Coyote, Canis latrans, first documented on South Core Banks in 2014.
Abstract
There were 70 American Oystercatcher pairs nesting throughout the ocean beach habitat of the seashore in 2017. North Core Banks had 30 pairs, South Core Banks had 34 pairs, and Shackleford Banks had 6 pairs. Egg-laying was initiated on April 11th and a total of 133 nests were documented. Only 5 nests hatched and zero chicks fledged. Predators were responsible for 59% of failures, which resulted in 0% productivity. This is the lowest productivity at CALO in the past 22 years and the only year with zero productivity.

Introduction
American Oystercatchers are common nesters throughout the park, primarily on the ocean beach. They have been listed since 2008 as a North Carolina Special Concern species by the North Carolina Wildlife Resource Commission (2014). 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). The research 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 and Simons 2015). Since 1997 NCSU and park staff has conducted censuses, monitored nesting success, and banded oystercatchers primarily on the core banks of the seashore. Data in this summary report are presented from the last fourteen breeding seasons, 2004 to 2017, during which all of the seashore was monitored regularly.

Site Description
Cape Lookout National Seashore is located in the southern Outer Banks of North Carolina between Ocracoke and Beaufort Inlets. The seashore was physically divided into four barrier islands during the 2017 breeding season. The northernmost island, North Core Banks (NCB), is 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 forth island, Shackleford Banks (SB), is 8 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) contains management guidelines and monitoring protocols (National Park Service 2006). Following this protocol, park staff conducted surveys of Shackleford Banks for nesting birds twice a week beginning in April. Daily surveys of nesting habitat on North and South Core Banks also began in April and breeding monitoring continued seven days per week until the end of the nesting season.

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 in decimal degrees with 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 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. Based on a standard established by the American Oystercatcher working group in 2010, chicks were to be considered fledged at 35 days old for range wide productivity records. For seashore management purposes, the chicks were to be considered fledged when strong flight was actually observed.
Results

Seventy 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>
<thead>
<tr>
<th>Island</th>
<th>#Pairs</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Chicks Fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Core Banks</td>
<td>30</td>
<td>56</td>
<td>5 (9%)</td>
<td>0</td>
</tr>
<tr>
<td>South Core Banks</td>
<td>34</td>
<td>69</td>
<td>0 (0%)</td>
<td>0</td>
</tr>
<tr>
<td>Shackleford Banks</td>
<td>6</td>
<td>8</td>
<td>0 (0%)</td>
<td>0</td>
</tr>
<tr>
<td>CALO Total</td>
<td>70</td>
<td>135</td>
<td>5 (4%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Nesting pairs were spread throughout most of the ocean beach habitat in the park (Appendix 1A & B). 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, 133 nests were found, 5 of which hatched at least one egg. Zero chicks were known to survive 35 days to fledge (Table 2). Of the nests that failed, 76 were lost to predation, 33 nests failed due to unknown causes, 16 were lost to flooding, 1 was lost to human disturbance, and 7 were abandoned (Table 3). Coyote (48), raccoon (21), ghost crab (5), and otter (1) were responsible for depredated oystercatcher nests. There was 1 nest depredated by an undetermined predator. There was 1 documented instance of nest failure due to human disturbance. Table 4 summarizes the reproductive success over the last 14 years of standardized monitoring. The fledgling success is calculated using the known nesting pairs. This allowed for cross-year comparisons with variable monitoring efforts and other unknowns. Figure 1 illustrates the reproductive success over the last 14 years and shows a downward trending fledge success. In 2017, 70 known nesting pairs produced 0 fledglings for a fledge success rate of 0. Individual nest data are found in Appendix 2. Tables 5, 6, 7, and 8 summarize the reproductive success by island with known and comparable data.

Table 2. Oystercatcher reproductive success by island in 2017.

<table>
<thead>
<tr>
<th>Island</th>
<th>#Pairs</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Chicks Fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Core Banks</td>
<td>30</td>
<td>56</td>
<td>5 (9%)</td>
<td>0</td>
</tr>
<tr>
<td>South Core Banks</td>
<td>34</td>
<td>69</td>
<td>0 (0%)</td>
<td>0</td>
</tr>
<tr>
<td>Shackleford Banks</td>
<td>6</td>
<td>8</td>
<td>0 (0%)</td>
<td>0</td>
</tr>
<tr>
<td>CALO Total</td>
<td>70</td>
<td>135</td>
<td>5 (4%)</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3. Causes of nest failure in 2017.

