

**CAPE HATTERAS NATIONAL SEASHORE  
MARINE MAMMAL STRANDINGS  
2014 SUMMARY**



National Park Service  
1401 National Park Drive  
Manteo, NC 27954

## **ABSTRACT**

Cape Hatteras National Seashore (CAHA) experiences high numbers of marine mammal strandings each year, this includes cetaceans (whales, dolphins, and porpoises), pinnipeds (seals), and sirenians (manatees). An average number of stranded marine mammals were documented during 2014, including a multitude of species. The overall count of 58 individuals included a high-end Bottlenose dolphin (*Tursiops truncatus*) count – a result of the lingering outbreak of morbillivirus. The majority of strandings occurred in Hatteras Island and 7 total animals stranded live (6 euthanized). Given its location on the Outer banks, CAHA continues to be the most likely location of marine mammal strandings; accounting for 60% of all animals on the Outer Banks and 34% of all North Carolina strandings. Four Military Training Exercise events were reported in 2014 corresponding with 6 stranded animals. The active stranding year reinforced the seashore's 14-year average of about 60 stranding events.

## **INTRODUCTION**

The Outer Banks of North Carolina, known for history, hurricanes, and shipwrecks also happen to be a hotspot for marine mammal activity. Recorded strandings date back to 1884, so it can be argued that the Outer Banks has the longest running record of marine mammal strandings in the U.S. Thusly, CAHA is a melting pot of species diversity when it comes to marine mammal strandings – given its location on the Outer Banks. The seashore is comprised of barrier island chains that extend into the Atlantic Ocean and come in very close proximity to the continental shelf, and for this reason a large number of strandings occur within park boundaries. At any given time, a wide arrangement of marine mammals move-about and feed very close to CAHA beaches, influenced chiefly by the southern Gulf Stream and the northern Labrador Current colliding off our coast.

The seashore has encountered a vast diversity of stranded species as well as few common species that strand more frequently. This includes a resident bottlenose dolphin population that relies utterly on our coastal environment; long-living individuals can exceed ages of >50 years. One factor affecting this stranding species variation is water temperature. The surrounding water temperatures can vary considerably; warmer temps bringing southern species closer and colder temps bringing northern species closer to CAHA. Ultimately, the large numbers of marine mammals are sometimes coupled with outside factors such as intense fishery actions, strong hurricanes and Nor'easters, active Military Training Exercises, or even zoonosis, leading to high stranding numbers of both live and dead animals.

## **METHODS**

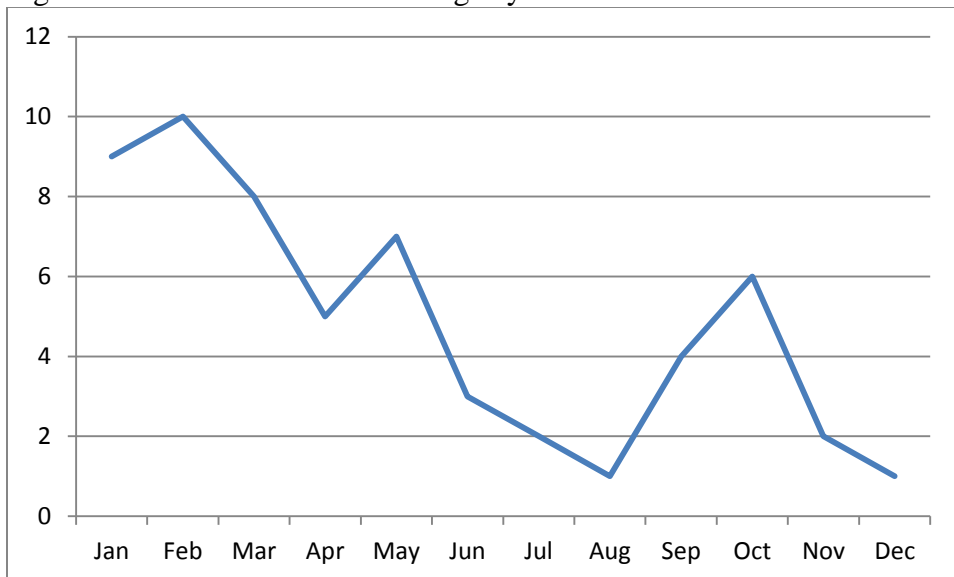
National Park Service (NPS) technicians respond to live and dead marine mammals in CAHA by patrolling the beach regularly using UTV's or 4x4 trucks and conducting walkthroughs on the Pamlico sound side of the islands during fall, winter, and spring. Also, technicians receive and act-upon many strandings reported by the general public. This also includes reports from members of the Outer Banks Marine Mammal Stranding Network (OBXMMSN), which includes the NPS. The network is comprised of three organizations; the National Park Service, the North Carolina Wildlife Resources Commission, and the North Carolina Aquarium on Roanoke Island.

