        | Nest FAILED 5/24 - Found predated, unknown predator.                                    |
| 31 | 27 | UNB, UNB         | 47    | PSS, soundside of closure   | 6/9/2014  | UNK | Interior    | Fledged 1 chick DG (CTC)- last seen on 7/10 when banded at day 36                       |
| 32 | 2  | DG (L2), UNB     | 39.66 | upper beach                 | 6/11/2014 | 1   | 600' buffer | Nest FAILED 6/16 - Coyote predation   |
| 33 | 5  | DG (K0), UNB     | 32.42 | upper beach                 | 6/18/2014 | 3   | 600' buffer | Nest FAILED 7/4 - due to Hurricane Arthur   |
| 34 | 21 | Red- UR, UNB     | 36.55 | on dune ledge, near edge    | 6/24/2014 | 2   | 600' buffer | Nest FAILED 7/4 - due to Hurricane Arthur   |
| 35 | 22 | DG (J9), UNB     | 37.87 | toe of dune                 | 7/1/2014  | 2   | 600' buffer | Nest FAILED 7/4 - due to Hurricane Arthur   |

27 nesting pairs, 35 nests, 23 nests hatched, 26 chicks fledged



APPENDIX 1C AMERICAN OYSTERCATCHER NESTS- SHACKLEFORD BANKS -2014

| Nest # | Pair # | Adult Bands  | Mile  | Location             | Found     | Eggs | Closure | Comments (Abbreviated)   |
|--------|--------|--------------|-------|----------------------|-----------|------|---------|--|
| 1      | 1      | DG (E9), UNB | 50    | shell flat           | 5/2/2014  | 3    | none    | nest failed by 5/16, unknown   |
| 2      | 2      | UNB, UNB     | 49.85 | back shell flat      | 5/2/2014  | 3    | none    | Fledged 1 chick, seen at day 40 and day 49, brood moved soundside  |
| 3      | 3      | UNB, UNB     | 49.35 | shell flat           | 5/2/2014  | 3    | none    | Fledged 2 chicks at day 38, brood moved soundside  |
| 4      | 4      | UNB, UNB     | 50.31 | face of low dune     | 5/2/2014  | 3    | none    | nest lost to flooding by 5/16  |
| 5      | 5      | UNB, UNB     | 53.88 | face of dune         | 5/9/2014  | 2    | none    | 1 day 35 fledgling , chick seen on 7/2 before Hurricane at day 34, 7/3 was day 35, hurricane was on 7/4, foraged ocean beach |
| 6      | 6      | UNB, UNB     | 47    | Barden Inlet         | 5/9/2014  | 2    | none    | nest failed by 6/1, unknown  |
| 7      | 7      | UNB, UNB     | 48.68 | behind dune in field | 5/16/2014 | 3    | none    | nest failed by 6/1, unknown, went from 3 eggs on 5/19 to two eggs on 5/28, many horse tracks in area, paint stick broken     |
| 8      | 1      | DG (E9), UNB | 50.15 | shell flat           | 6/5/2014  | 3    | none    | chicks lost shortly after hatch, went to soundside, ATV tracks at 3 feet from active nest on 6/20                            |

7 nesting pairs, 8 nests, 4 nests hatched, 4 chicks fledged