<table>
<thead>
<tr>
<th>Island</th>
<th>Predation</th>
<th>Flooding/Storms</th>
<th>Human Disturbance</th>
<th>Abandoned</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Core Banks</td>
<td>27</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>South Core Banks</td>
<td>48</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Shackleford Banks</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>CALO total</td>
<td>76</td>
<td>16</td>
<td>1</td>
<td>7</td>
<td>33</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Pairs (nesting)</th>
<th>#Chicks fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Cape Lookout N.S.</td>
<td>71</td>
<td>38 (54%)</td>
<td>52</td>
<td>45 (0.86)</td>
</tr>
<tr>
<td>2005</td>
<td>Cape Lookout N.S.</td>
<td>66</td>
<td>36 (54%)</td>
<td>51</td>
<td>25 (0.42)</td>
</tr>
<tr>
<td>2006</td>
<td>Cape Lookout N.S.</td>
<td>70</td>
<td>25 (36%)</td>
<td>50</td>
<td>22 (0.39)</td>
</tr>
<tr>
<td>2007</td>
<td>Cape Lookout N.S.</td>
<td>99</td>
<td>41 (41%)</td>
<td>51</td>
<td>21 (0.42)</td>
</tr>
<tr>
<td>2008</td>
<td>Cape Lookout N.S.</td>
<td>91</td>
<td>17 (19%)</td>
<td>45</td>
<td>11 (0.26)</td>
</tr>
<tr>
<td>2009</td>
<td>Cape Lookout N.S.</td>
<td>83</td>
<td>20 (24%)</td>
<td>48</td>
<td>12 (0.30)</td>
</tr>
<tr>
<td>2010</td>
<td>Cape Lookout N.S.</td>
<td>114</td>
<td>42 (37%)</td>
<td>50</td>
<td>16 (0.37)</td>
</tr>
<tr>
<td>2011</td>
<td>Cape Lookout N.S.</td>
<td>112</td>
<td>41 (37%)</td>
<td>50</td>
<td>10 (0.27)</td>
</tr>
<tr>
<td>2012</td>
<td>Cape Lookout N.S.</td>
<td>104</td>
<td>32 (31%)</td>
<td>46</td>
<td>14 (0.29)</td>
</tr>
<tr>
<td>2013</td>
<td>Cape Lookout N.S.</td>
<td>102</td>
<td>30 (29%)</td>
<td>45</td>
<td>9 (0.18)</td>
</tr>
<tr>
<td>2014</td>
<td>Cape Lookout N.S.</td>
<td>87</td>
<td>30 (35%)</td>
<td>36</td>
<td>15 (0.32)</td>
</tr>
<tr>
<td>2015</td>
<td>Cape Lookout N.S.</td>
<td>112</td>
<td>36 (33%)</td>
<td>60</td>
<td>10 (0.19)</td>
</tr>
<tr>
<td>2016</td>
<td>Cape Lookout N.S.</td>
<td>112</td>
<td>17 (15%)</td>
<td>70</td>
<td>10 (0.18)</td>
</tr>
<tr>
<td>2017</td>
<td>Cape Lookout N.S.</td>
<td>133</td>
<td>4 (4%)</td>
<td>70</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
Figure 1. The number of nesting oystercatcher pairs and number of chicks fledged by year at Cape Lookout National Seashore, 2004 to 2017. Lines illustrate the trends in these values over time.

Table 5. Summary of oystercatcher reproductive success on North Core Banks, 2004-2017, Ocracoke Inlet mile 0 to Ophelia Inlet mile 22.7.