Collectively, there is potential for any member of the OBXMMSN to assist with any live or dead stranding and/or necropsy event. Given the condition of the animal (generally fresh dead or moderate decomposition), a necropsy will be conducted with the goal of determining cause of death. Various samples are taken from each animal and are eventually transferred to scholastic labs where they are used for multiple graduate research projects and potential publications. In the event of an animal stranding alive, thorough consultations are made via telephone with the appropriate veterinarian, a NOAA representative, and the State of NC Stranding Coordinator before any further action is taken. Generally, due to the animal's poor condition and the lack of rehabilitation facilities, the outcome is chemical euthanasia. Euthanasia procedures are readily performed by trained CAHA technicians or collegiate staff in cases of live large-whale strandings (e.g. humpback or sperm whales). Participating colleges that receive samples from CAHA and assist with large-whale strandings include the University of North Carolina-Wilmington and North Carolina State University.

## RESULTS AND DISCUSSION

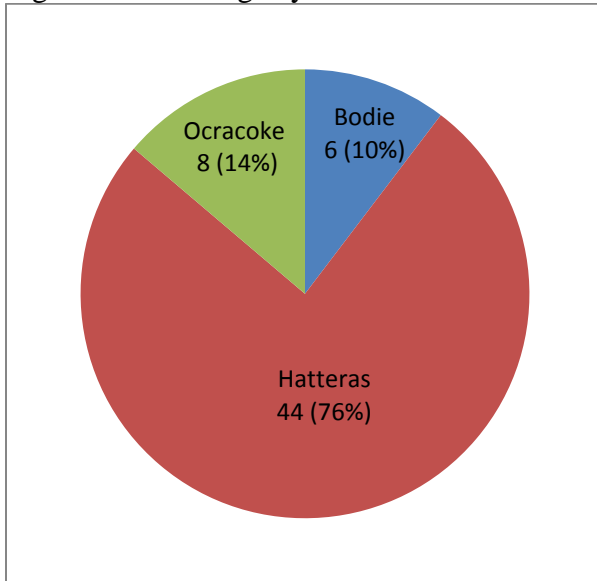
There can be great variation in monthly stranding events at CAHA but the general pattern suggests that the fall/spring months bring in the most animals. During this time the ocean temperatures are lower and more species have been observed via aerial flights foraging near the outer banks as well as the Gulf Stream. Also, the apex of bottlenose dolphin (*Tt*) calving season occurs in spring and early summer, thus an increase of *Tt* neonates usually occurs at this time. Generally, 1-2 months of the year are stranding-free, but this was not so in 2014 (Figure 1). The first quarter of the year saw the most strandings (8-10 animals), and eventually the pattern tapered to fewer animals by December (1-6 animals).

Figure 1. Marine mammal strandings by month in 2014.



Given its size and characteristic protrusion near the Gulf Stream, Hatteras Island typically encounters the most marine mammal strandings (Figure 2). Both Bodie and Ocracoke Islands showed average stranding numbers and accounted for one-quarter of this year's animals.

Figure 2. Strandings by island at CAHA in 2014.



The condition in which an animal arrives on the beach determines the level of data collection and sampling that follows. Only 21% of stranded marine mammals experienced advanced stages of decomposition in 2014 (Figure 3). This is fortunate in that more advanced sampling (histological, genetic, pathological, clinical, life history) was conducted with the remaining animals thereby giving further insight into cause of death. Of the seven animals (12%) that stranded alive, six were successfully euthanized while one case involved a bottlenose dolphin that died naturally. The dolphin beached, then was pushed back out by the public, and re-stranded dead. The euthanized animals include three common dolphins (*Dd*), two bottlenose dolphins (*Tt*), and one striped dolphin (*Sc*). Two animals were documented with Unknown initial condition codes. One was a bottlenose dolphin (CAHA 230) that was observed by the public on the sound side but was not reported until several days later, while a similar case occurred on Cape Point with another *Tt* (CAHA 246).

Figure 3. Condition codes of marine mammal strandings.

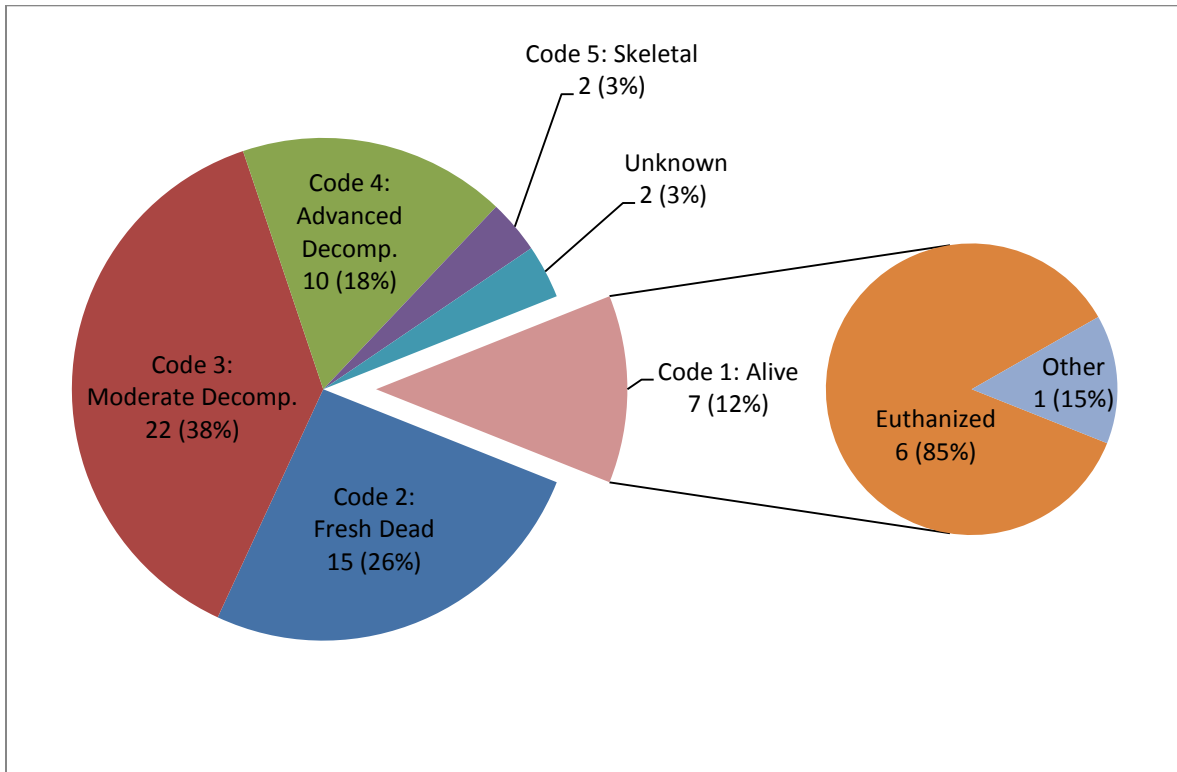
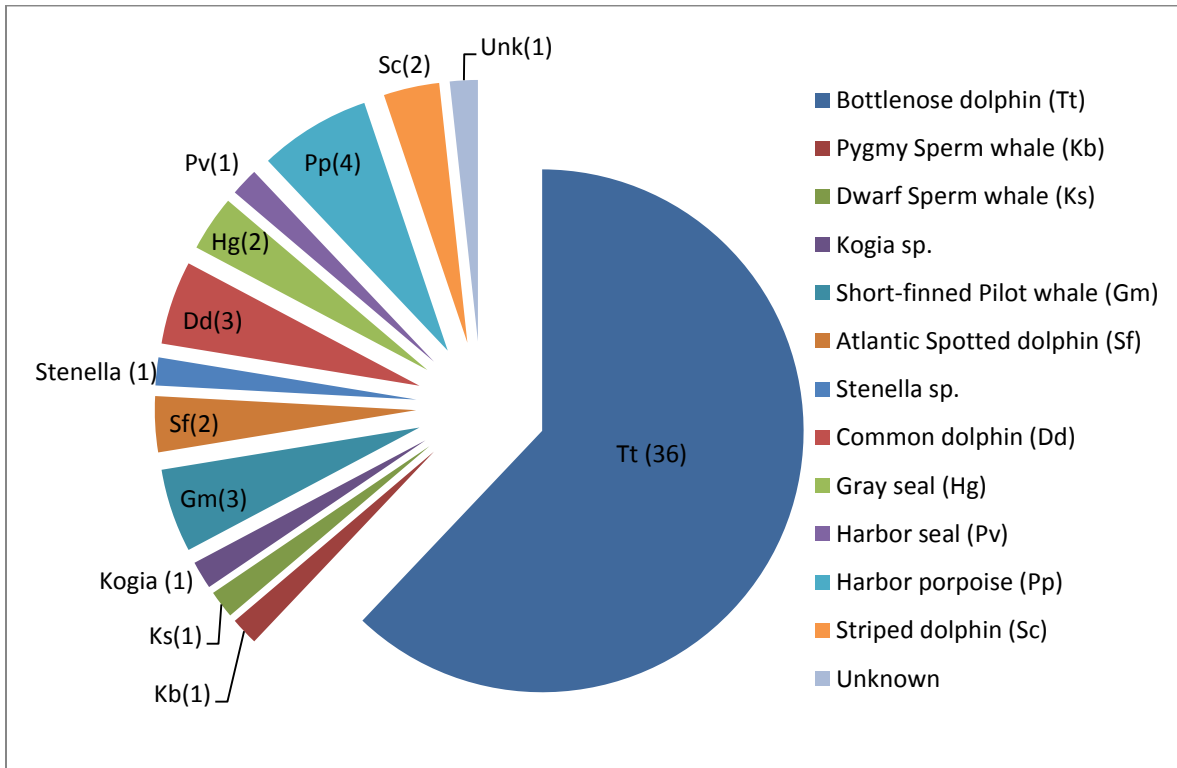