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Pairs (nesting)</th>
<th>#Chicks fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>North Core Banks</td>
<td>30</td>
<td>24 (80%)</td>
<td>26</td>
<td>38 (1.46)</td>
</tr>
<tr>
<td>2005</td>
<td>North Core Banks</td>
<td>29</td>
<td>16 (64%)</td>
<td>23</td>
<td>15 (0.65)</td>
</tr>
<tr>
<td>2006</td>
<td>North Core Banks</td>
<td>28</td>
<td>16 (57%)</td>
<td>24</td>
<td>15 (0.62)</td>
</tr>
<tr>
<td>2007</td>
<td>North Core Banks</td>
<td>46</td>
<td>17 (37%)</td>
<td>30</td>
<td>27 (0.90)</td>
</tr>
<tr>
<td>2008</td>
<td>North Core Banks</td>
<td>30</td>
<td>9 (30%)</td>
<td>22</td>
<td>10 (0.45)</td>
</tr>
<tr>
<td>2009</td>
<td>North Core Banks</td>
<td>40</td>
<td>7 (18%)</td>
<td>29</td>
<td>8 (0.28)</td>
</tr>
<tr>
<td>2010</td>
<td>North Core Banks</td>
<td>58</td>
<td>15 (26%)</td>
<td>31</td>
<td>15 (0.48)</td>
</tr>
<tr>
<td>2011</td>
<td>North Core Banks</td>
<td>54</td>
<td>18 (33%)</td>
<td>32</td>
<td>24 (0.75)</td>
</tr>
<tr>
<td>2012</td>
<td>North Core Banks</td>
<td>45</td>
<td>16 (36%)</td>
<td>28</td>
<td>26 (0.93)</td>
</tr>
<tr>
<td>2013</td>
<td>North Core Banks</td>
<td>50</td>
<td>12 (24%)</td>
<td>30</td>
<td>13 (0.43)</td>
</tr>
<tr>
<td>2014</td>
<td>North Core Banks</td>
<td>44</td>
<td>11 (25%)</td>
<td>31</td>
<td>10 (0.32)</td>
</tr>
<tr>
<td>2015</td>
<td>North Core Banks</td>
<td>49</td>
<td>13 (27%)</td>
<td>29</td>
<td>17 (0.59)</td>
</tr>
<tr>
<td>2016</td>
<td>North Core Banks</td>
<td>49</td>
<td>8 (16%)</td>
<td>31</td>
<td>13 (0.42)</td>
</tr>
<tr>
<td>2017</td>
<td>North Core Banks</td>
<td>56</td>
<td>5 (9%)</td>
<td>30</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
Table 6. Summary of oystercatcher reproductive success on the Middle Core Bank Section of North Core Banks, 2004 to 2017, Old Drum Inlet mile 18.85 to mile 22.7 Ophelia Inlet.

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Pairs (nesting)</th>
<th>#Chicks fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Middle Core Banks</td>
<td>5</td>
<td>4 (80%)</td>
<td>5</td>
<td>7 (1.40)</td>
</tr>
<tr>
<td>2005</td>
<td>Middle Core Banks</td>
<td>9</td>
<td>5 (55%)</td>
<td>7</td>
<td>9 (1.28)</td>
</tr>
<tr>
<td>2006</td>
<td>Middle Core Banks</td>
<td>10</td>
<td>8 (80%)</td>
<td>10</td>
<td>10 (1.00)</td>
</tr>
<tr>
<td>2007</td>
<td>Middle Core Banks</td>
<td>14</td>
<td>9 (64%)</td>
<td>13</td>
<td>13 (1.00)</td>
</tr>
<tr>
<td>2008</td>
<td>Middle Core Banks</td>
<td>8</td>
<td>5 (62%)</td>
<td>8</td>
<td>7 (0.88)</td>
</tr>
<tr>
<td>2009</td>
<td>Middle Core Banks</td>
<td>13</td>
<td>3 (23%)</td>
<td>10</td>
<td>1 (0.10)</td>
</tr>
<tr>
<td>2010</td>
<td>Middle Core Banks</td>
<td>24</td>
<td>4 (17%)</td>
<td>13</td>
<td>2 (0.15)</td>
</tr>
<tr>
<td>2011</td>
<td>Middle Core Banks</td>
<td>23</td>
<td>8 (35%)</td>
<td>14</td>
<td>12 (0.86)</td>
</tr>
<tr>
<td>2012</td>
<td>Middle Core Banks</td>
<td>19</td>
<td>7 (37%)</td>
<td>13</td>
<td>12 (0.92)</td>
</tr>
<tr>
<td>2013</td>
<td>Middle Core Banks</td>
<td>17</td>
<td>7 (39%)</td>
<td>13</td>
<td>9 (0.69)</td>
</tr>
<tr>
<td>2014</td>
<td>Middle Core Banks</td>
<td>18</td>
<td>4 (22%)</td>
<td>13</td>
<td>5 (0.38)</td>
</tr>
<tr>
<td>2015</td>
<td>Middle Core Banks</td>
<td>24</td>
<td>2 (8%)</td>
<td>13</td>
<td>1 (0.08)</td>
</tr>
<tr>
<td>2016</td>
<td>Middle Core Banks</td>
<td>19</td>
<td>2 (10%)</td>
<td>13</td>
<td>6 (0.46)</td>
</tr>
<tr>
<td>2017</td>
<td>Middle Core Banks</td>
<td>21</td>
<td>0 (0%)</td>
<td>13</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

Table 7. Summary of oystercatcher reproductive success on South Core Banks, 2004 to 2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th>#Pairs (nesting)</th>
<th>#Chicks fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>South Core Banks</td>
<td>33</td>
<td>13 (39%)</td>
<td>20</td>
<td>6 (0.30)</td>
</tr>
<tr>
<td>2005</td>
<td>South Core Banks</td>
<td>27</td>
<td>9 (33%)</td>
<td>22</td>
<td>3 (0.14)</td>
</tr>
<tr>
<td>2006</td>
<td>South Core Banks</td>
<td>31</td>
<td>6(19%)</td>
<td>19</td>
<td>10 (0.53)</td>
</tr>
<tr>
<td>2007</td>
<td>South Core Banks</td>
<td>41</td>
<td>4(21%)</td>
<td>21</td>
<td>4 (0.19)</td>
</tr>
<tr>
<td>2008</td>
<td>South Core Banks</td>
<td>44</td>
<td>5 (11%)</td>
<td>24</td>
<td>5 (0.21)</td>
</tr>
<tr>
<td>2009</td>
<td>South Core Banks</td>
<td>30</td>
<td>11(37%)</td>
<td>22</td>
<td>11 (0.50)</td>
</tr>
<tr>
<td>2010</td>
<td>South Core Banks</td>
<td>43</td>
<td>11 (25%)</td>
<td>23</td>
<td>17 (0.74)</td>
</tr>
<tr>
<td>2011</td>
<td>South Core Banks</td>
<td>51</td>
<td>9 (18%)</td>
<td>24*</td>
<td>12 (0.50)</td>
</tr>
<tr>
<td>2012</td>
<td>South Core Banks</td>
<td>41</td>
<td>15 (36%)</td>
<td>22</td>
<td>16 (0.73)</td>
</tr>
<tr>
<td>2013</td>
<td>South Core Banks</td>
<td>46</td>
<td>19 (41%)</td>
<td>27</td>
<td>12 (0.44)</td>
</tr>
<tr>
<td>2014</td>
<td>South Core Banks</td>
<td>35</td>
<td>23 (66%)</td>
<td>27</td>
<td>26 (0.96)</td>
</tr>
<tr>
<td>2015</td>
<td>South Core Banks</td>
<td>54</td>
<td>20 (37%)</td>
<td>30</td>
<td>28 (0.93)</td>
</tr>
<tr>
<td>2016</td>
<td>South Core Banks</td>
<td>64</td>
<td>7 (11%)</td>
<td>33</td>
<td>3 (0.09)</td>
</tr>
<tr>
<td>2017</td>
<td>South Core Banks</td>
<td>69</td>
<td>0 (0%)</td>
<td>34</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

*Shackleford and South Core shared a nesting pair

<table>
<thead>
<tr>
<th>Year</th>
<th>Island</th>
<th>#Nests</th>
<th>#Nests Hatched</th>
<th># Pairs (nesting)</th>
<th>#Chicks fledged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Shackleford Banks</td>
<td>8</td>
<td>1 (12%)</td>
<td>6</td>
<td>1 (0.17)</td>
</tr>
<tr>
<td>2005</td>
<td>Shackleford Banks</td>
<td>10</td>
<td>1 (10%)</td>
<td>9</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>2006</td>
<td>Shackleford Banks</td>
<td>11</td>
<td>1 (9%)</td>
<td>9</td>
<td>1 (0.11)</td>
</tr>
<tr>
<td>2007</td>
<td>Shackleford Banks</td>
<td>12</td>
<td>0 (0%)</td>
<td>10</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>2008</td>
<td>Shackleford Banks</td>
<td>17</td>
<td>3 (18%)</td>
<td>11</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>2009</td>
<td>Shackleford Banks</td>
<td>13</td>
<td>2 (15%)</td>
<td>10</td>
<td>2 (0.20)</td>
</tr>
<tr>
<td>2010</td>
<td>Shackleford Banks</td>
<td>12</td>
<td>2 (17%)</td>
<td>8</td>
<td>2 (0.25)</td>
</tr>
<tr>
<td>2011</td>
<td>Shackleford Banks</td>
<td>9</td>
<td>2 (22%)</td>
<td>7*</td>
<td>1 (0.14)</td>
</tr>
<tr>
<td>2012</td>
<td>Shackleford Banks</td>
<td>13</td>
<td>0 (0%)</td>
<td>8</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>2013</td>
<td>Shackleford Banks</td>
<td>8</td>
<td>1 (12%)</td>
<td>6</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>2014</td>
<td>Shackleford Banks</td>
<td>8</td>
<td>4 (50%)</td>
<td>7</td>
<td>4 (0.57)</td>
</tr>
<tr>
<td>2015</td>
<td>Shackleford Banks</td>
<td>9</td>
<td>4 (44%)</td>
<td>7</td>
<td>5 (0.71)</td>
</tr>
<tr>
<td>2016</td>
<td>Shackleford Banks</td>
<td>8</td>
<td>2 (25%)</td>
<td>6</td>
<td>1 (0.17)</td>
</tr>
<tr>
<td>2017</td>
<td>Shackleford Banks</td>
<td>8</td>
<td>0 (0%)</td>
<td>6</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