Figure 4. Species diversity of strandings at CAHA during 2014.



An assortment of marine mammals was observed during 2014, the 10 distinct species (Figure 4) is an average number for CAHA but has varied previously from 6-14 species. One yearly trend that remains unchanged is the abundant presence of stranded Bottlenose dolphins; nearly two-thirds of 2014 animals were *Tt* and this may still be attributed to morbillivirus as 36 individuals is still on the higher end. Although the stranding numbers are not as intense, the virus was still sporadically detected. Three pinnepeds were documented in the winter/spring months, one Harbor seal (Code 2) and two Gray seals (Code 4). No large-whale cases were documented, which is somewhat unusual given the seashore has averaged 2 per year over a 7-year period.

Figure 5. Comparison of 2014 CAHA strandings to the rest of Outer Banks.

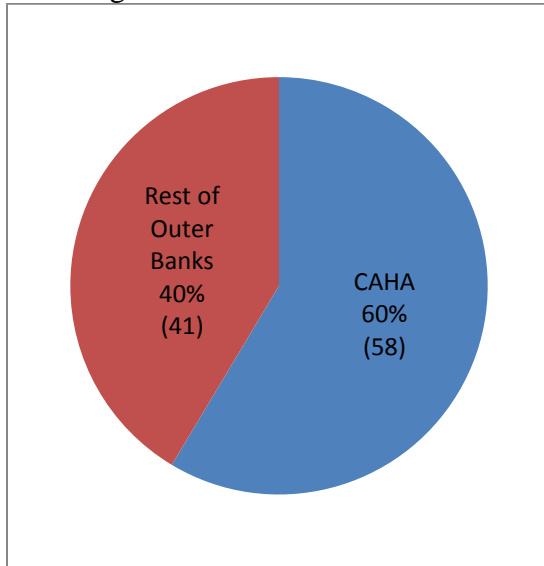
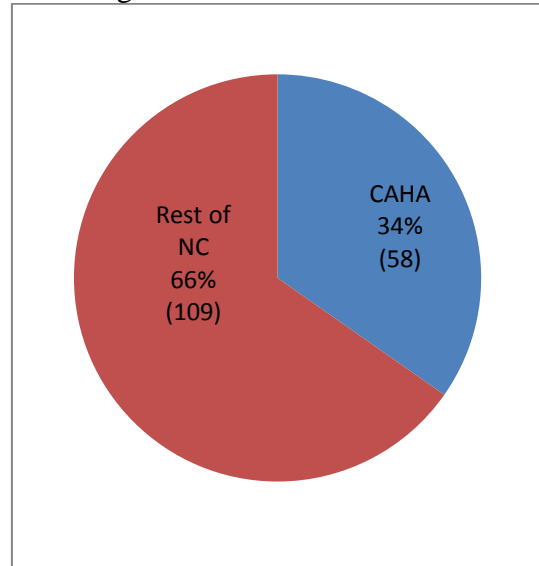


Figure 6. Comparison of 2014 CAHA strandings to the rest of North Carolina.



The marine mammal strandings documented by CAHA in 2014 encompassed the majority of total strandings documented on the outer banks as well as one-third of total North Carolina strandings (Figure 5 and Figure 6). Human Interaction (HI) is one common element that is observed on a yearly basis among strandings, whether or not HI was the cause of death remains debatable. Of the total 58 stranded animals in 2014, two of them (3%) showed signs of HI. This low park percentage is favorable but is not indicative of overall negative effects humans have had on marine mammals during 2014. Both cases of HI involved bottlenose dolphins and were fisheries related. One *Tt* (CAHA 232) had healed and matching line wraps at the left and right gapes of the mouth (tissues were enflamed/infected) and there were healed linear scars (wraps) at the insertion of both pectoral flippers. The second *Tt* (CAHA 275) had multiple line impressions on all appendages including the rostrum/mandible and light to moderate load of lungworm.