*Shackleford and South Core shared a nesting pair

Banding

Zero chicks were captured and banded along the seashore in 2017, as none of the hatched chicks survived to banding age. Park staff recorded band re-sights of individuals and nesting pairs on the seashore throughout the summer. Of the 70 nesting pairs, 48 pairs (69%) had at least one individual of the pair banded, while 15 pairs (21%) were unbanded and seven pairs (10%) were undetermined. NCB had 17 banded pairs, 11 unbanded pairs, and two unconfirmed pairs. SCB had 31 banded pairs and three unbanded pairs. SB had no confirmed banded pairs, with two confirmed unbanded pairs, and four pairs that were not identified. There were 133 total documented individuals nesting across all sites, with one instance of mate switching occurring on SCB. There were 65 (49%) banded individual adults, 58 (44%) individuals that were unbanded, and 10 (7%) unknown individuals in the nesting population in 2017. See Appendix 2 for nesting pair re-sight data and 2017 chick band data. Details on oystercatcher band combinations can be found at the website: [http://www.amoywg.org/banding-re-sighting/](http://www.amoywg.org/banding-re-sighting/).
Discussion

Hatch success rates were 9% on North Core Banks, 0% on South Core Banks and 0% on Shackleford Banks. The total hatch success, at 4%, was the lowest on record on the seashore for the past 14 years and since monitoring began 22 years ago. Predators (76), weather (16), human disturbance (1), and abandonment (7) were responsible for nest losses. There were 33 total nests lost to unknown causes; 20 on NCB, 8 on SCB, and 5 on SB. On SCB, coyote was the prominent known cause of nest loss, responsible for depredating at least 47 nests. One instance of river otter depredation was also recorded. Coyote tracks indicated that multiple individual coyotes roamed the length of the island and had learned to prey on American Oystercatcher and tern nests. In fact, 12 coyote individuals were removed from SCB after the breeding season with a few still remaining after the trapping effort was complete in September. Coyote predation was limited to SCB in 2017 and was largely responsible for the record low nest success on the seashore. Raccoon predation accounted for 21 nest losses on NCB. Five instances of ghost crab depredation were also recorded. Table 9 shows the increased predation rate for the past three years since coyotes have become established on SCB. Coyotes are present on SB, but no known predation was recorded. This could be the result of only conducting nest checks twice weekly on SB. One nest on SB (SB 2) appeared to have been lost due to human disturbance over the busy weekend preceding Memorial Day. The nest site was approximately 20 feet from campers.


<table>
<thead>
<tr>
<th>Year</th>
<th>Total Nests</th>
<th>Nests Lost</th>
<th>Predation</th>
<th>Flooding /Storms</th>
<th>Human Disturbance</th>
<th>Abandoned</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>104</td>
<td>72</td>
<td>21 (29%)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>2014</td>
<td>87</td>
<td>49</td>
<td>15 (30%)</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>2015</td>
<td>112</td>
<td>75</td>
<td>41 (54%)</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>2016</td>
<td>121</td>
<td>104</td>
<td>68 (65%)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>2017</td>
<td>133</td>
<td>128</td>
<td>76 (59%)</td>
<td>16</td>
<td>1</td>
<td>7</td>
<td>33</td>
</tr>
</tbody>
</table>

Fledge success in the park was 0.0 chicks per nesting pair. Productivity in the seashore was the lowest in the past 14 years. Zero fledglings were produced. Though the number of fledglings was the lowest documented, the seashore matched the previous year’s record number of nesting pairs. The number of pairs is trending upward. MCB continues to show the highest concentration of oystercatcher pairs along the seashore at 3.4 pairs per mile (mile 18.85-22.7), while NCB (mile 0-18.85), SCB, and SB have approximately 1 pair per mile.
There were seven new breeding birds identified by their unique leg bands. Dark Green CAN, CHL, CFE, CRJ, YM, CMP and Red AHT were new nesters along the shoreline. All of these birds fledged from Cape Lookout in 2011-2013, except dark green CJR and CMP and Red AHT, and have since established their own breeding territories along the seashore. Dark Green CJR fledged from Wrightsville Beach, NC in 2013 and dark green CMP fledged from Hatteras Island, NC in 2014. Red AHT was banded in 2016 in Georgia while on the wintering grounds.