## Unusual Mortality Event (UME)

The morbillivirus strain has continued to impact bottlenose dolphin mortality at CAHA through 2014. Fortunately, the total *Tt* numbers were much fewer than the previous year; nearly half. Though, a total of 36 *Tt* is still on the high end for the seashore (Figure 7). The current UME has produced nearly double the *Tt* strandings as the similar 1987 event with Virginia documenting the most animals (Figure 8). A total of 1,597 *Tt* have stranded from 1 July 2013 through 30 November 2014. Currently, there is no indication of when the UME will be declared “done” by NOAA as positive individuals continue to strand sporadically on the east coast; reaching the southern extremities of the Florida Keys. According to the University of California (Davis), our most recent *Tt* that tested positive for dolphin morbillivirus was CAHA 260; a stranding that occurred on 10 May 2014 (Appendix A).

Figure 7. Historic counts of *Tt* strandings at CAHA.

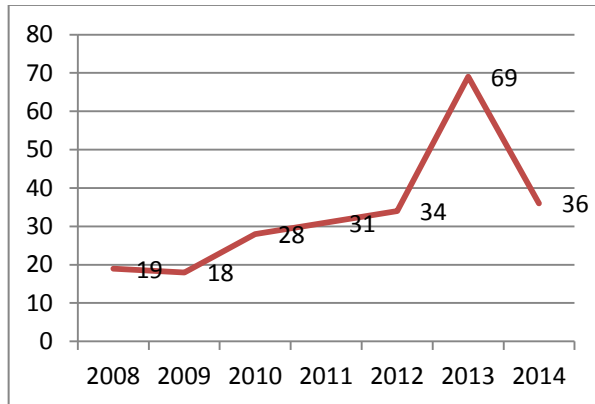
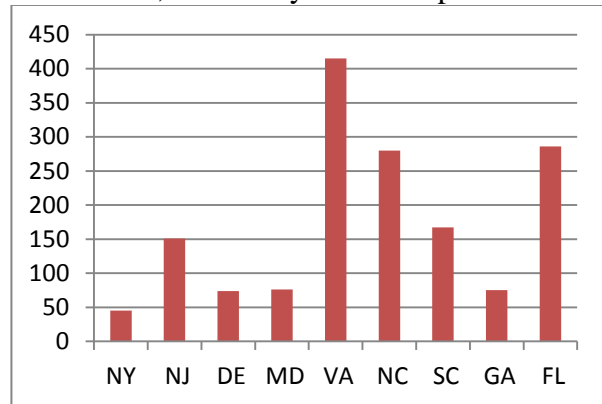


Figure 8. Observed *Tt* Strandings during 2013-2014 UME; A state-by-state comparison.



## Live Seal Sightings

When ocean temperatures plummet during the winter and spring months, seal sightings are a common occurrence. Coming from the north, the seals migrate along the Outer Banks coast following the colder water while feeding. They will haul-out onto the beach to rest and this point they become a documentable occurrence. The seals are generally healthy and strict monitoring protocols are followed to safely observe the seal at a distance so as not to change its behavior. If an abnormality is observed (e.g. poor health, entanglement, broken appendage, open wounds), only then is intervention acceptable. A capture and rehabilitation plan is devised and implemented by OBXMMSN members.

During the first four months of the year, two species of seals were documented on the shores of CAHA for a combined total of 14 separate sightings (Appendix B: Map 5-7). Generally, the most common seal observed at CAHA is the Harbor seal (*Phoca vitulina*); thirteen individuals were observed. The Gray (*Halichoerus grypus*) seals are less common to this area yet two individuals were observed on multiple occasions; Harp (*Pagophilus groenlandica*) seals were not observed as these tend to arrive during coldest ocean temps. Only two unidentified seals were observed. Four sightings occurred on Bodie Island, three on Green Island, six on Hatteras Island, and one on Ocracoke; monthly, this can be summarized as three in January, three in February, four in

March, and four in April. The south end of Green Island has been used by Harbor seals as a haul-out site for multiple years, therefore a sighting doesn't necessarily imply one individual; the most observed at one time in 2014 was four but up to 33 seals have previously been observed. Dredging and bridge-building equipment was present at Oregon Inlet for a 2<sup>nd</sup> consecutive year, which is 0.4 miles from the Green Island haul-out site. The vast equipment and noise within the 0.3-mile-wide inlet may have discouraged seals from utilizing the island.

### **Atlantic Fleet Training and Testing (AFTT)**

Many varieties of Military Training Exercises (MTE) occur on a yearly basis along the east coast from Virginia to Florida; some include sonar. There is experimental evidence suggesting that anthropogenic sonar disorients and causes harm to marine mammals. The OBXMMSN is notified prior to these exercises and given special instructions if unusual strandings should occur during the MTE. In the case of single strands, NOAA personnel must be notified by text/email but an immediate pager is available in case of emergencies i.e. live strandings, large whale, beaked whale, and multiple (mass) strandings. Overall, CAHA documented six stranding events that occurred during AFTT events (Table 1), all of which were bottlenose dolphins. One animal stranded alive but reasons for stranding were inconclusive for all six individuals.

Table 1. Actual AFTT Events and Corresponding Strandings in 2014.

	<b>2014 MTE Durations and Strandings</b>			
<b>MTE</b>	MTE 1	MTE 2	MTE 3	MTE 4
<b>Duration</b>	8/23 - 8/28	9/6 - 9/8	10/6 - 10/28	10/29 - 11/10
<b># Strandings</b>	1	0	4	1

On a related note, the Lamont-Doherty Earth Observatory and the National Science Foundation engaged in seismic surveys off the coast of NC (CAHA) from 15 September to 31 October. The surveys extended from the NC coast out to deeper water. The project included mitigation strategies if marine mammals were spotted in the area of survey. While seismic surveys can have severely negative impacts on marine mammals, no strandings occurred during this period that could be associated with the surveys.

### **Historical Data**

The observed data suggests that CAHA is a major contributor to the overall stranding numbers of the Outer Banks and the state of North Carolina (Figure 9 and Figure 10). Strandings at CAHA account for an average 60 individual animals per year from 2008-2014, while also averaging one-half of all strandings on the Outer Banks during this period and one-third of North Carolina's total strandings.



Figure 9. Stranding history at CAHA compared to the rest of the Outer Banks.

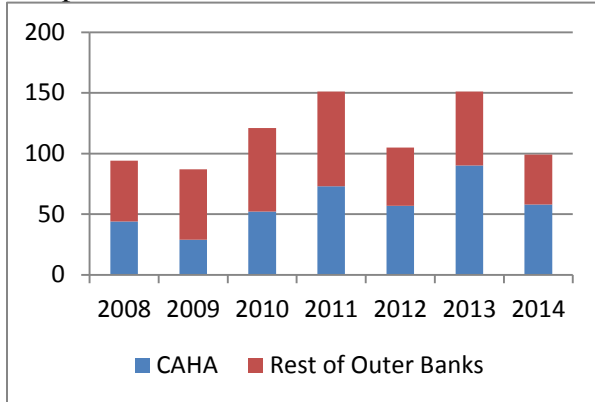
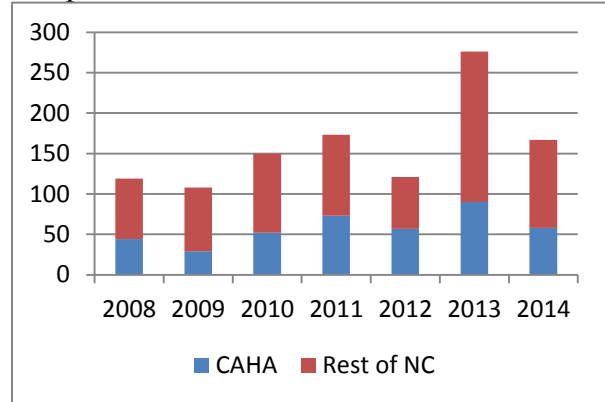
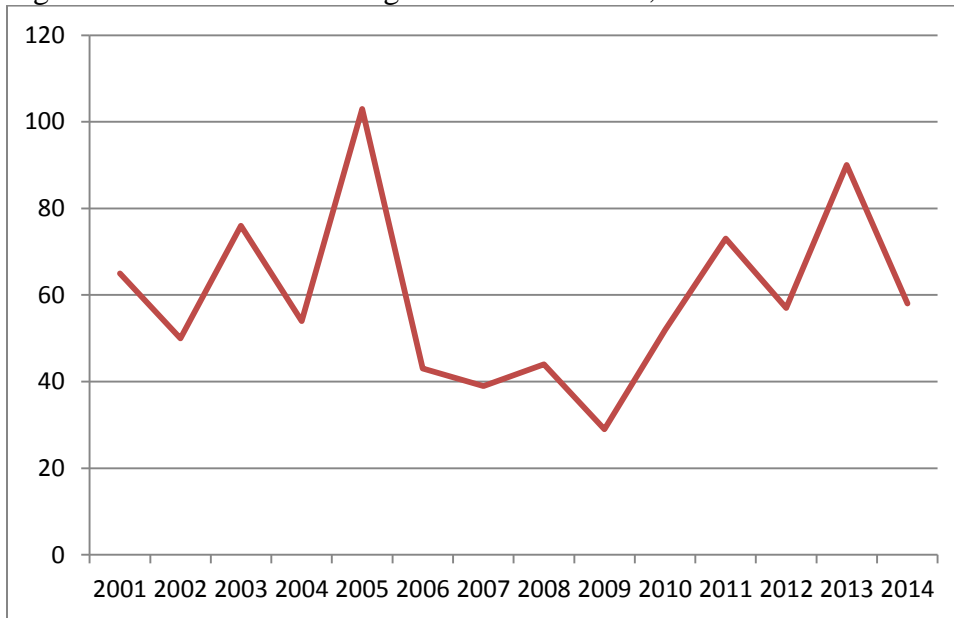