**Conclusions and Recommendations**

American oystercatcher productivity in 2017 was the lowest on record of the past 14 breeding seasons. Coyote predation on South Core Banks and raccoon predation on North Core Banks severely limited hatch success and chick survival. Productivity across all islands was lower in 2017 than in both 2004 and 2005, when chicks did not have the protection of vehicle free zones and vehicle chick mortality was documented. Predator management of coyotes and raccoons prior to the 2018 breeding season is recommended to prevent a long term population decline of these high quality breeding sites. First nesting attempt failures lead to multiple re-nesting attempts, which in turn increase the energy resources expended by breeding pairs, and can lengthen the breeding season. Successful first nesting attempts minimize the length of the breeding season as well as the staff work load; multiple nesting attempts equate to more nest sign maintenance, posting, and removal. Minimal field staffing levels of four, six-month Biological Science Technicians is recommended to monitor and manage American oystercatchers on the Core Banks. The long term banding effort of adults and chicks should continue. Banded individuals allow for the accurate monitoring of breeding birds and productivity.
Literature Cited


### APPENDIX 2A

**AMERICAN OYSTERCATCHER NESTS- NORTH CORE BANKS-2017**

<table>
<thead>
<tr>
<th>Nest #</th>
<th>Pair #</th>
<th>Adult Band</th>
<th>Adult Band</th>
<th>Mile</th>
<th>Found</th>
<th>Eggs</th>
<th>Closure</th>
<th>Comments (Abbreviated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>UNB</td>
<td>UNB</td>
<td>14.27</td>
<td>4/18/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- raccoon</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>DG(73)</td>
<td>DG(RR)</td>
<td>9.59</td>
<td>4/18/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- ghost crab</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>DG(CFX)</td>
<td>DG(CY)</td>
<td>3.82</td>
<td>4/18/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- Storm tide wash over</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>UNB</td>
<td>UNB</td>
<td>6.75</td>
<td>4/19/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- Storm tide wash over</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>DG(T3)</td>
<td>DG(CE1)</td>
<td>10.51</td>
<td>4/20/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- raccoon</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>UNB</td>
<td>UR-red</td>
<td>11.92</td>
<td>4/21/2017</td>
<td>1</td>
<td>600' buffer</td>
<td>FAILED- Storm tide wash over</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>DG(CCE)</td>
<td>UNB</td>
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<td>3</td>
<td>600' buffer</td>
<td>FAILED- Unknown cause for chick, Avian depredation for 2 eggs</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>DG(CE)</td>
<td>UNB</td>
<td>17.77</td>
<td>4/26/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- ghost crab</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>DG(CMP)</td>
<td>DG(F3)</td>
<td>5.77</td>
<td>4/26/2017</td>
<td>1</td>
<td>600' buffer</td>
<td>FAILED- abandoned, unknown cause</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>UNB</td>
<td>UL-orange, UR-black</td>
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<td>interior</td>
<td>FAILED- raccoon</td>
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<tr>
<td>11</td>
<td>11</td>
<td>DG(MO)</td>
<td>UNB</td>
<td>19.13</td>
<td>4/27/2017</td>
<td>1</td>
<td>interior</td>
<td>FAILED- abandoned, unknown cause</td>
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<tr>
<td>12</td>
<td>12</td>
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<td>UNB</td>
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<td>4/28/2017</td>
<td>3</td>
<td>interior</td>
<td>FAILED- raccoon</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>UNB</td>
<td>UNB</td>
<td>20.75</td>
<td>4/28/2017</td>
<td>1</td>
<td>none</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>Nest #</td>
<td>Pair #</td>
<td>Adult Band 1</td>
<td>Adult Band 2</td>
<td>Mile</td>
<td>Found</td>
<td>Eggs</td>
<td>Closure</td>
<td>Comments (Abbreviated)</td>
</tr>
<tr>
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<td>------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14</td>
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<td>UNB</td>
<td>6.52</td>
<td>4/30/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED- unknown cause</td>
</tr>
<tr>
<td>15</td>
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<td>5/1/2017</td>
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<tr>
<td>16</td>
<td>16</td>
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<td>UNB</td>
<td>19.77</td>
<td>5/3/2017</td>
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<td>none</td>
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</tr>
<tr>
<td>17</td>
<td>17</td>
<td>DG(TF)</td>
<td>UNB</td>
<td>21.76</td>
<td>5/3/2017</td>
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<td>interior</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>DG(T6)</td>
<td>UNB</td>
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<td>5/4/2017</td>
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<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
<td>DG(73)</td>
<td>DG(RR)</td>
<td>9.28</td>
<td>5/6/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED-ghost crab</td>
</tr>
<tr>
<td>20</td>
<td>3</td>
<td>DG(CFX)</td>
<td>DG(CY)</td>
<td>3.25</td>
<td>5/6/2017</td>
<td>2</td>
<td>interior</td>
<td>FAILED-ghost crab</td>
</tr>
<tr>
<td>21</td>
<td>8</td>
<td>DG(CE)</td>
<td>UNB</td>
<td>18.18</td>
<td>5/9/2017</td>
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<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>22</td>