Figure 10. Stranding history at CAHA compared to the rest of North Carolina.



In a 14-year period (Figure 11), it is probable that the trend of generally high stranding numbers will continue with time so long as the geographical characteristics of the seashore remain the same. The average number of strandings over this period is 60 animals per year. Coincidentally, the two years with the highest strand number (2005 and 2013) both endured extreme situations that contributed to such high numbers; in 2005 the mass stranding event on Bodie spit of Short-finned Pilot whales (*Gm*) produced an additional 31 animals while the recent *Tt* morbillivirus outbreak is also evident.

Figure 11. Historical stranding numbers at CAHA, 2001-2014.



## **APPENDICES**

### **APPENDIX A: UNIVERSITY OF CALIFORNIA (DAVIS) MORBILLIVIRUS LAB RESULTS (SAMPLE)**

### **APPENDIX B: MAPS**

Map 1: Bodie Island Marine Mammal Strandings, 2014

Map 2: North Hatteras Island Marine Mammal Strandings, 2014

Map 3: South Hatteras Island Marine Mammal Strandings, 2014

Map 4: Ocracoke Island Marine Mammal Strandings, 2014

Map 5: Bodie Island and Green Island Seal Sightings, 2014

Map 6: North Hatteras Island Seal Sightings, 2014

Map 7: South Hatteras Island Seal Sightings, 2014

## APPENDIX A: UNIVERSITY OF CALIFORNIA (DAVIS) MORBILLIVIRUS LAB RESULTS (SAMPLE)

UNIVERSITY OF CALIFORNIA, DAVIS

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18 October 2014

### UC Davis Marine Ecosystem Health Diagnostic & Surveillance Laboratory

Client: Dr. T. Rowles, NMFS-OPR and A. Pabst, University of North Carolina Wilmington UNCW

Final Report

Viral Family/Genus PCR results:

Animal ID	Age	Sex	Species	Sample Date	Sample type	Pan Morbilli
CAHA260	Subadult	F	Tursiops truncatus	05/10/14	Lung	Dolphin morbillivirus
CAHA260	Subadult	F	Tursiops truncatus	05/10/14	Spinal cord	Dolphin morbillivirus
KLC212	Adult	M	Kogia breviceps	10/01/14	Spinal cord	Negative
CAHA271	Adult	M	Tursiops truncatus	09/11/14	Lung	Negative
CAHA271	Adult	M	Tursiops truncatus	09/11/14	Spinal cord	Negative
KLC207					Lung lymph node	Negative

Negative = no viral nucleic acid detected

Positive = viral nucleic acid detected

Inconclusive = no amplifiable nucleic acid in the samples

Comment:

Amplifiable RNA was obtained from all samples for analysis. PCR products of the expected size were amplified in the lung and spinal cord from the samples from CAHA260, but not in any of the samples from KLC212, CAHA271 or KLC207 using the Pan- morbilliviral assay.

Sequencing of the PCR products from the Pan-morbillivirus PCR confirmed the presence of Dolphin morbillivirus (Genbank accession no. AJ608288, KC572861) in the samples from CAHA260.

Morbillivirus testing was performed using the universal morbillivirus primers directed against the phosphoprotein (P) gene (Barret *et al.* 1993).



CAHA 260: An emaciated Bottlenose dolphin that is the latest morbillivirus case to strand at CAHA. Also notable is the heavy barnacle load and multiple pox/lesions.

Photo: NPS Staff

## **APPENDIX B: MAPS**

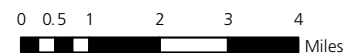


# Map 1: Bodie Island Marine Mammal Strandings, 2014





## Map 2: North Hatteras Island Marine Mammal Strandings, 2014





# Map 3: South Hatteras Island Marine Mammal Strandings, 2014





# Map 4: Ocracoke Island Marine Mammal Strandings, 2014



### 2014 Marine Mammal Strandings

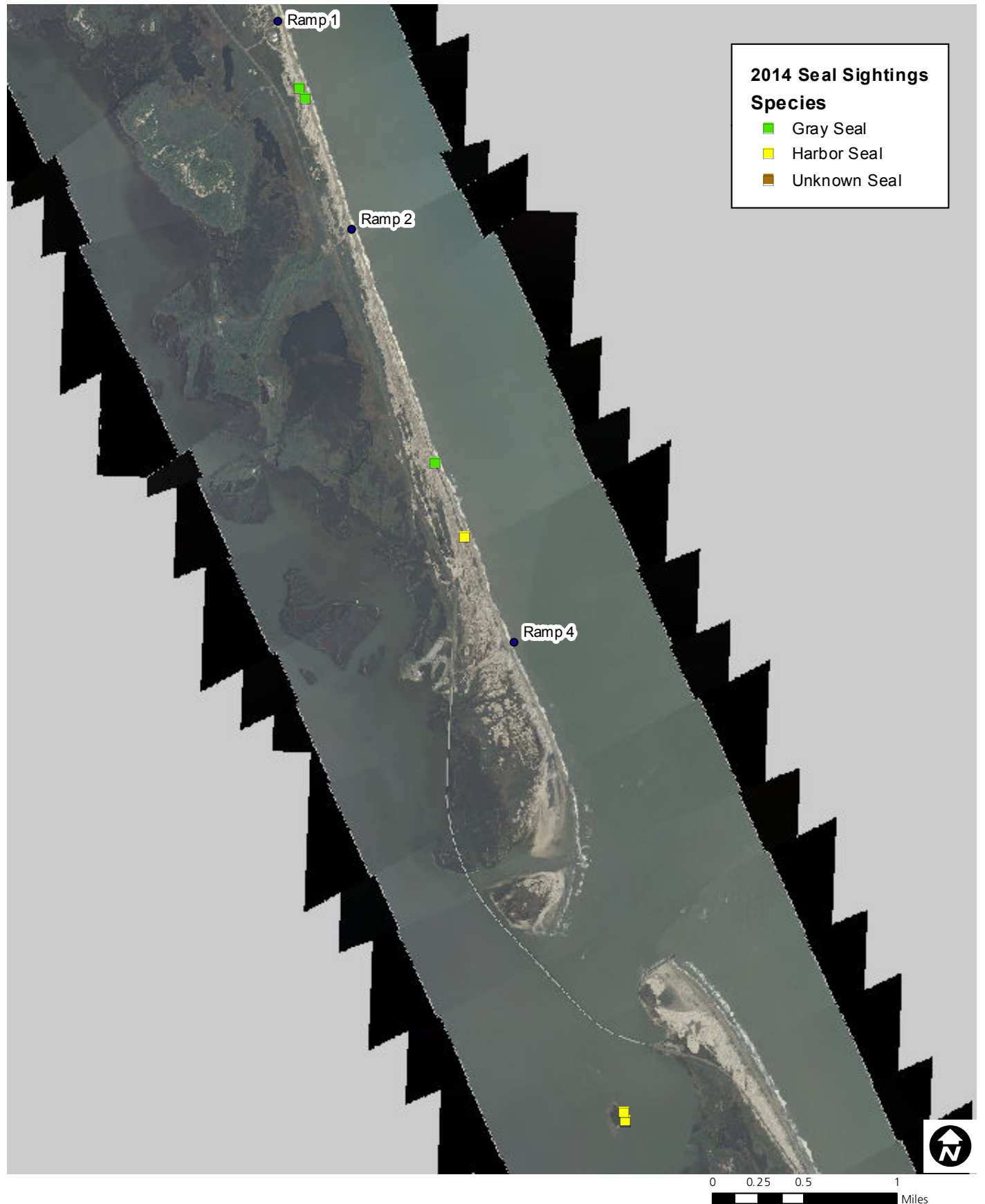
#### Species

- Atlantic Spotted Dolphin
- Bottlenose Dolphin
- Common Dolphin
- Dwarf Sperm Whale
- Gray Seal
- Harbor Porpoise
- Harbor Seal
- Kogia sp.
- Pygmy Sperm Whale
- Short-finned Pilot Whale
- Stenella sp.
- Striped Dolphin
- Unidentified dolphin



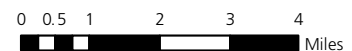


## Map 5: Bodie & Green Islands Seal Sightings, 2014





## Map 6: North Hatteras Island Seal Sightings, 2014





# Map 7: South Hatteras Island Seal Sightings, 2014