<td>19</td>
<td>DG(CFL)</td>
<td>DG(TN)</td>
<td>18.94</td>
<td>5/9/2017</td>
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<td>interior</td>
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</tr>
<tr>
<td>23</td>
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<td>UNB</td>
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<td>5/9/2017</td>
<td>1</td>
<td>none</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>24</td>
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<td>UNB</td>
<td>20.84</td>
<td>5/9/2017</td>
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<td>none</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>DG(CE1)</td>
<td>DG(T3)</td>
<td>10.73</td>
<td>5/10/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED-unknown; 1 chick dead in nest cup, 2 chicks survived until 6/28 at day 19</td>
</tr>
<tr>
<td>26</td>
<td>20</td>
<td>UNB</td>
<td>UNB</td>
<td>10.2</td>
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<tr>
<td>27</td>
<td>9</td>
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<td>DG(F3)</td>
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</tr>
<tr>
<td>Nest #</td>
<td>Pair #</td>
<td>Adult Band</td>
<td>Adult Band</td>
<td>Mile</td>
<td>Found</td>
<td>Eggs</td>
<td>Closure</td>
<td>Comments (Abbreviated)</td>
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<td>------</td>
<td>---------</td>
<td>------------------------</td>
</tr>
<tr>
<td>28</td>
<td>6</td>
<td>UR-red</td>
<td>UNB</td>
<td>12.75</td>
<td>5/10/2017</td>
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<td>FAILED-raccoon</td>
</tr>
<tr>
<td>29</td>
<td>21</td>
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<td>DG(W5)</td>
<td>10.34</td>
<td>5/11/2017</td>
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<td>FAILED-unknown cause, 2 chicks lost, 1 chick survived until 7/4 at day 28</td>
</tr>
<tr>
<td>30</td>
<td>14</td>
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<td>UNB</td>
<td>6.11</td>
<td>5/13/2017</td>
<td>3</td>
<td>600' buffer</td>
<td>FAILED-unknown; 2 eggs abandoned, 1 chick hatched and was lost on day 2</td>
</tr>
<tr>
<td>31</td>
<td>22</td>
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<td>UNB</td>
<td>0.35</td>
<td>5/15/2017</td>
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<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>32</td>
<td>23</td>
<td>DG(M8)</td>
<td>UNB</td>
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<td>5/16/2017</td>
<td>3</td>
<td>none</td>
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</tr>
<tr>
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<td>UNB</td>
<td>22.65</td>
<td>5/16/2017</td>
<td>3</td>
<td>interior</td>
<td>FAILED-unknown</td>
</tr>
<tr>
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<td>1</td>
<td>UNB</td>
<td>UNB</td>
<td>14.35</td>
<td>5/19/2017</td>
<td>2</td>
<td>600' buffer</td>
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</tr>
<tr>
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<td>DG(CFX)</td>
<td>DG(CY)</td>
<td>3.26</td>
<td>5/21/2017</td>
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<tr>
<td>37</td>
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<td>UNB</td>
<td>22.54</td>
<td>5/27/2017</td>
<td>2</td>
<td>interior</td>
<td>FAILED-unknown</td>
</tr>
<tr>
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<td>UNB</td>
<td>19.1</td>
<td>5/27/2017</td>
<td>1</td>
<td>interior</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>39</td>
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<td>UNB</td>
<td>UNB</td>
<td>21.18</td>
<td>5/27/2017</td>
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</tr>
<tr>
<td>40</td>
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<td>UNB</td>
<td>19.14</td>
<td>5/27/2017</td>
<td>2</td>
<td>interior</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>41</td>
<td>17</td>
<td>DG(TF)</td>
<td>UNB</td>
<td>21.79</td>
<td>5/29/2017</td>
<td>3</td>
<td>none</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>Nest #</td>
<td>Pair #</td>
<td>Adult Band</td>
<td>Adult Band</td>
<td>Mile</td>
<td>Found</td>
<td>Eggs</td>
<td>Closure</td>
<td>Comments (Abbreviated)</td>
</tr>
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<tr>
<td>42</td>
<td>13</td>
<td>UNB</td>
<td>UNB</td>
<td>20.88</td>
<td>5/29/2017</td>
<td>2</td>
<td>none</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>43</td>
<td>8</td>
<td>DG(CE)</td>
<td>UNB</td>
<td>17.39</td>
<td>5/30/2017</td>
<td>2</td>
<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
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<td>9</td>
<td>DG(CMP)</td>
<td>DG(F3)</td>
<td>5.81</td>
<td>6/1/2017</td>
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<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>45</td>
<td>1</td>
<td>UNB</td>
<td>UNB</td>
<td>14.25</td>
<td>6/5/2017</td>
<td>2</td>
<td>600' buffer</td>
<td>FAILED-unknown</td>
</tr>
<tr>
<td>46</td>
<td>4</td>
<td>UNB</td>
<td>UNB</td>
<td>6.8</td>
<td>6/7/2017</td>
<td>2</td>
<td>600' buffer</td>
<td>FAILED-raccoon</td>
</tr>
<tr>
<td>47</td>
<td>2</td>
<td>DG(73)</td>
<td>DG(RR)</td>
<td>9.2</td>
<td>6/9/2017</td>
<td>3</td>
<td>600' buffer</td>
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</tr>
<tr>
<td>48</td>
<td>28</td>
<td>UNB</td>
<td>UNK</td>
<td>2.81</td>
<td>6/9/2017</td>
<td>1</td>
<td>interior</td>
<td>FAILED-ghost crab</td>
</tr>
<tr>
<td>49</td>
<td>3</td>
<td>DG(CFX)</td>
<td>DG(CY)</td>
<td>3.78</td>
<td>6/9/2017</td>
<td>3</td>
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<td>UNK</td>
<td>UNK</td>
<td>18.89</td>
<td>6/10/2017</td>
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30 nesting pairs, 56 nests, 5 nests hatched, 0 chicks fledged
## APPENDIX 2B  AMERICAN OYSTERCATCHER NESTS- SOUTH CORE BANKS-2017

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<td>66</td>
<td>20</td>
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<td>67</td>
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<td>68</td>
<td>14</td>
<td>DG(KO) UNB</td>
<td>DG(KO) UNB</td>
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<tr>
<td>69</td>
<td>29</td>
<td>DG(CP) UNB</td>
<td>DG(CP) UNB</td>
<td>44.74</td>
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<td>Failed- Coyote</td>
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34 nesting pairs, 69 nests, 0 nests hatched, 0 chicks fledged
<table>
<thead>
<tr>
<th>Nest #</th>
<th>Pair #</th>
<th>Adult Bands</th>
<th>Adult Bands</th>
<th>Mile</th>
<th>Found</th>
<th>Eggs</th>
<th>Closure</th>
<th>Comments (Abbreviated)</th>
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<tbody>
<tr>
<td>1</td>
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<td>UNB</td>
<td>UNB</td>
<td>49.88</td>
<td>5/11/2017</td>
<td>3</td>
<td>none</td>
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<td>UNB</td>
<td>48.8</td>
<td>5/11/2017</td>
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<td>Bird Incubating with campers at 20 feet away on 5/19. Nest loss after campers with fire pit at nest site from Memorial Day weekend.</td>
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<tr>
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<td>coyote tracks/predation</td>
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<td>Nest failed 11 days after expected hatch date</td>
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<tr>
<td>8</td>
<td>4</td>
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<td>none</td>
<td>Unknown nest loss</td>
</tr>
</tbody>
</table>

6 nesting pairs, 8 nests, 0 nests hatched, 0 chick fledged